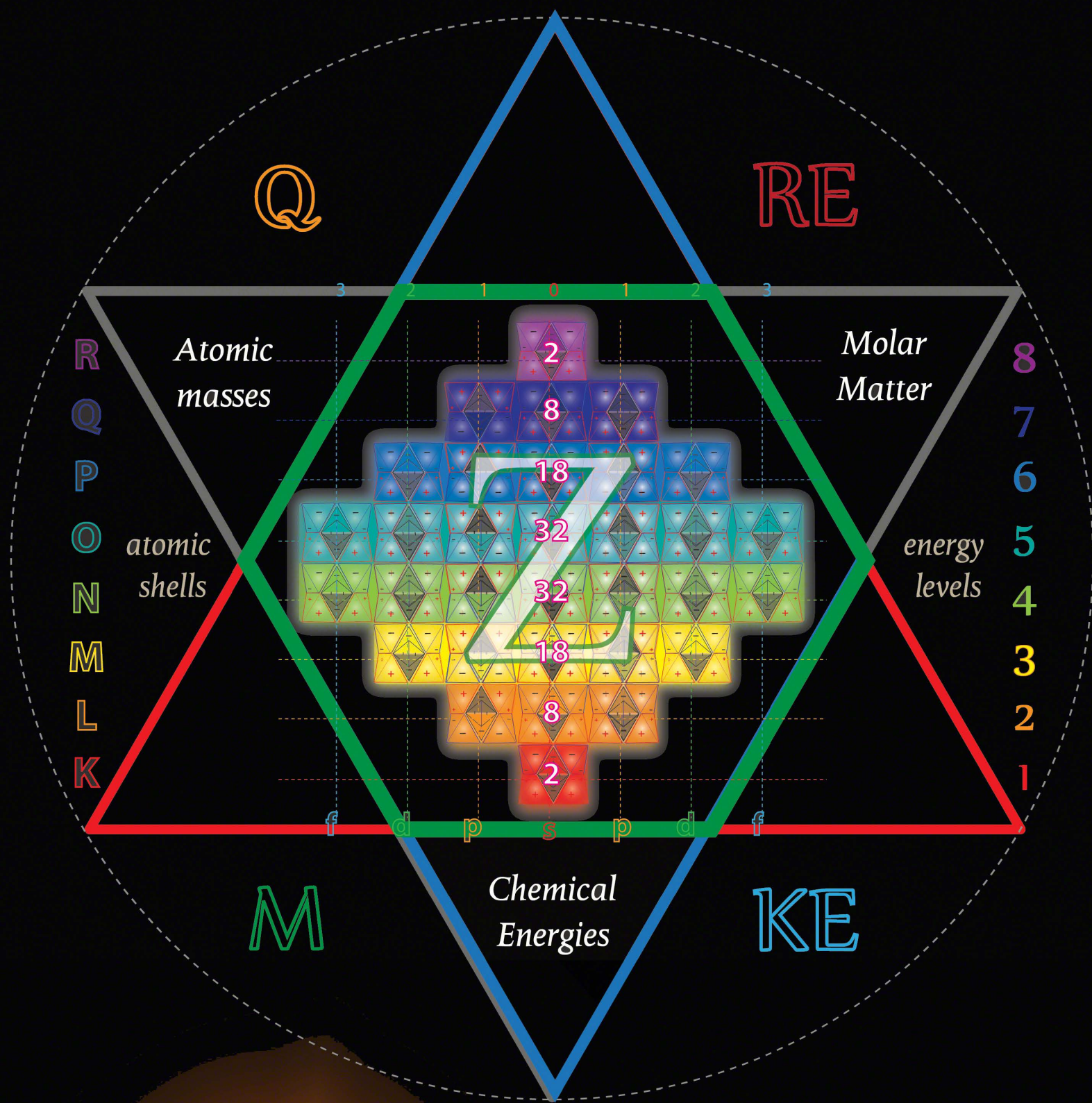


TETRYONICS

The charged topology of periodic & compound Matter

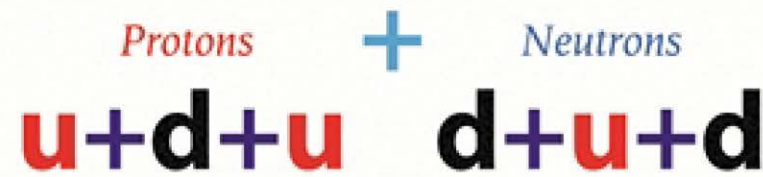


Foundational Quantum Chemistry

Abraham

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[Second Edition © 2012]

Tetryonics 41.00 - Tetryonic Chemistry



Residual Electro-Magnetic Forces

allow Neutrons and Protons to attract via the opposite Electric charge points created by their constituent Quarks in order to create Elementary Nuclei

All electrons, quarks and Baryons are made up of $4n+$ (Tetryonic) standing-wave EM fields.

As well as having nett Tetryonic charged topologies ranging between $[+24] \sim [-12]$ they all posses distinct ELECTRIC FIELDS that are concentrated in 3 apex points as indicated in the illustrations

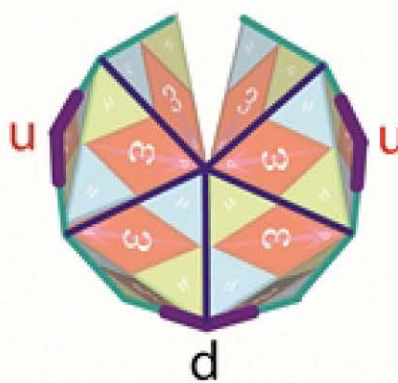
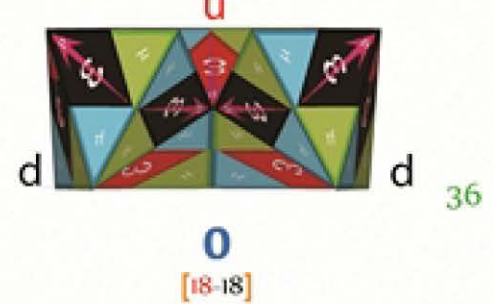
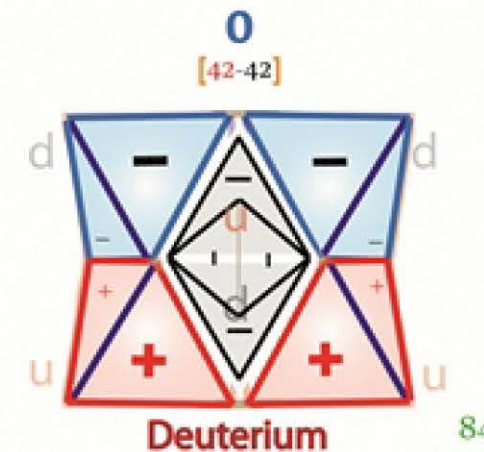
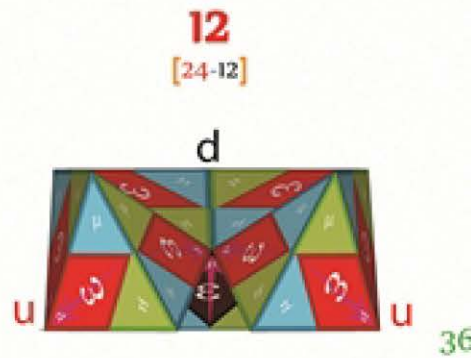
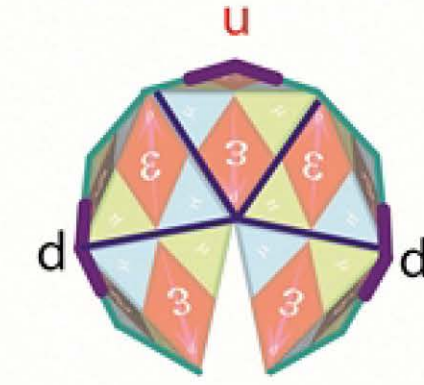
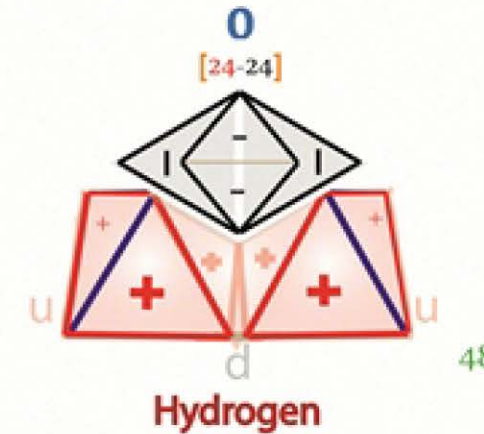
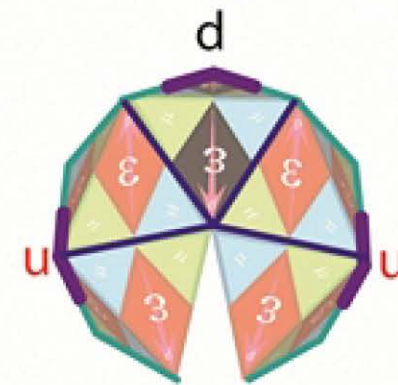
These points result from the orientation of Electric apices and orthogonal Magnetic dipole field edges that make up each particle's externalised EM fields.

The Positive and Negative electric apex points, obey the Law of Interaction forcing separated nuclei to combine due to their individual nett Tetryonic charges and provide a means of orienting nuclei to each other to create larger particles [elements, allotropes and compounds]

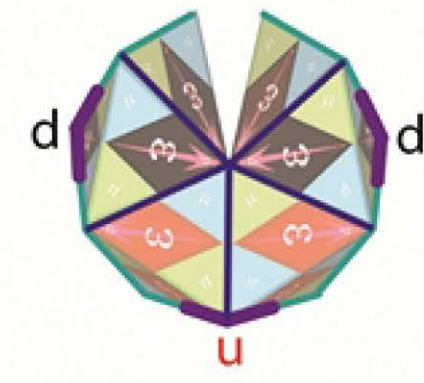
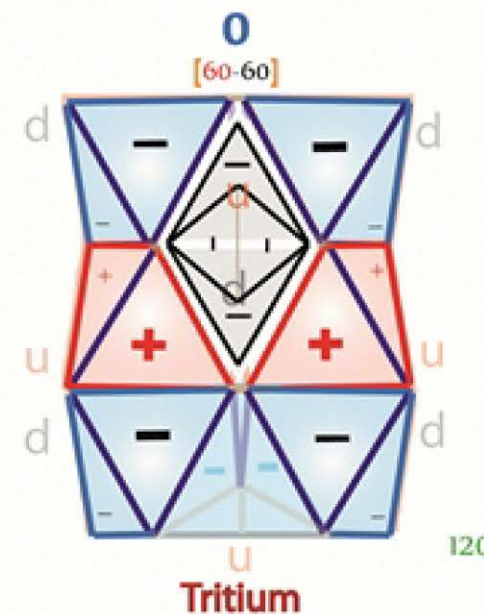
External Magnetic (H) fields can interact with the integral magnetic (B) dipoles of Tetryonic particles forcing them to orientate in specific directions to facilitate chemical bonding [nuclear forces]

Additionally, external Electric fields can interact with the integral electric fields attracting or repelling them depending on the polarity of the external electric field [Electrostatics]

External energies can be induced into these integral EM fields via inductive coupling or the absorption of spectral photons in turn leading to an increase in the strengthes of the integral EM apices in turn increasing the Strong Nuclear Force.



The Strong Nuclear force binds Matter together



The orientation of the component Electric fields within 3D Matter creates macroscopic force apices via externalised 'E-points'

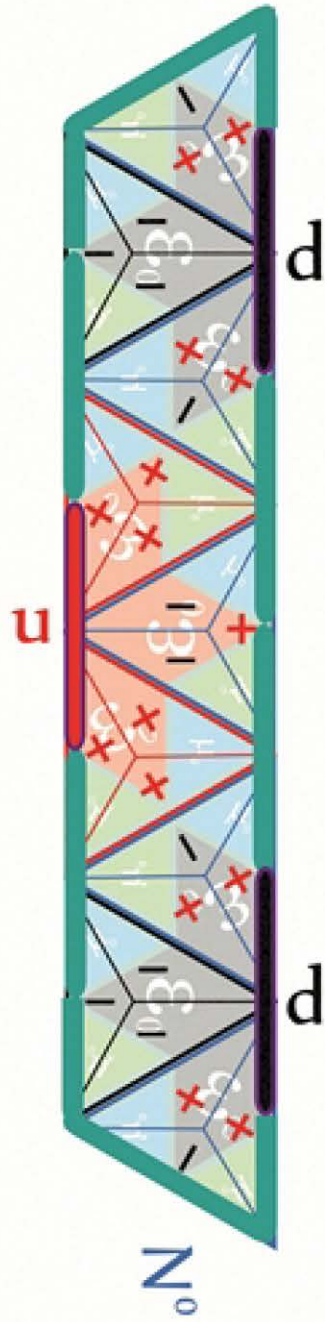
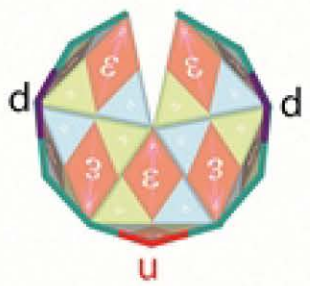
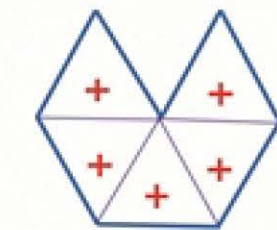
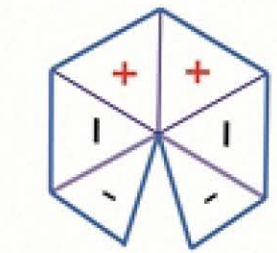
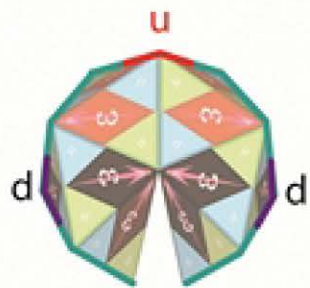
The orientation of the component Magnetic fields within 3D Matter creates macroscopic force apices via externalised 'M-dipoles'

Nucleonic residual EM force

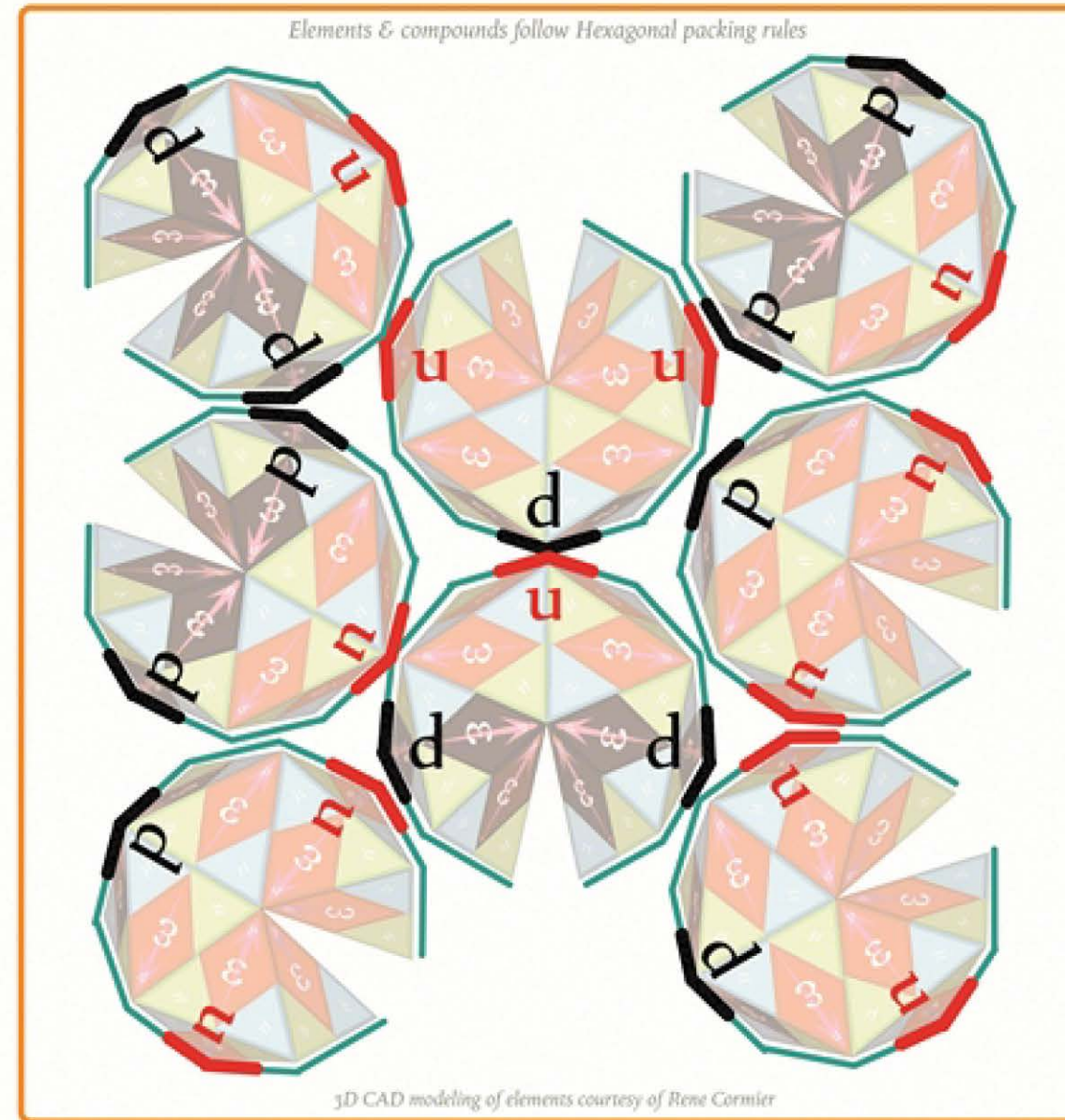
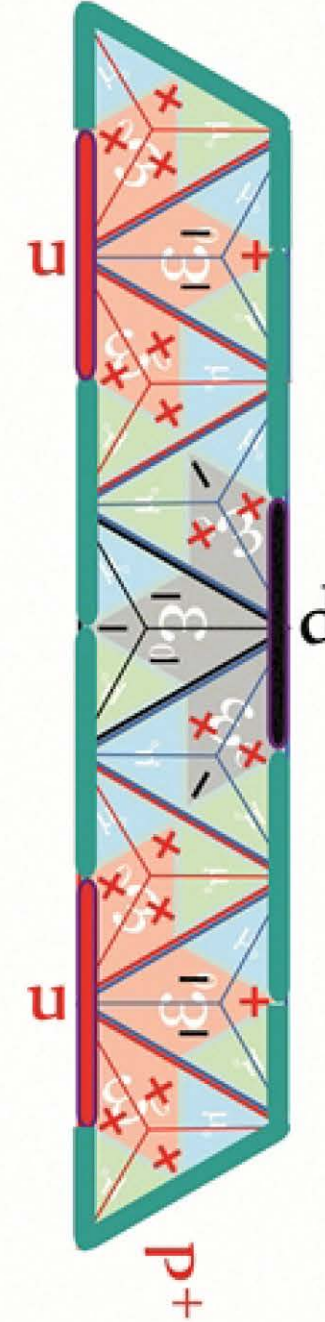
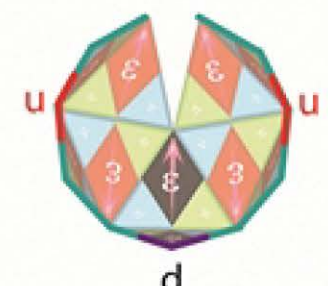
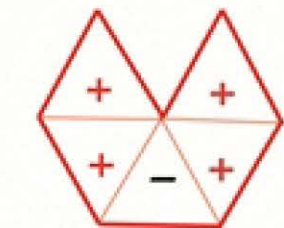
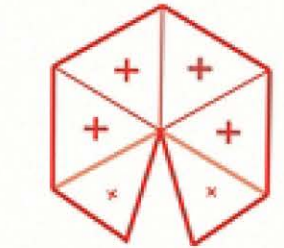
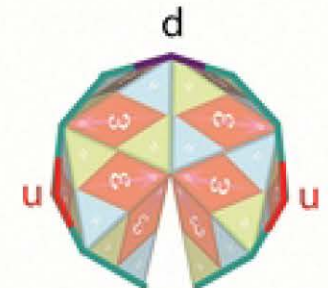
The attraction between Baryonic E&M field apices, a result of their component Quark arrangements, results in the formation of heavier and more complex Nuclei

The residual e-field apices and m-field dipoles form two rings of residual EM fields around the circumference of atomic nuclei

Neutrons



Protons



Elements & compounds follow Hexagonal packing rules

3D CAD modeling of elements courtesy of Rene Cormier

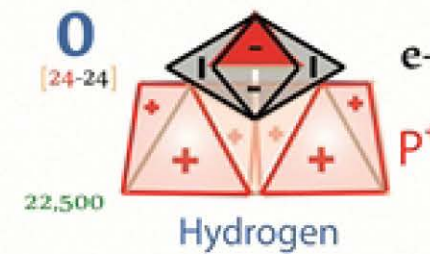
E-field apices and their polarities highlight the quark alignment of all atomic nuclei and elements

UP Quark
Positive Electric field apex

DOWN Quark
Negative Electric field apex

Insulators and Conductors

The position of electrons in Nuclei within Atomic Elements results in the properties of Insulators or Conductors



Coloumbic forces
 Electrons are attracted to the residual EM net (+12) positive charge of Protons or n[+12] unbalanced Ionic charges of nuclei

Conductor

Electrical energies move around the material via boson exchanges and electron movement

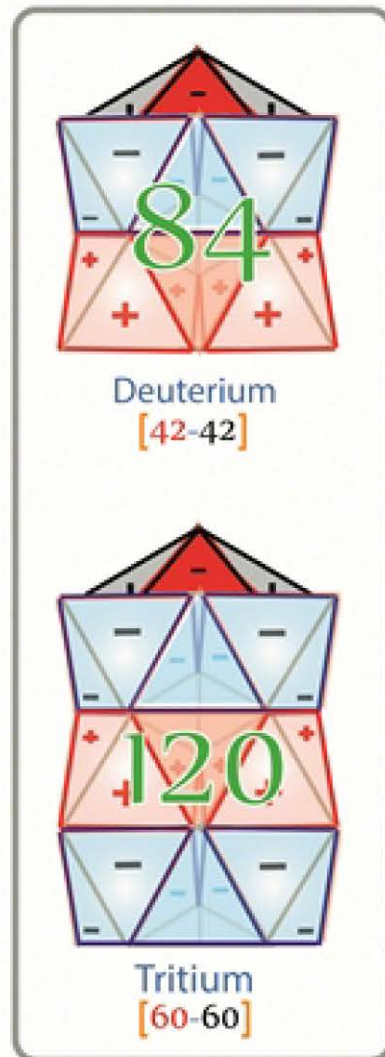
Insulator

Electrical energy is fixed within the nucleus as electrostatic charges & released upon demand via electron rotation/motion within the nucleus

Ions

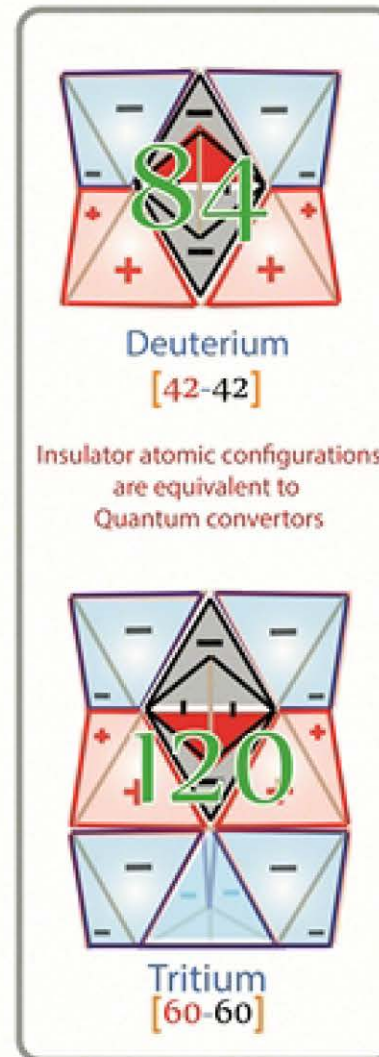
Charge (energy) is moved around material via electron movement

0



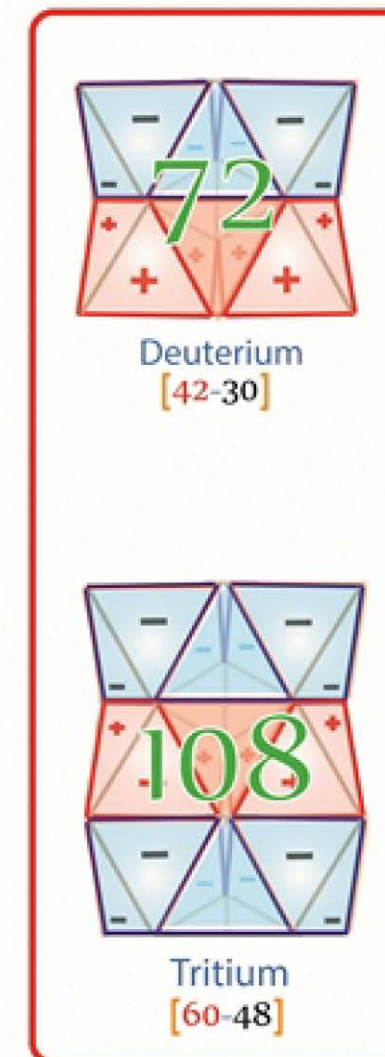
≈

0



0

12



12

Conductive materials contain 'free' electrons that can be readily or easily moved within the material

Insulator materials have electrons that are 'bound' tightly to the atoms and store charges locally where they are applied

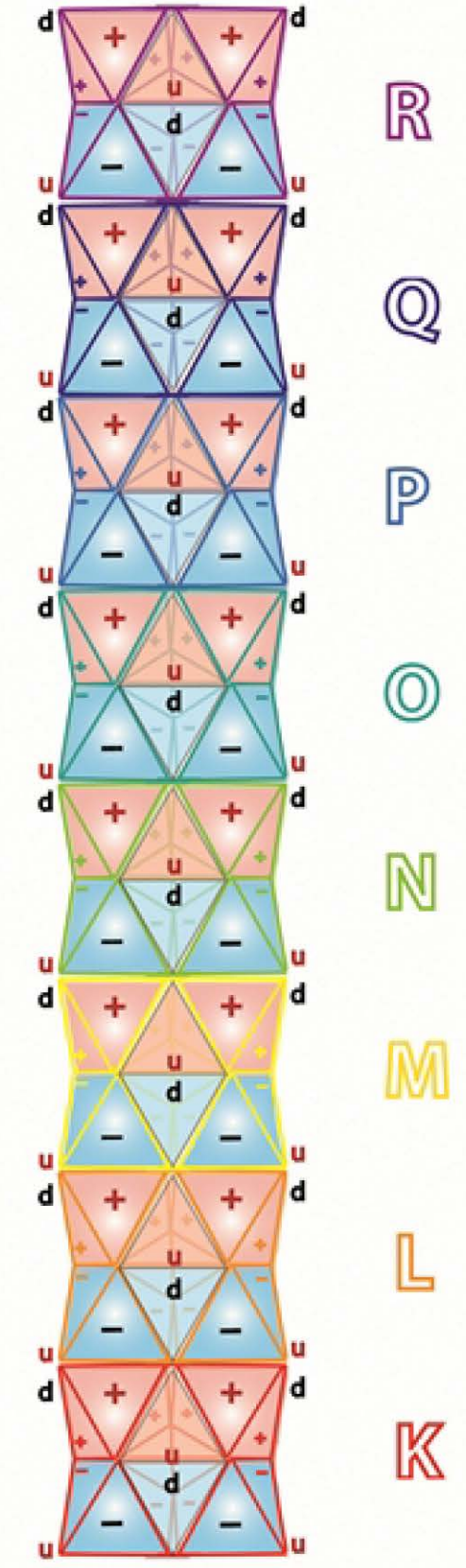
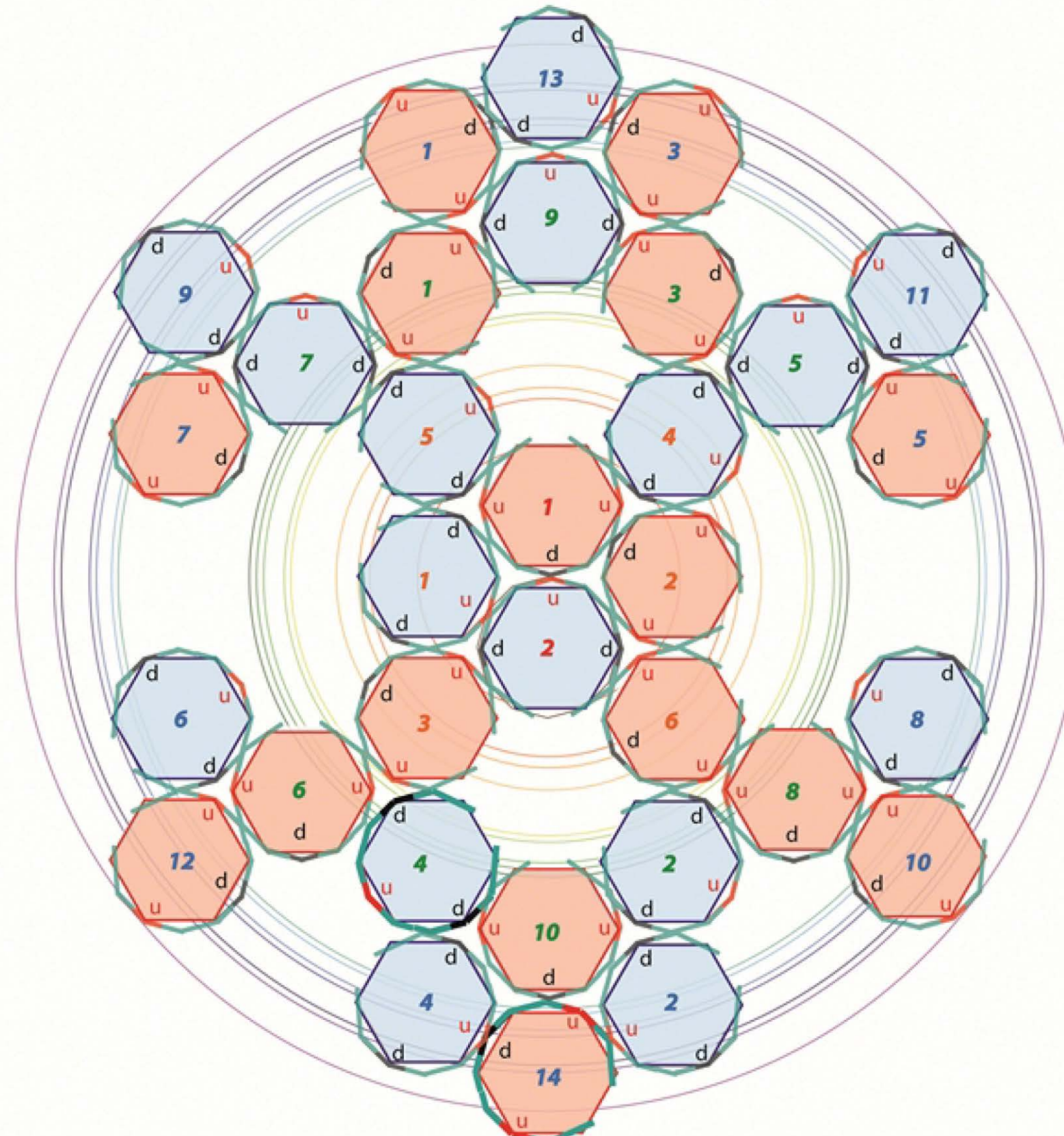
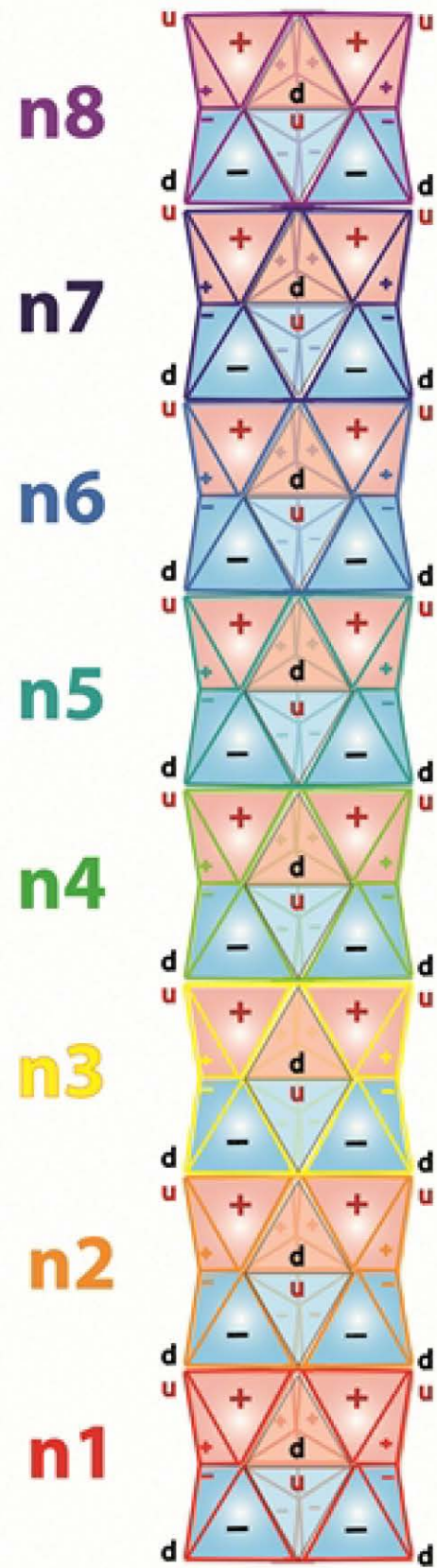
Materials that have been ionised are more likely to become Conductors as they easily attract and bind free electrons to them

Nucleon Quark Arrangement

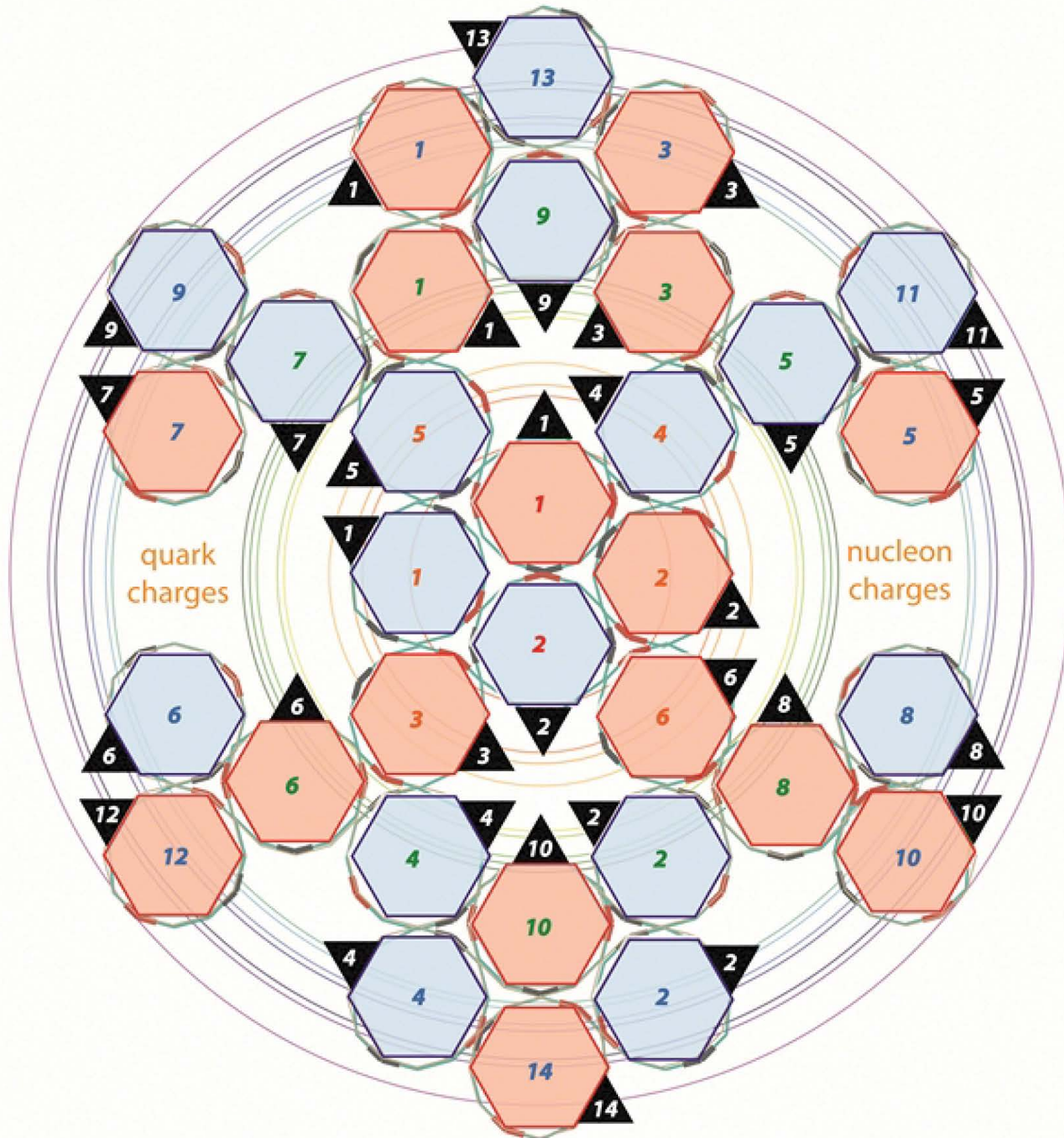
The nuclei arrangement of each atomic shell [quantum level] is the result of quark EM field interactions

Quantum levels

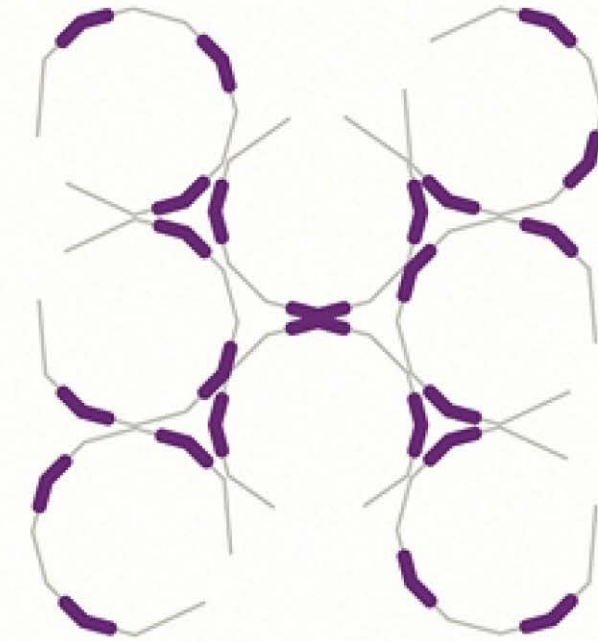
Atomic shells



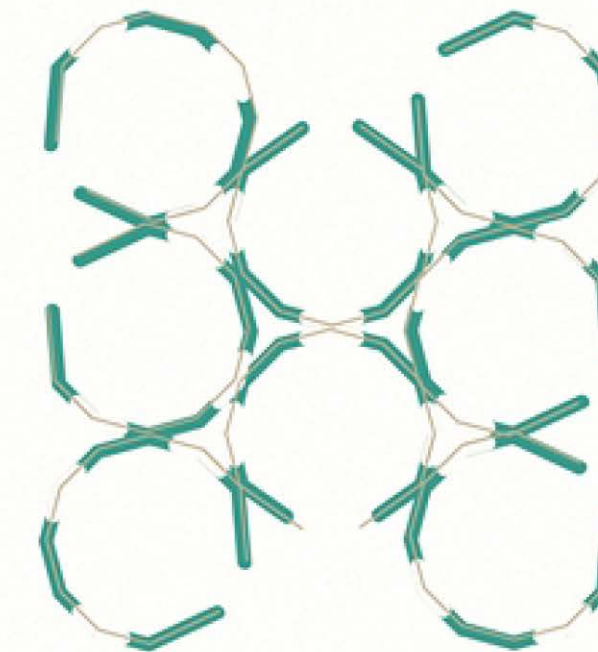
Nucleon Charges and Bonding



(Strong force - topological Electric Points)



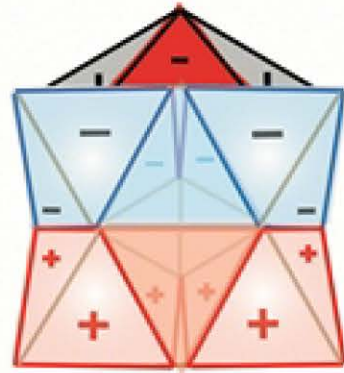
residual EM forces



(Strong force - topological Magnetic dipoles)

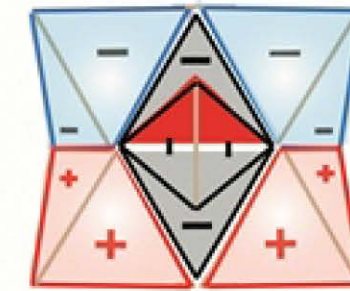
Bound electron arrangements

Externally bound electrons produce sub-orbital patterns different to the electron orbitals of internally bound electrons



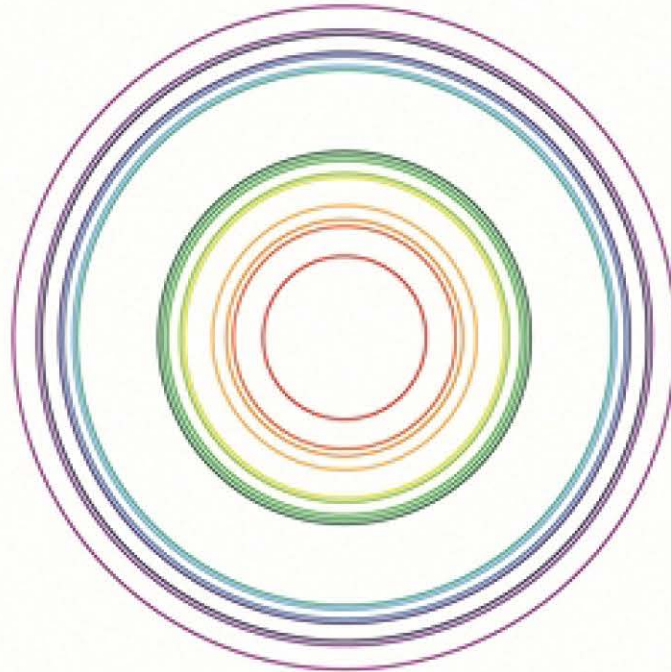
Deuterium

electrons are externally bound to the Deuteron nuclei



Deuterium

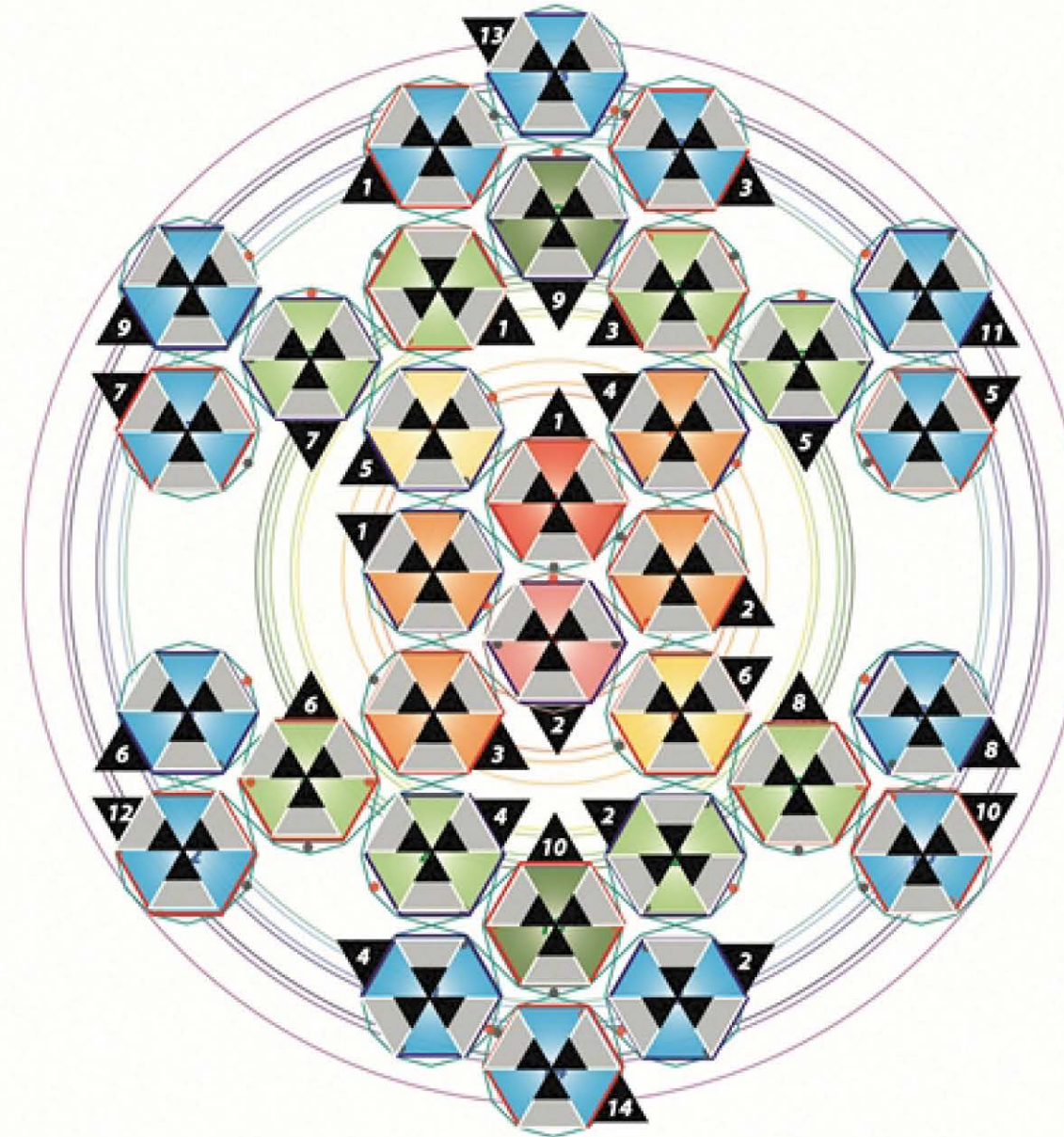
electrons are internally bound in the Deuteron nuclei



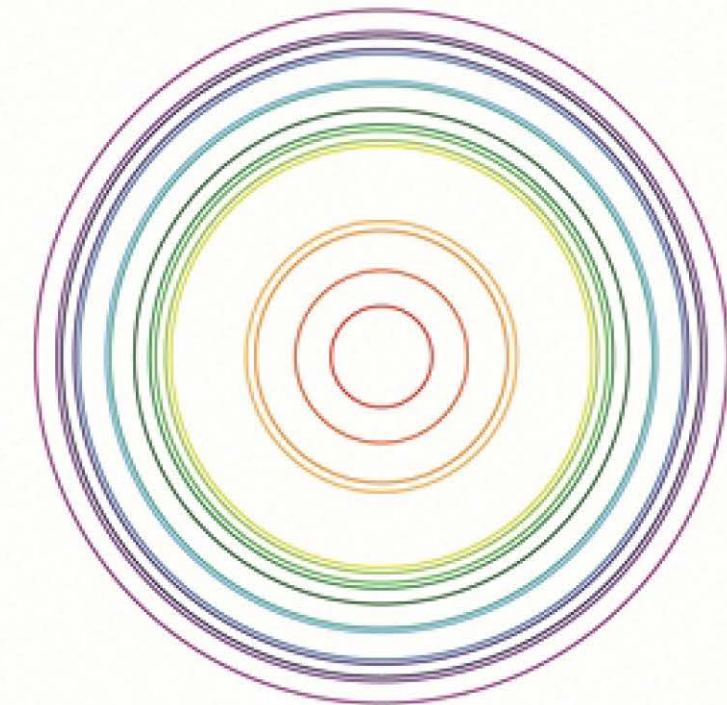
Conductors

Charges are free to move and equalise

electrons require less energy to 'break free' from Nuclei



The electron orbitals of conductors are lower energies than those of insulators



Insulators

Charges are bound to specific locations

electrons require more energy to 'break free' from Nuclei

2D mass-energy geometries form the fabric of 3D Matter topologies

Proton



12
[24-12]

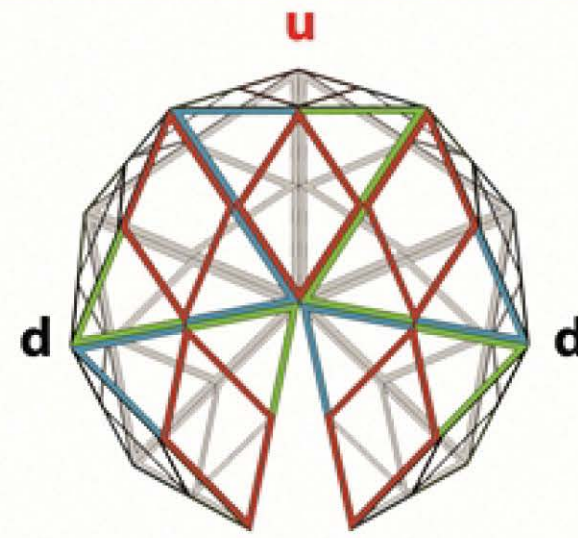
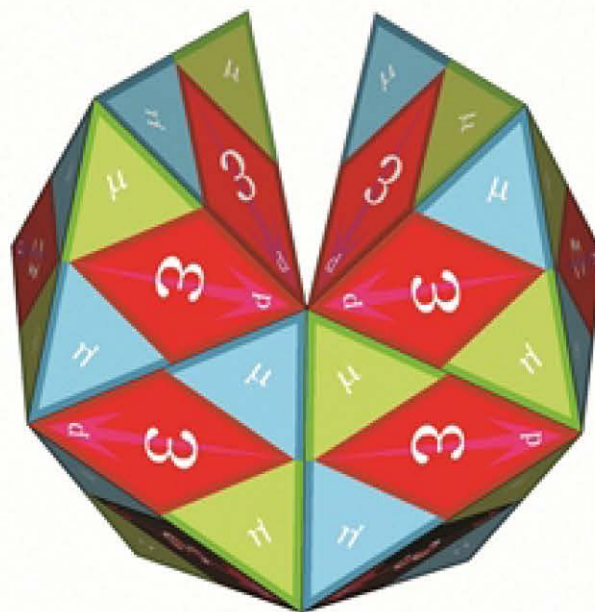
nett Charge
component charges



charged mass-energy
geometry

20π

Matter topology



12
[42-30]

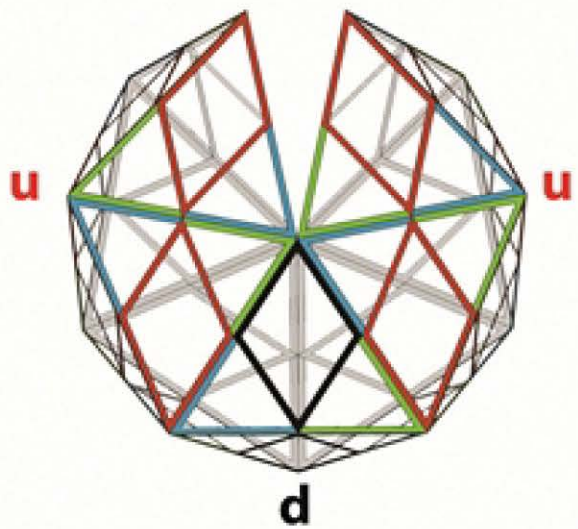
nett Charge
component charges



charged mass-energy
geometry

40π

Deuteron



0
[18-18]

nett Charge
component charges



charged mass-energy
geometry

20π

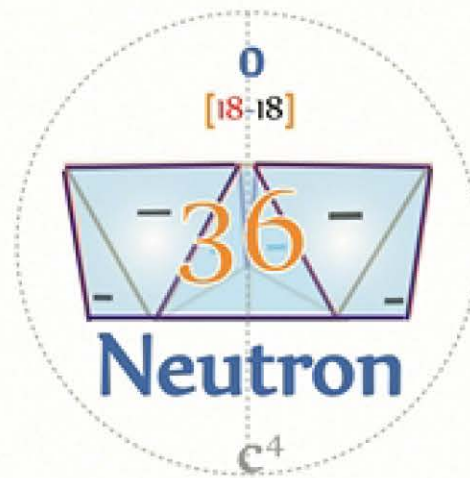
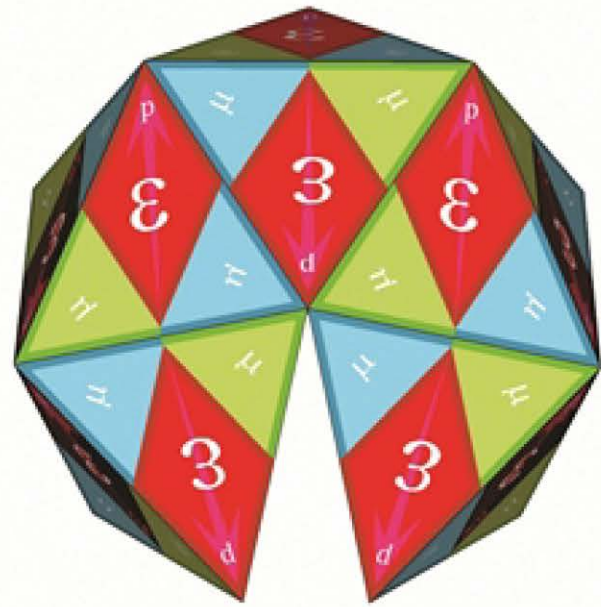
Matter topology



Neutron



Charge provides the framework for the mass-energy geometry of Matter

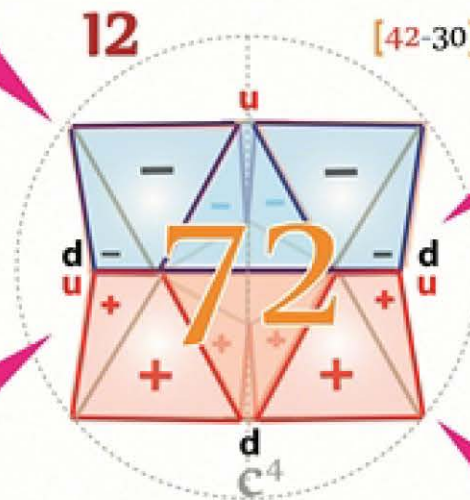


All Matter topologies are the result of charged EM mass-energy geometries

Matter

$$\frac{\text{Baryons}}{c^4} \left[\frac{\text{Planck quanta}}{m} \Omega v^2 \right]$$

mass-energy

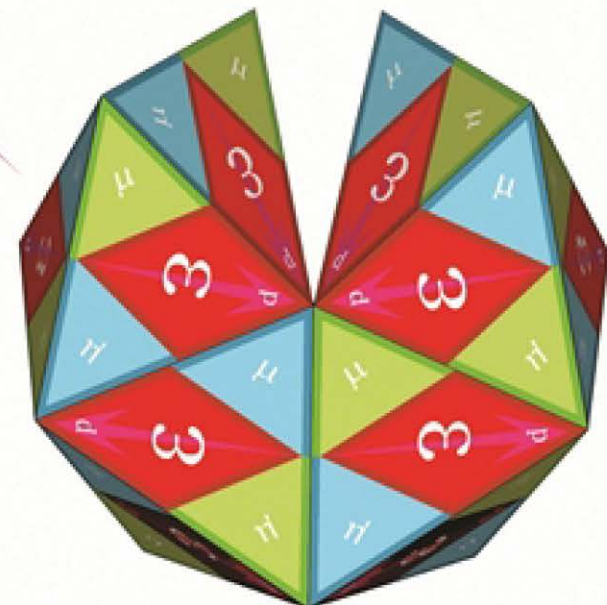
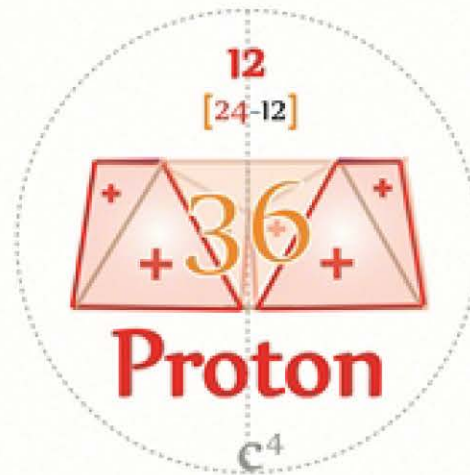
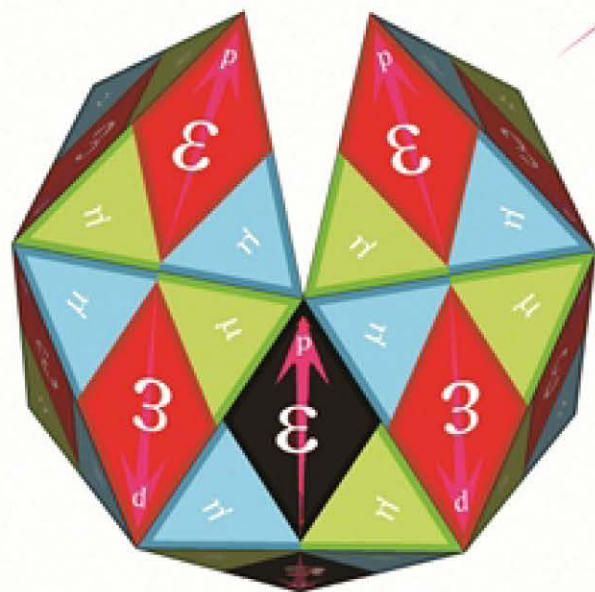


Matter

$$\frac{\text{Baryons}}{c^4} \left[\frac{\text{Planck quanta}}{m} \Omega v^2 \right]$$

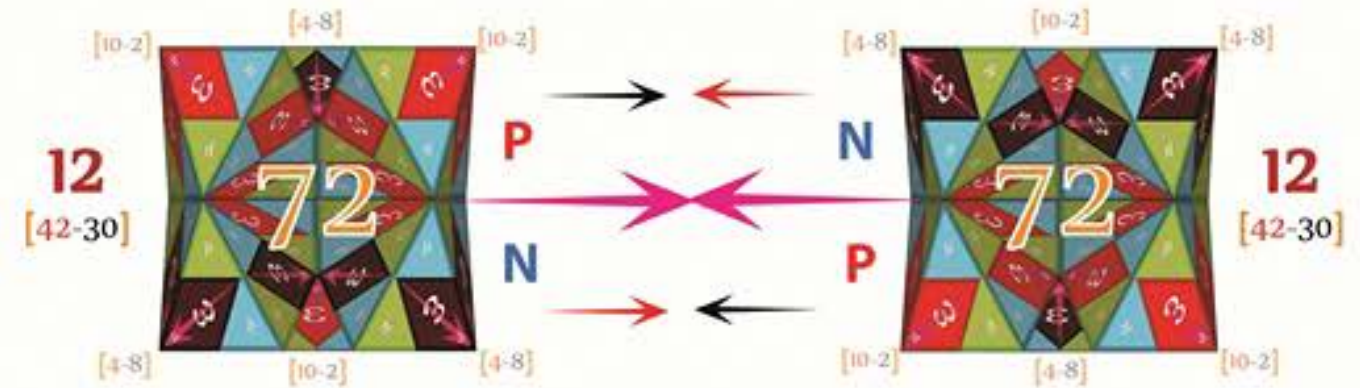
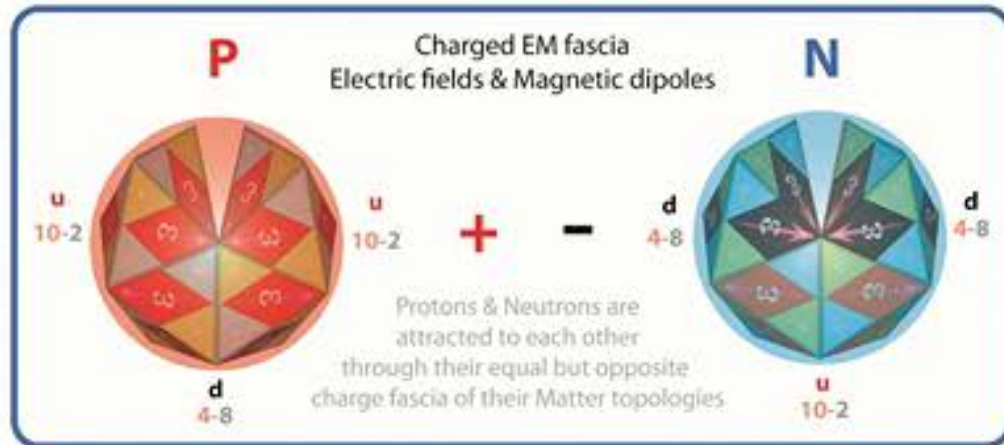
mass-energy

Deuterons
are the building blocks of all periodic elements and compounds

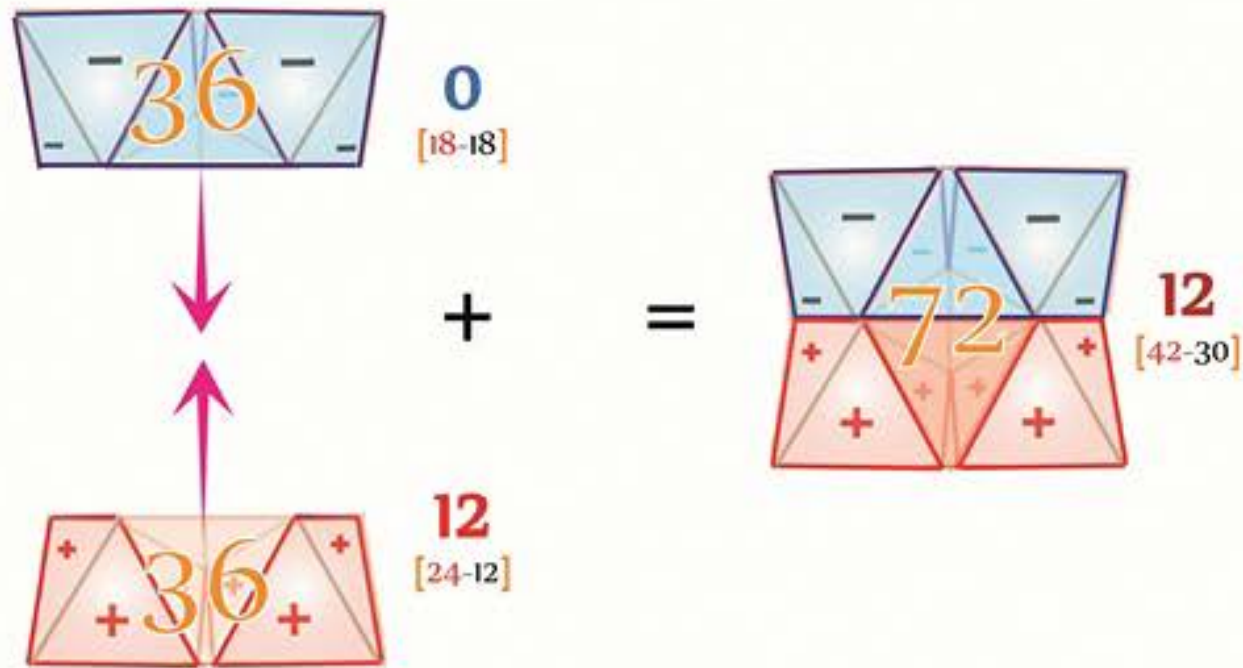


Strong Forces and Nuclear Bonding

How do Baryons with Positive and Neutral charges attract each other and bind to form stable elements ?

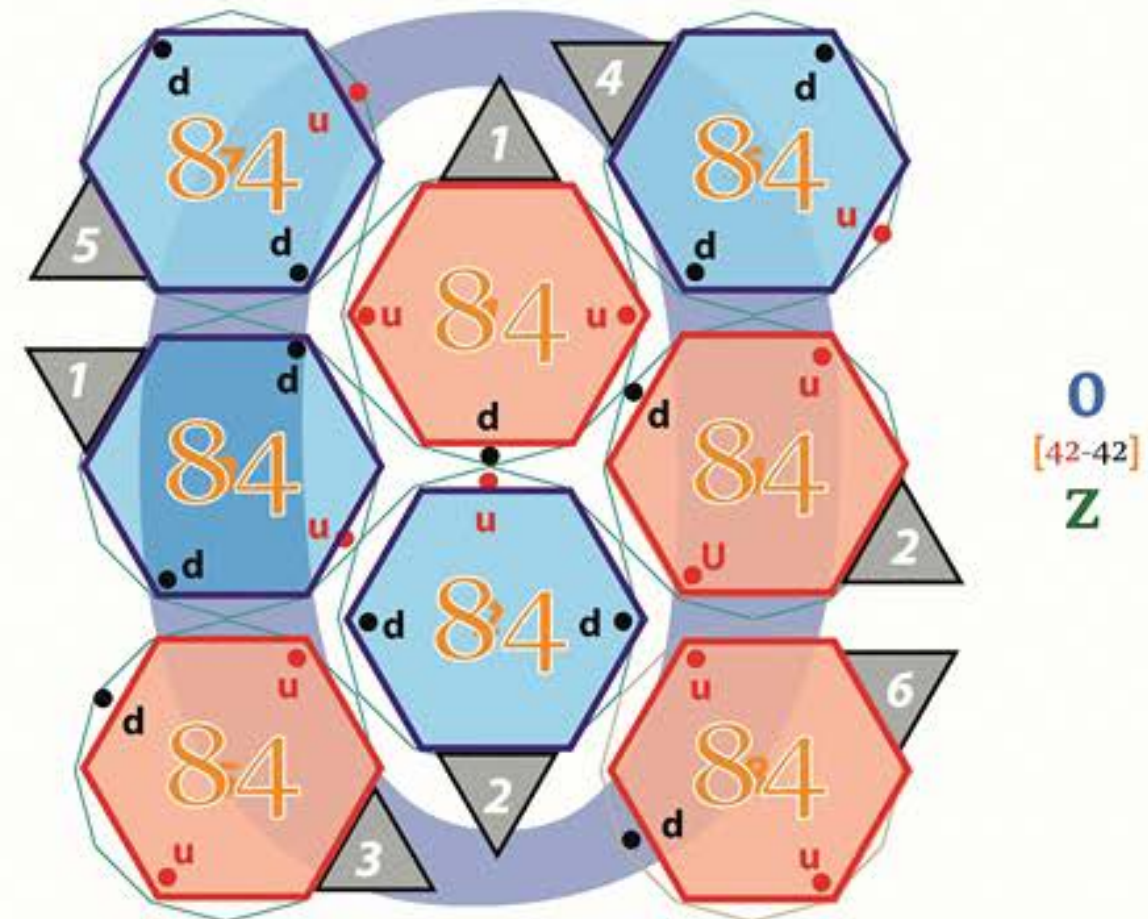


Once nuclei have been created their external electric fields & magnetic dipoles continue to attract and bind individual nuclei together via the Residual EM Force as nuclei seek charge equilibrium by combining with each other and electrons to form neutral elements

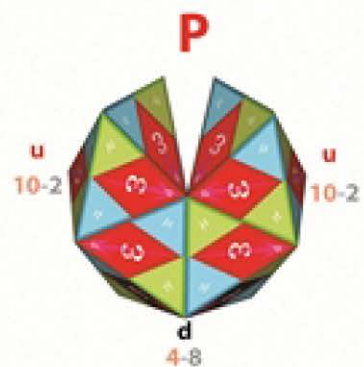
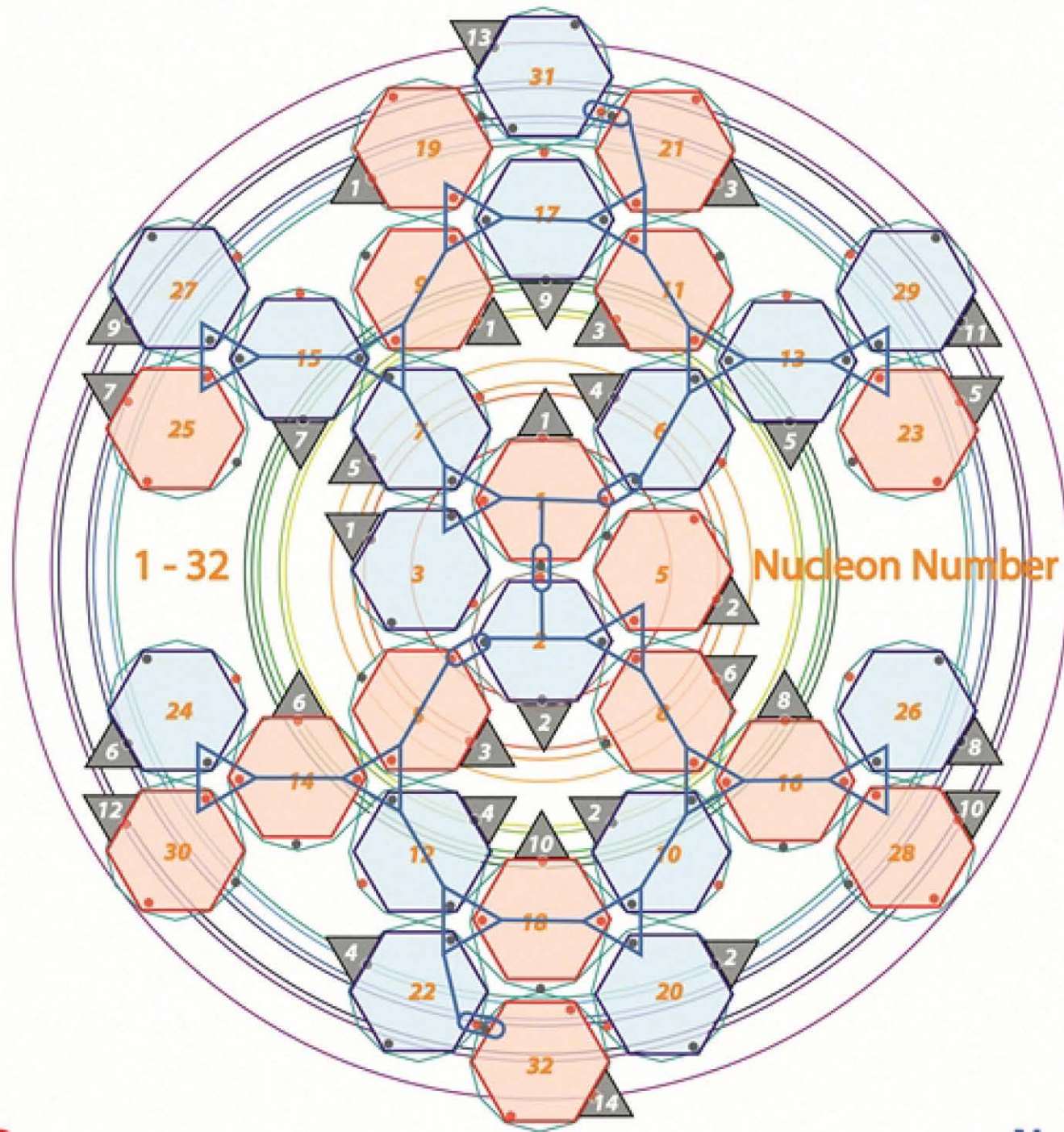


The attraction and binding of Protons and Neutrons through their electric charge imbalances creates Deuterons which have +12 charges

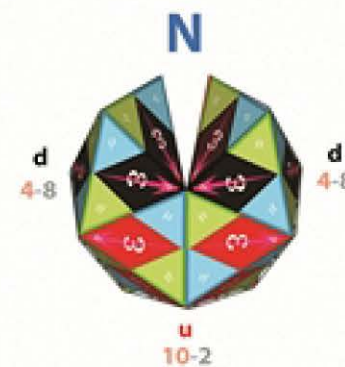
The residual Z[+12] charge is what attracts electrons to form neutral atomic nuclei via Coulombic attraction



Strong Nucleonic Bonding



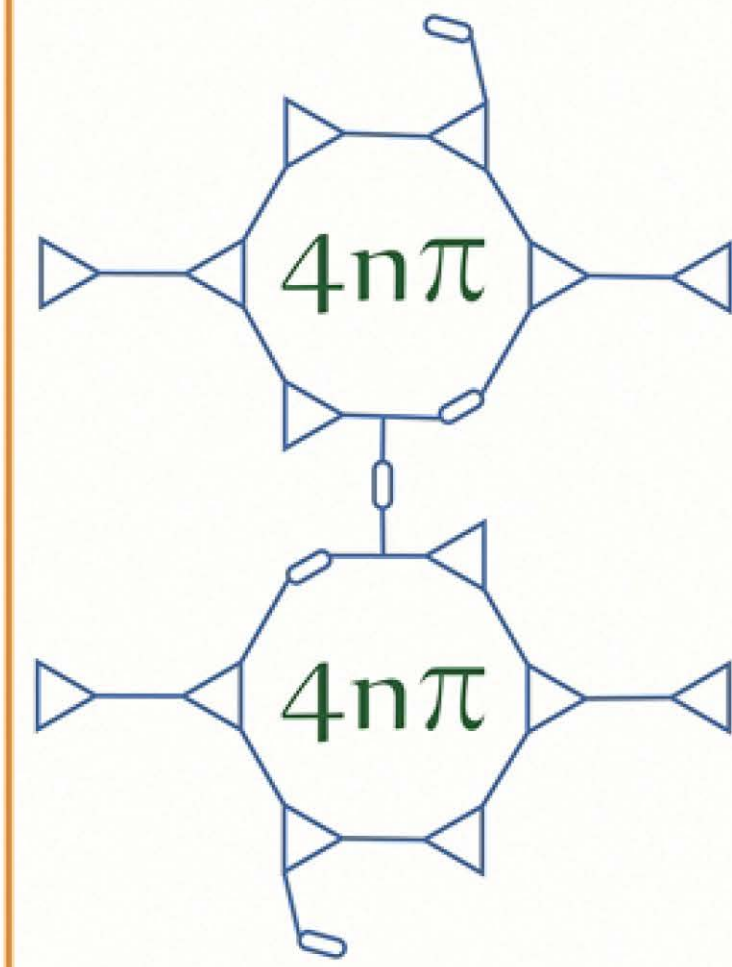
+ In addition to the Strong colour force a separate residual binding force arises from the external apices formed by Positive and Negative Electric points of quarks in each Baryon [nuclear-chemical bonds]



All energy seeks equilibrium



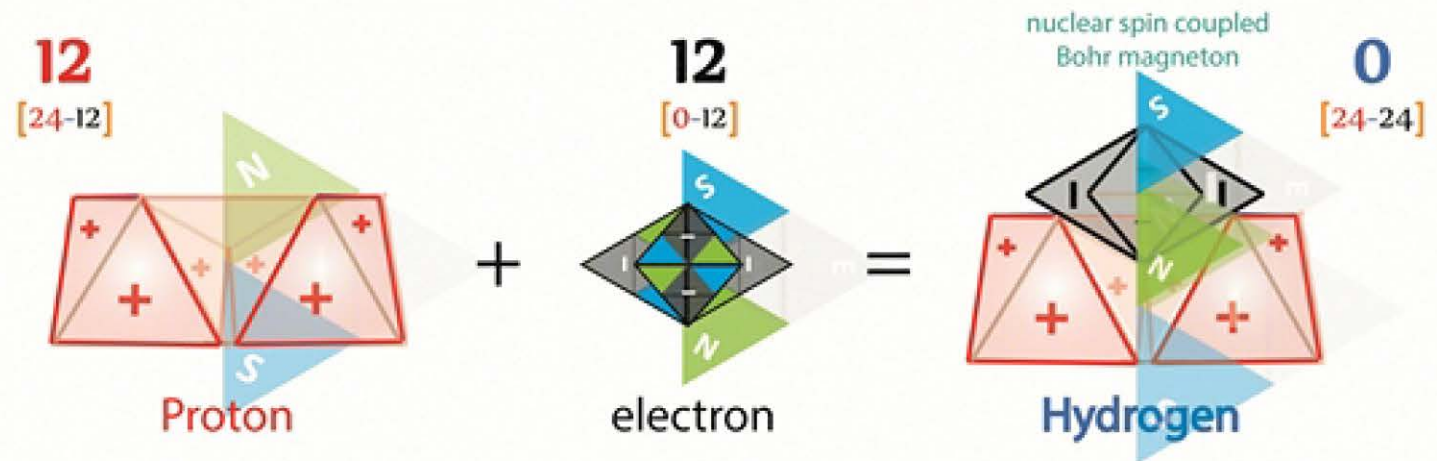
External Electric field points bind via Charge fascia interactions with Plus and Minus Electric points combining and sharing energy throughout the resultant nuclei



● Positive Electric field apex
● Negative Electric field apex

Hydrogenic vs Nucleonic electron binding

If a unbound Proton attracts an Electron the Electron can be bound to the nuclei in a number of differing orientations [each with differing spin energies]



The energy levels of Baryons determines the KEM field energy of bound electrons

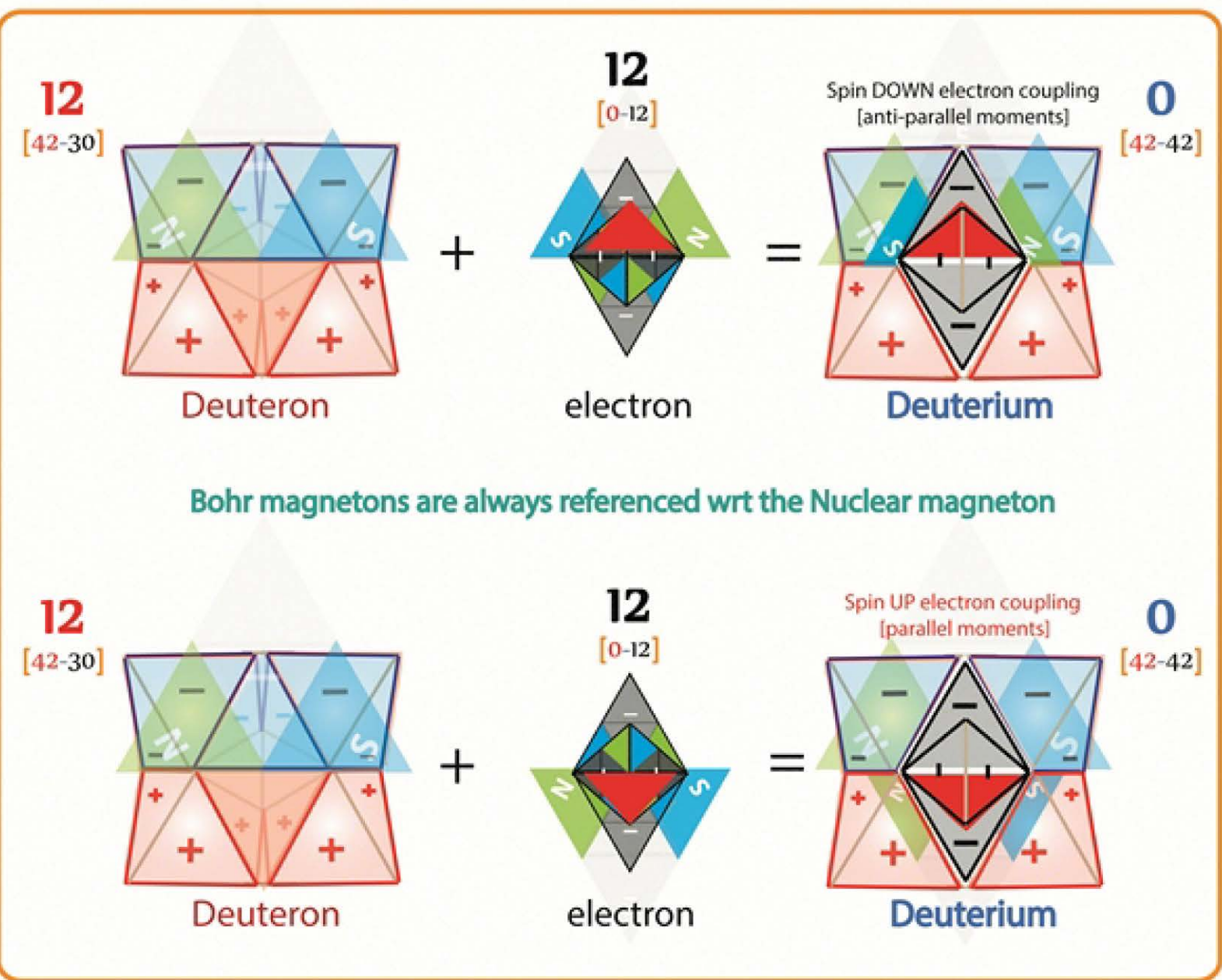
All atomic nuclei (and elements) are Deuteron'ic nuclei with a mixture of orthogonal, parallel and anti-parallel spin orientations

(this is why Rydberg is less accurate for elemental nuclei compared to Hydrogenic atoms - see QM spin)

Electrons can be bound to deuteron nuclei in four distinct orientations [2 horizontal & 2 vertical] with each spin coupling orientation producing differing energy electron orbitals [wrt to the nuclear magnetic moments]

Ejecting electrons from atomic nuclei by adding energies to their KEM fields [the Photoelectric effect] creates Positive Ions

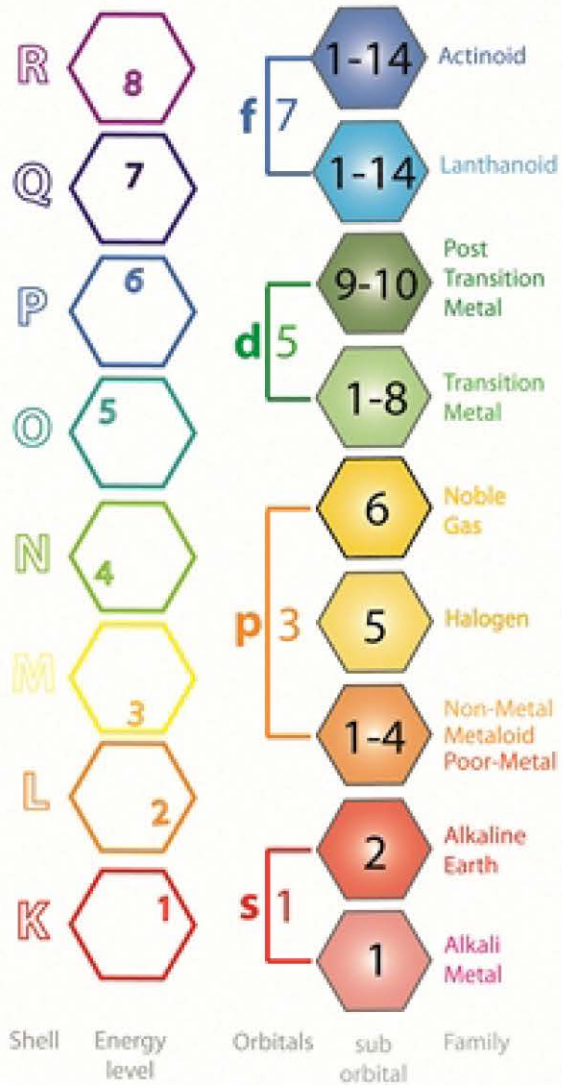
Vertically orientated electrons within Proton-Neutron Nuclei [Deuterons] create quantum synchronous convertor geometries



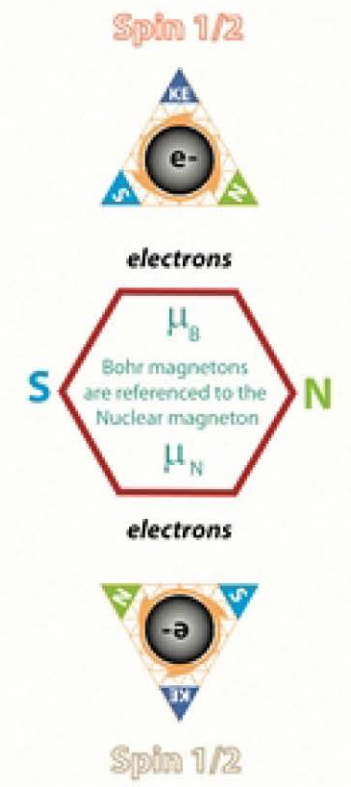
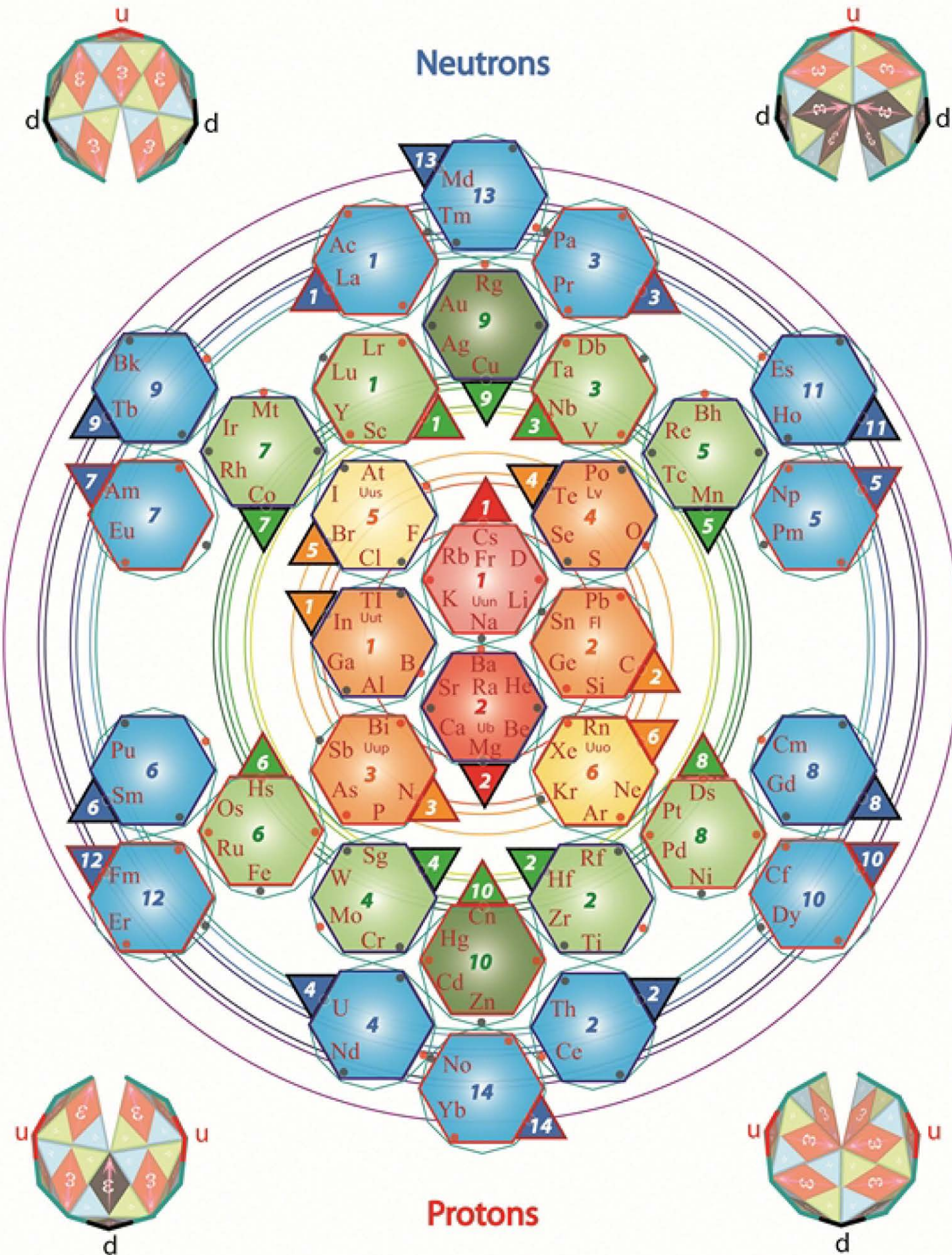
electrons produce stronger magnetic moments due to their mass-charge quotient

Atomic Nucleus Master Template

Nucleon Number Z
 1 Proton [24-12]
 1 electron [0-12]
 1 Neutron [18-18]

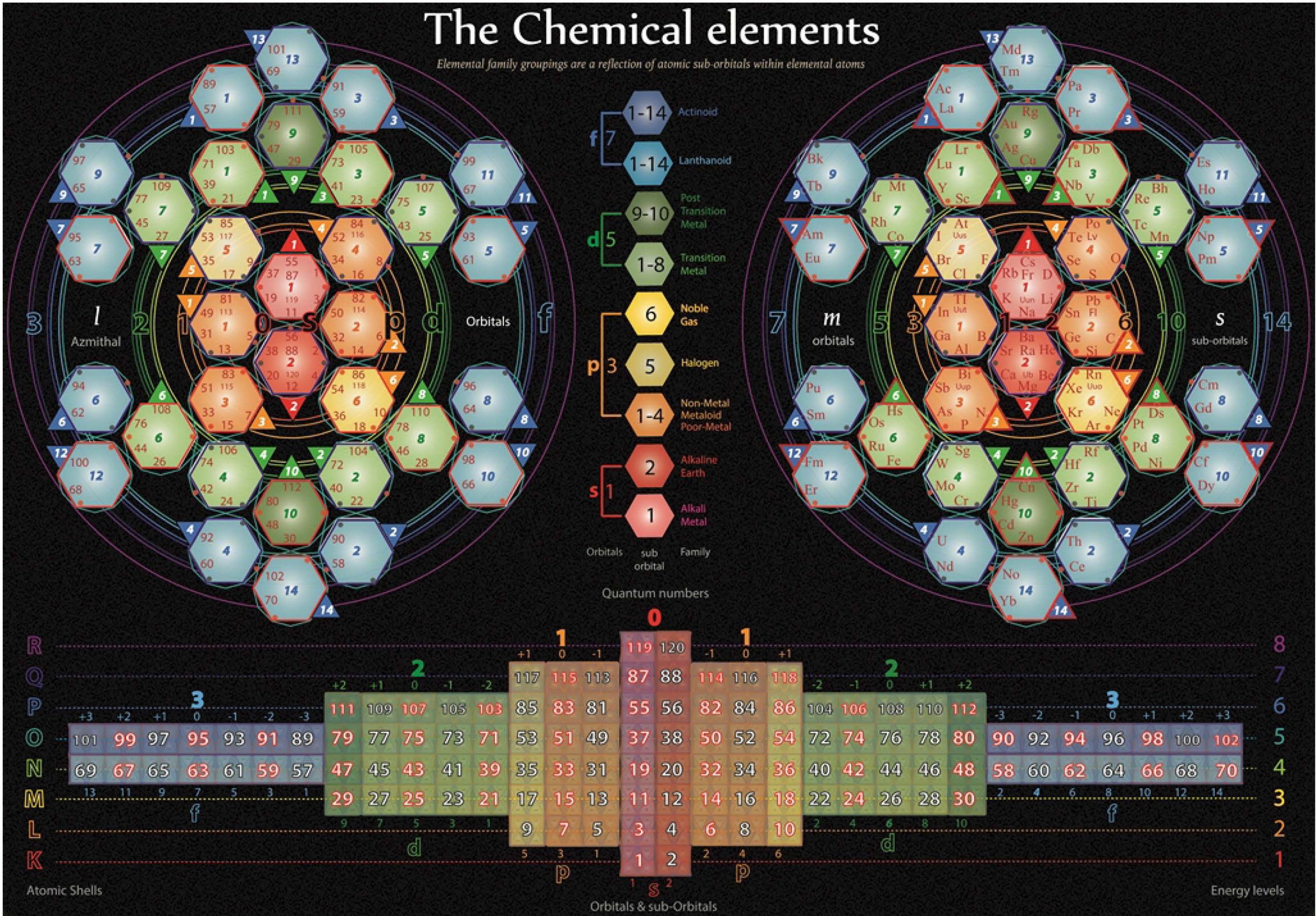


- **S** 1 sub-Orbital (2 electrons max)
- **P** 3 sub-Orbitals (6 electrons max)
- **d** 5 sub-Orbitals (10 electrons max)
- **f** 7 sub-Orbitals (14 electrons max)



The Chemical elements

Elemental family groupings are a reflection of atomic sub-orbitals within elemental atoms

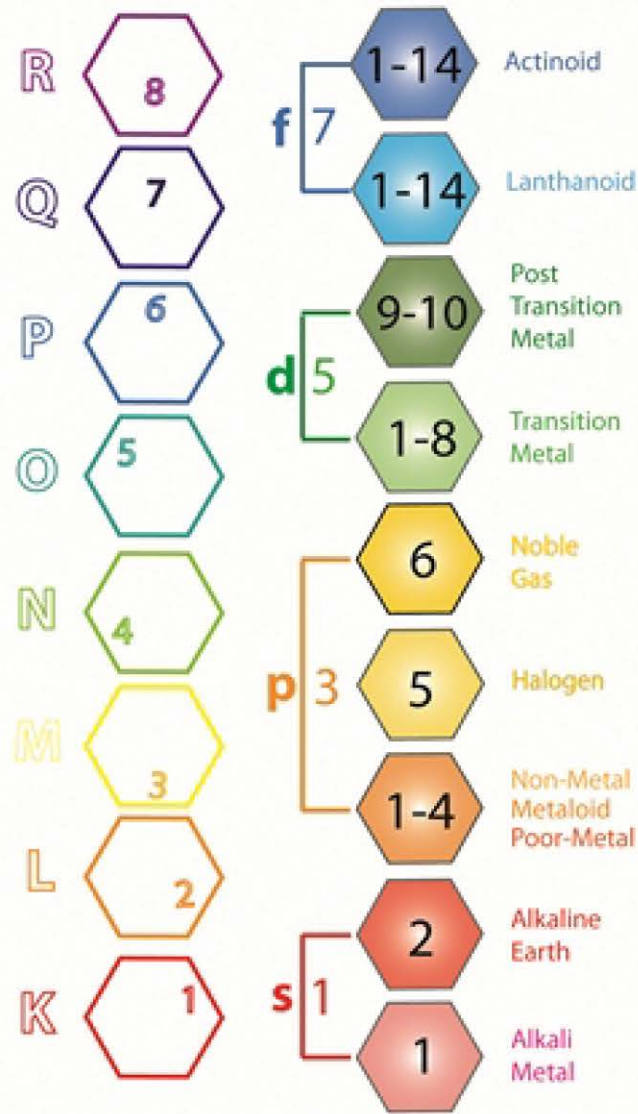


Element Numbers

Z *
 1 Proton [24-12]
 1 Neutron [18-18]
 1 electron [0-12]

Each elemental nuclei is made from Deuterium

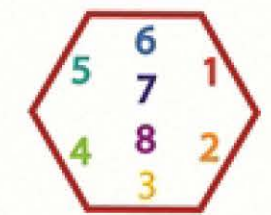
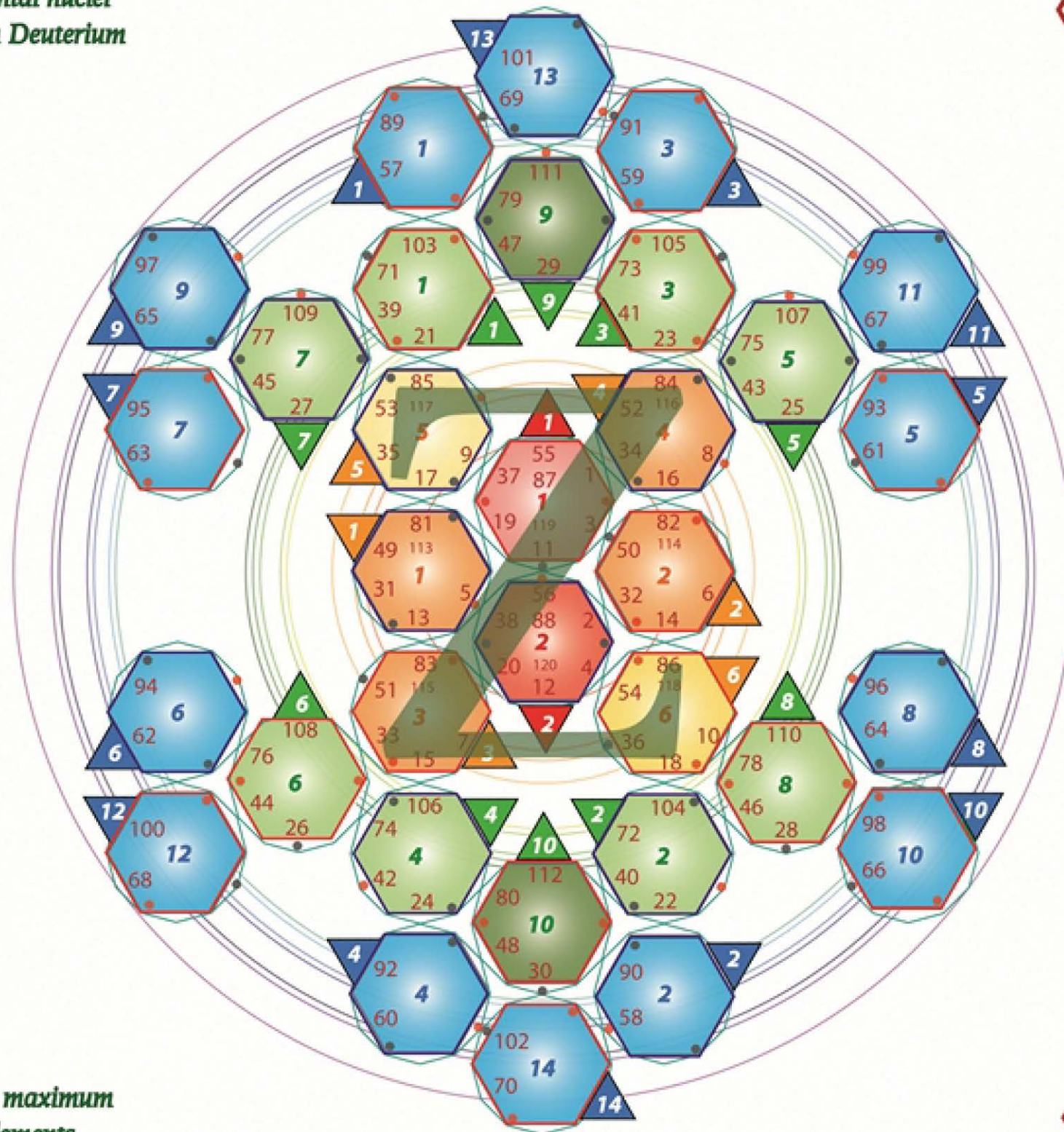
Atomic shells



Shell Energy level Orbitals sub orbital Family

- **s** 1 sub-Orbital (2 electrons max)
- **p** 3 sub-Orbitals (6 electrons max)
- **d** 5 sub-Orbitals (10 electrons max)
- **f** 7 sub-Orbitals (14 electrons max)

There are a maximum of 120 elements possible

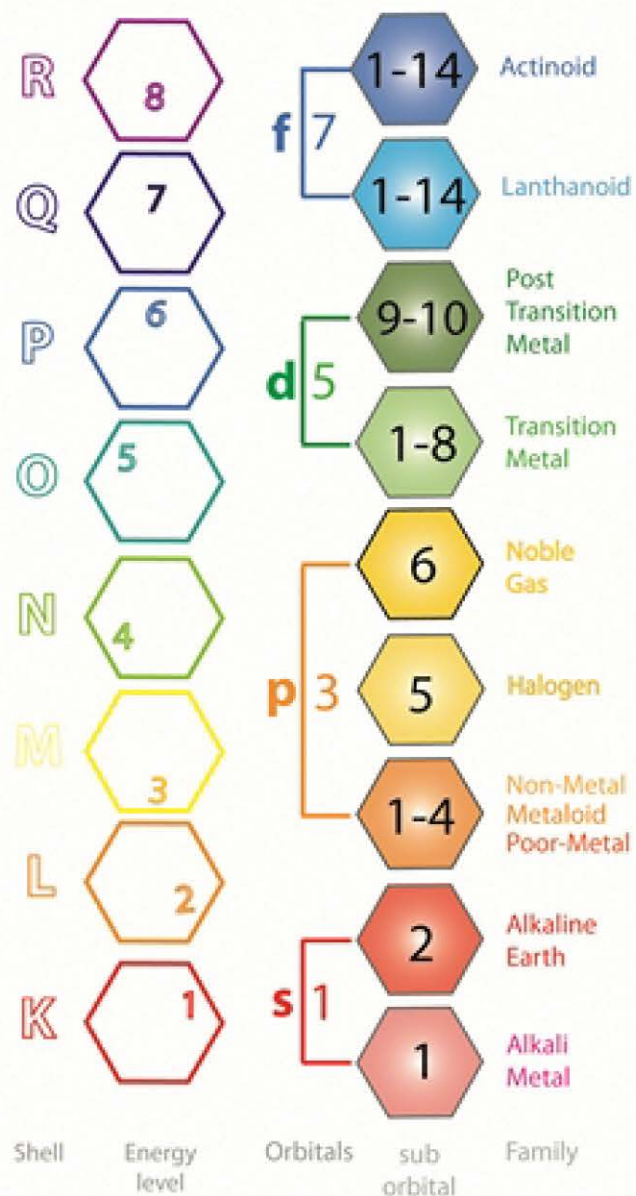
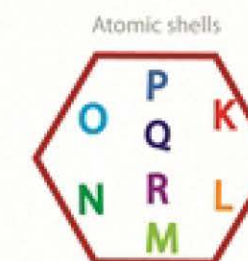


Energy levels

Element Names

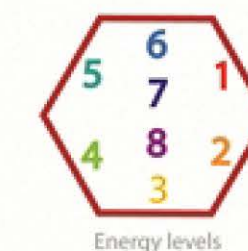
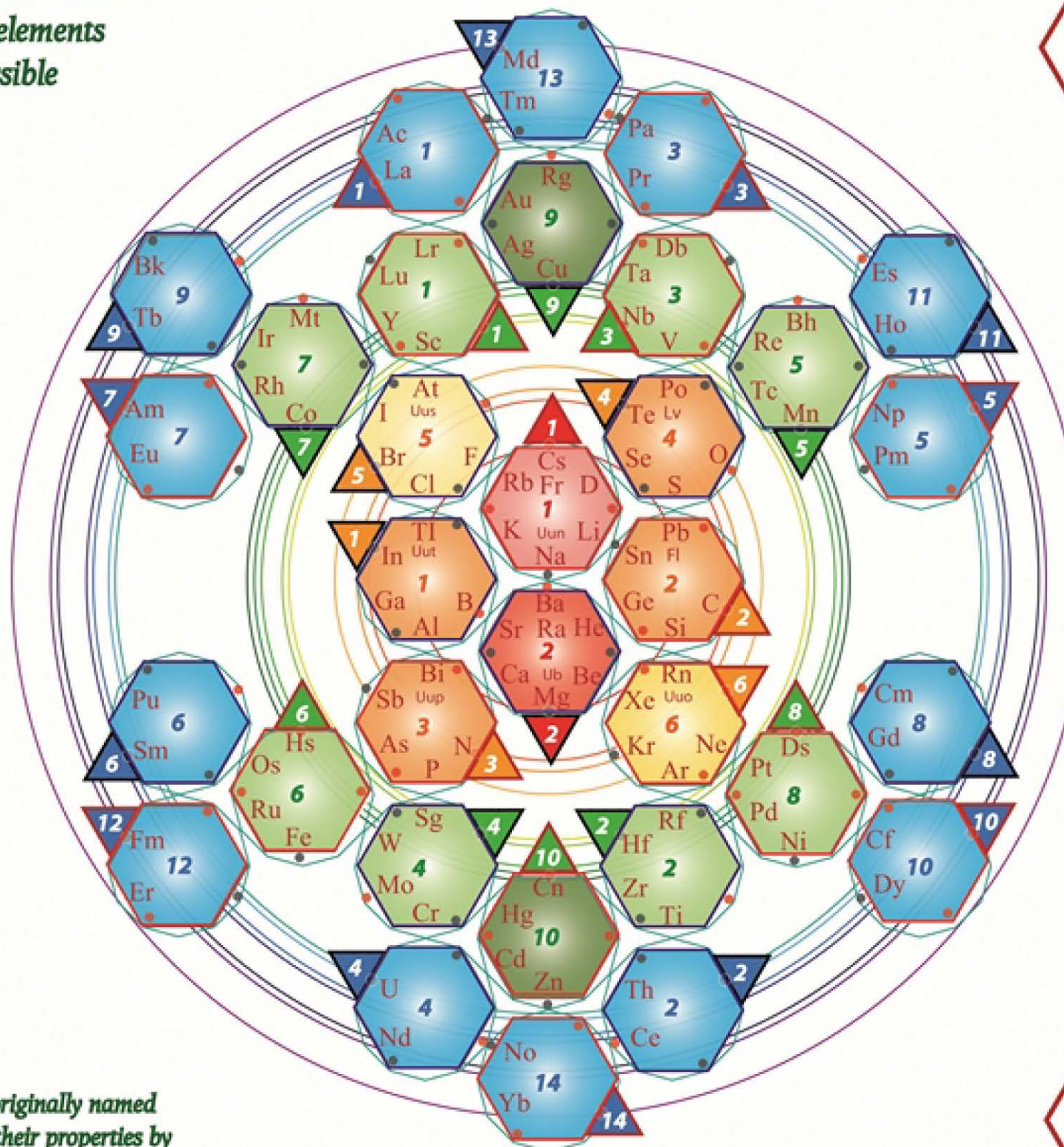
Z * 1 Proton [24-12]
 1 Neutron [18-18]
 1 electron [0-12]

There are a maximum of 120 elements possible



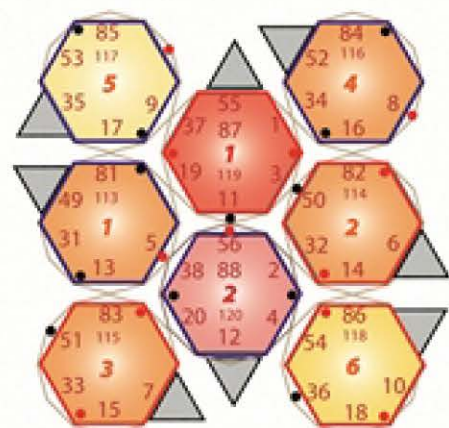
- **s** 1 sub-Orbital (2 electrons max)
- **p** 3 sub-Orbitals (6 electrons max)
- **d** 5 sub-Orbitals (10 electrons max)
- **f** 7 sub-Orbitals (14 electrons max)

They were originally named according to their properties by their discoverer but have recently been named after famous scientists



Electron orbital configurations

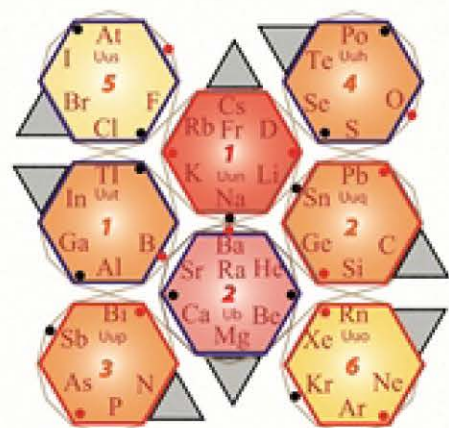
A huge number of differing d and f orbital configurations are possible given the number of nuclei and bond points created by elemental topologies



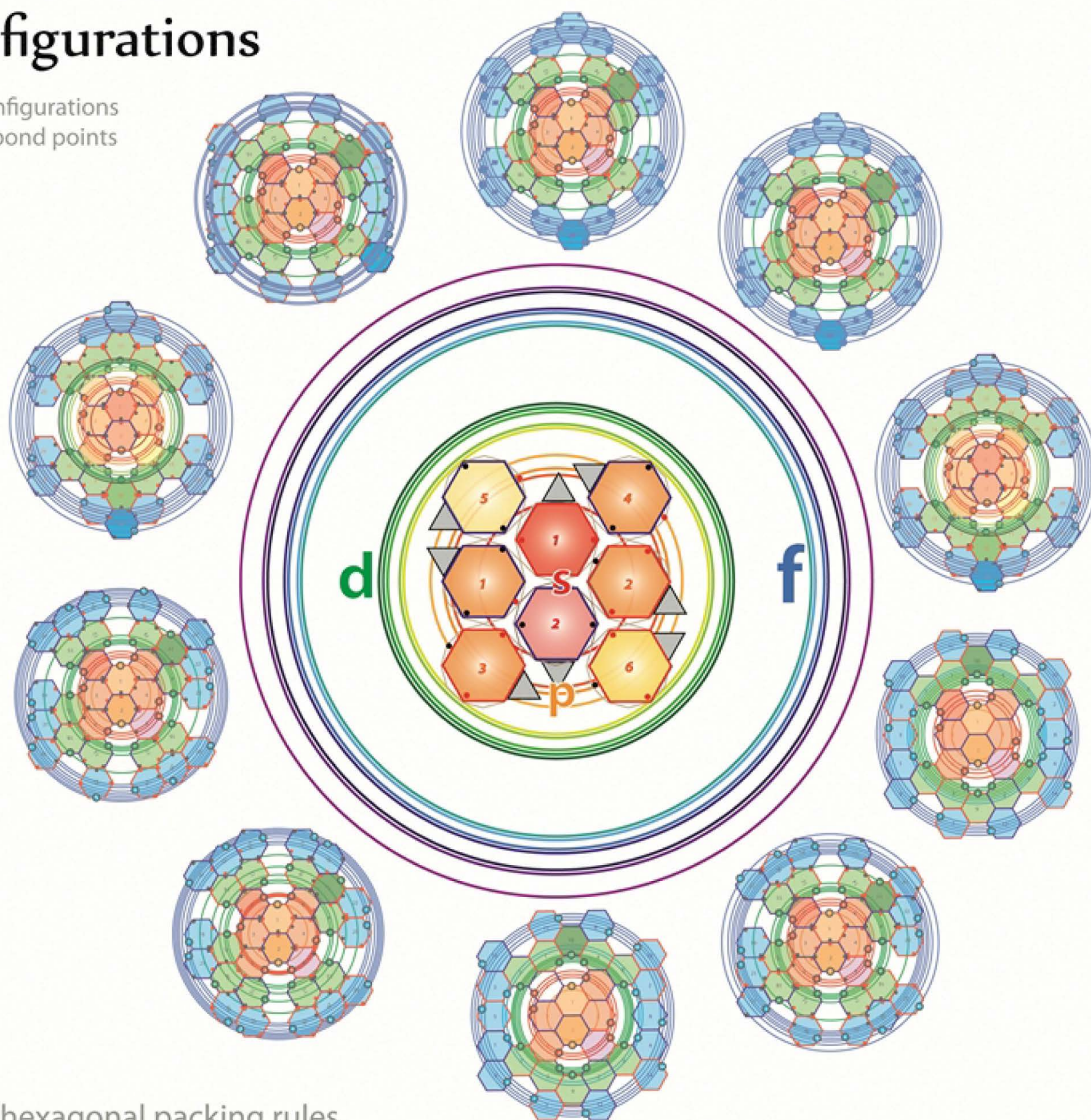
As the number of nucleons increases so does the complexity of the electron orbitals possible

quantum snowflakes

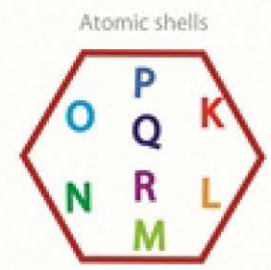
However all have a stable 'core' grouping of nuclei comprised of s and p electron orbitals



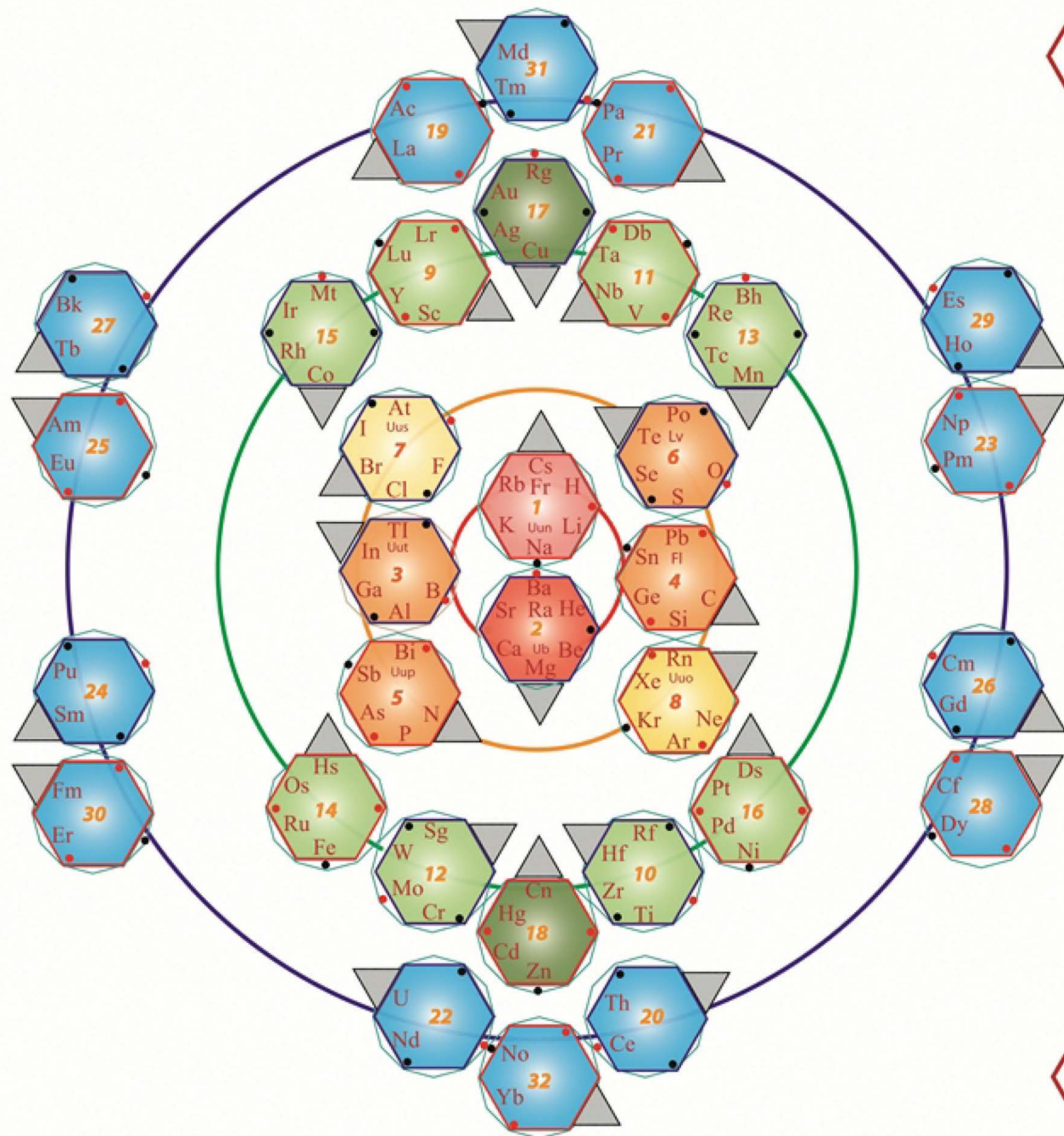
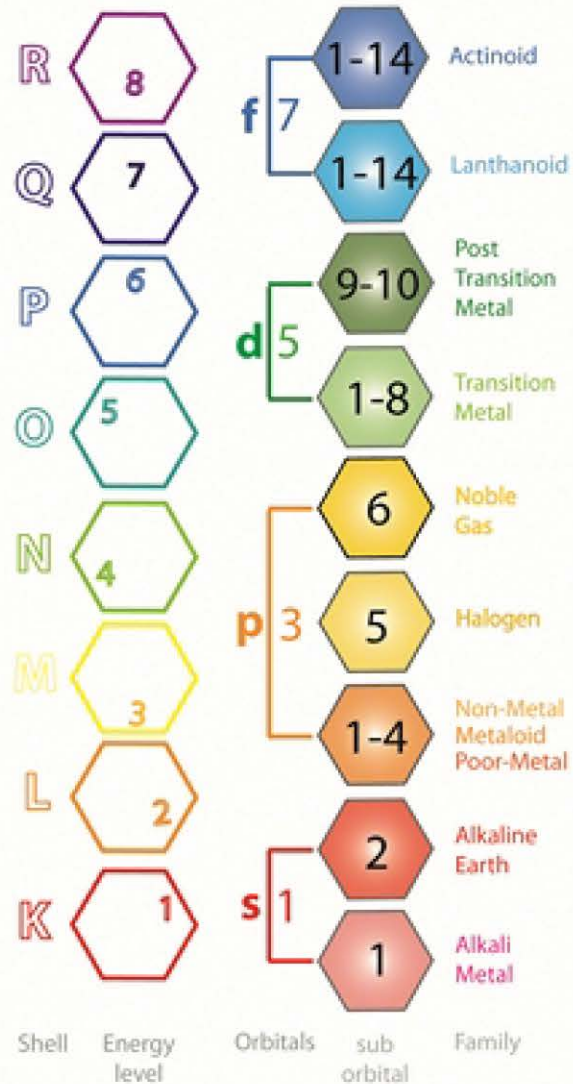
All nuclei bonding closely follows hexagonal packing rules



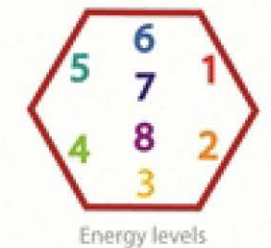
Atomic Nucleus Exploded view



1 Proton [24-12]
1 electron [0-12]
1 Neutron [18-18]



- **s** 1 sub-Orbital (2 electrons max)
- **p** 3 sub-Orbitals (6 electrons max)
- **d** 5 sub-Orbitals (10 electrons max)
- **f** 7 sub-Orbitals (14 electrons max)



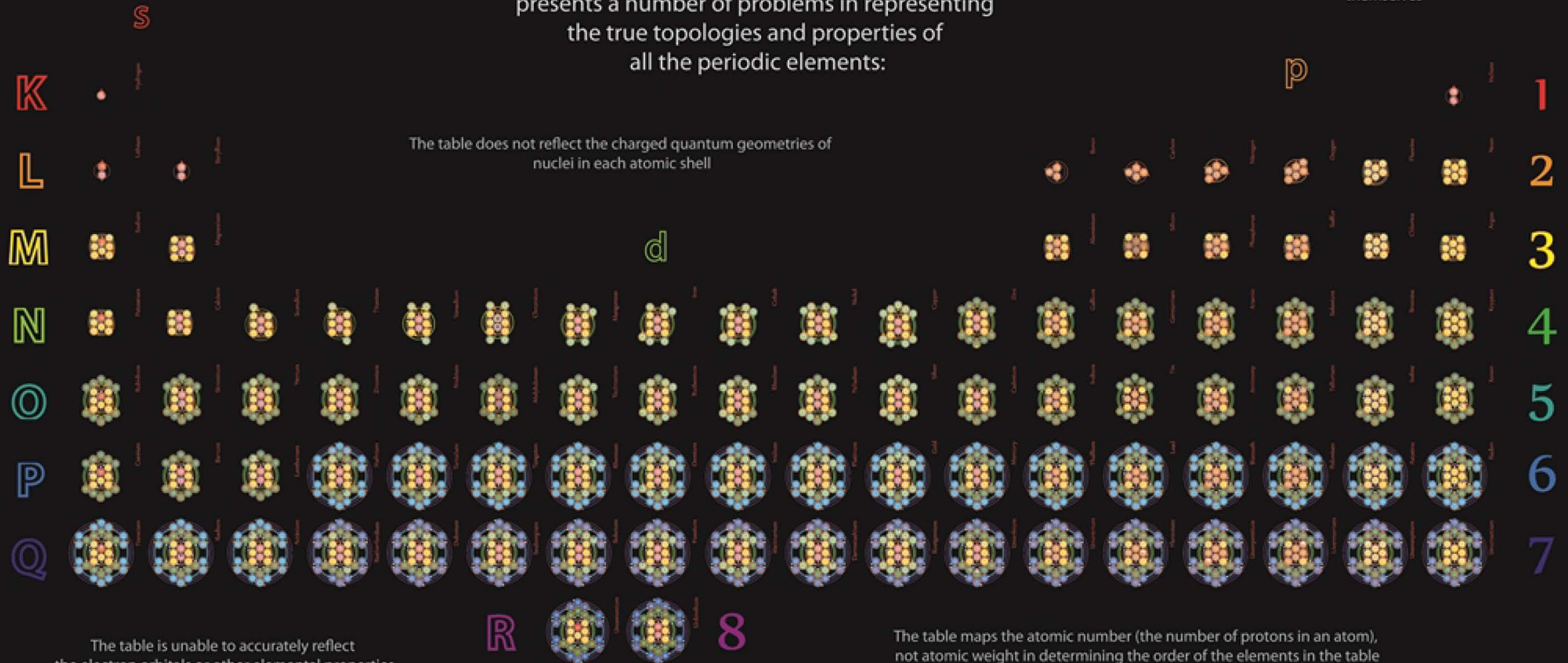
Atomic radii of elements

Questions are raised over Hydrogen's appropriate position in the table

The table correctly positions elements according to their elemental properties but offers no insight into the individual geometries of the periodic elements themselves

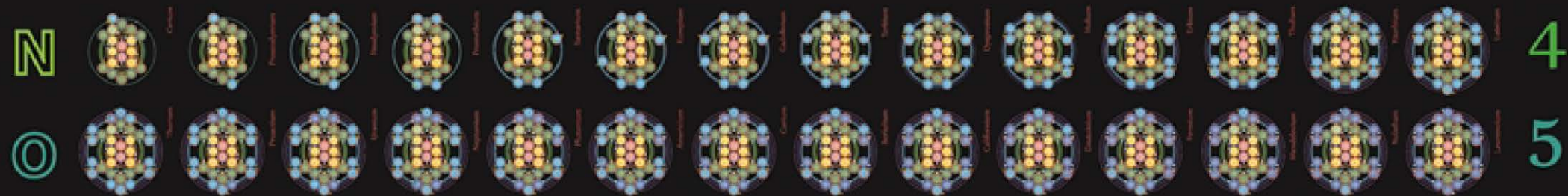
The Mendeleev block arrangement of periodic elements presents a number of problems in representing the true topologies and properties of all the periodic elements:

The table does not reflect the charged quantum geometries of nuclei in each atomic shell



The table is unable to accurately reflect the electron orbitals or other elemental properties described by the Bohr & Schrodinger models

The table maps the atomic number (the number of protons in an atom), not atomic weight in determining the order of the elements in the table resulting in a number of errors in periodic element placements



f orbitals elements are not normally presented in their true atomic number positions



Tetryonic charge geometry rectifies all of these deficiencies

PERIODIC TABLE OF ELEMENTS

modelled on the polar view of the charge topologies of periodic elements

84

[42-42]



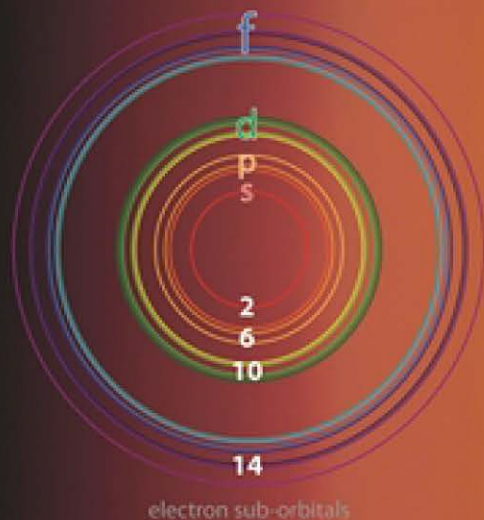
Deuterium
[not Hydrogen]
is the building block
of all elements

Energy levels



Atomic shells

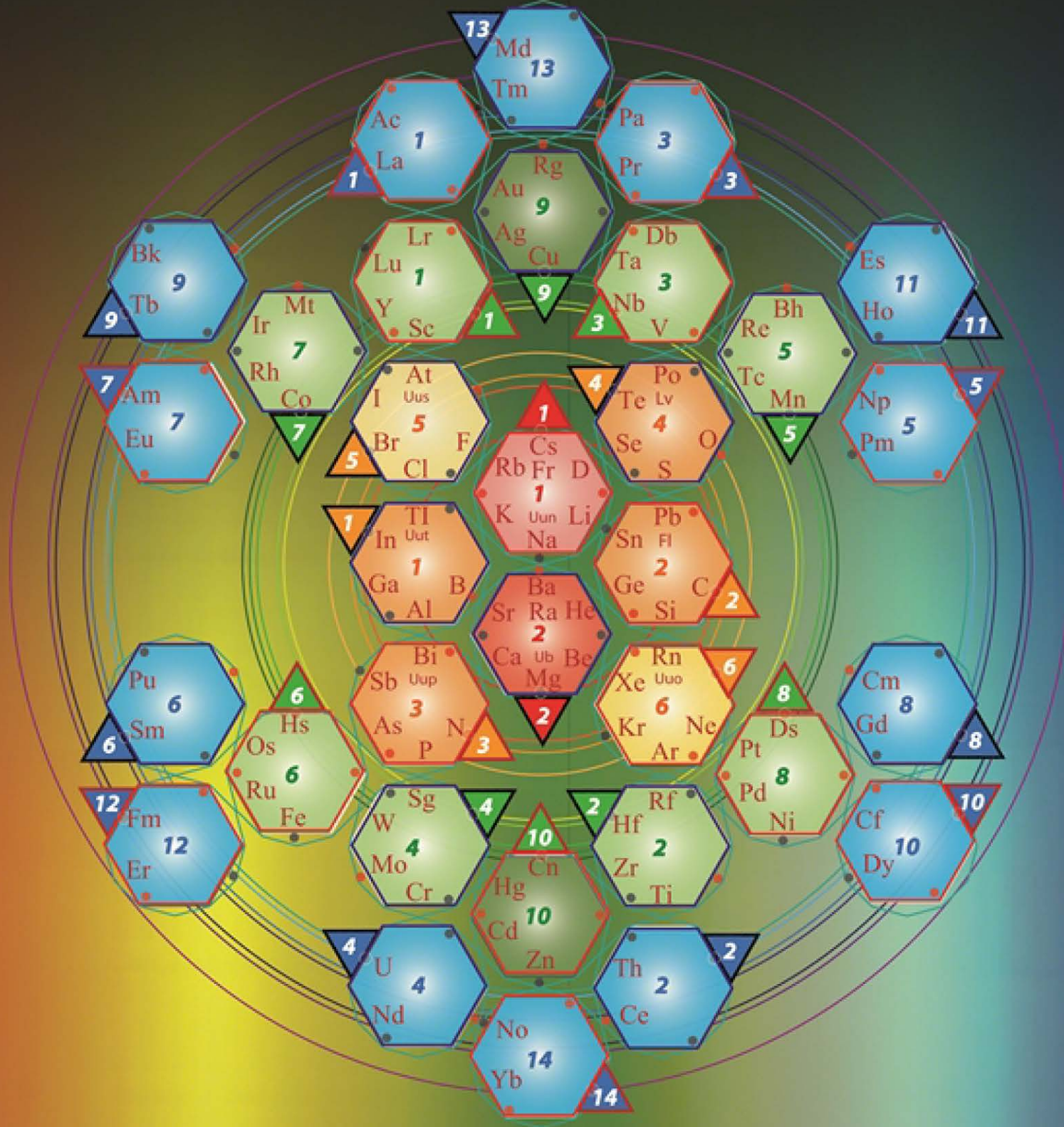
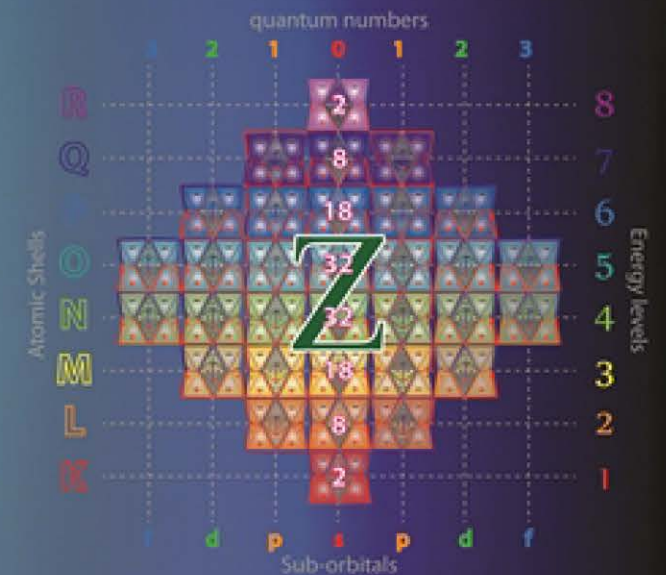
electron orbitals



Periodic element families



3D quantum charge geometry
of periodic element nuclei



THE ATOMIC NUCLEUS

the charged quantum mass-energy geometry of periodic element topologies

Neils Bohr



(7 October 1885 – 18 November 1962)

Erwin Schrödinger



[12 August 1887 – 4 January 1961]

NEILS BOHR

Atomic Shells

R
Q
P
O
N
M
L
K

quantum numbers

3 2 1 0 1 2 3



8
7
6
5
4
3
2
1

Energy levels

SCHRÖDINGER

The Bohr model gives us a basic conceptual model of electrons orbits and energies, along with the idea of quantum jumps.

The Schrodinger wave equation gives precise details of spectra and electron position and motions within the nuclei

electron orbitals

The uncertainty principle erroneously dictates that position and momentum cannot be simultaneously determined.

Periodicity of atomic elements

An electron shell may be thought of as an orbit followed by electrons around an atom's nucleus.
 The closest shell to the nucleus is called the "1 shell" (also called "K shell"), followed by the "2 shell" (or "L shell"), then the "3 shell" (or "M shell"), and so on further and further from the nucleus.
 The shell letters K, L, M, ... are alphabetical

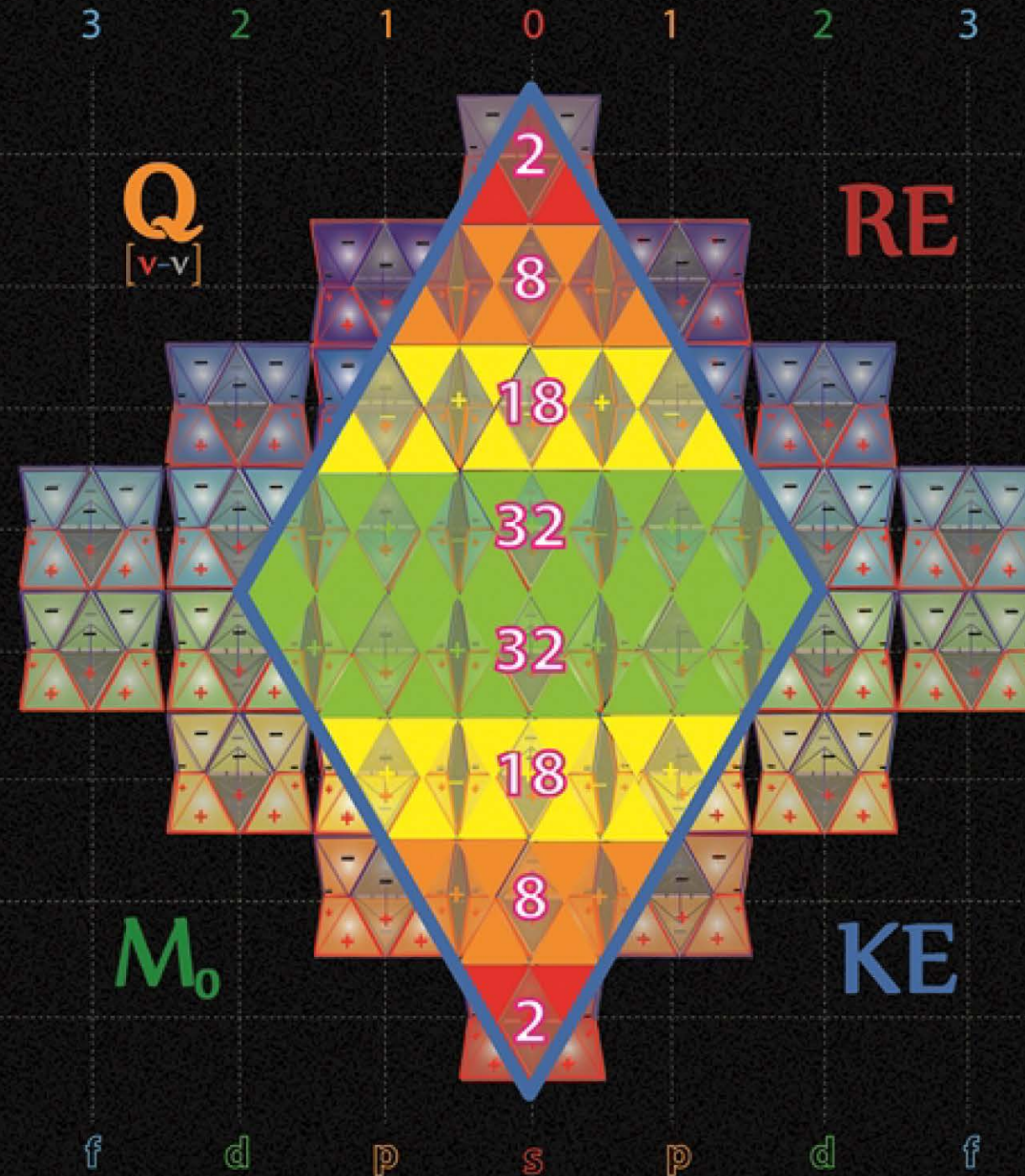
Each shell can contain only a fixed number of deuterium nuclei [Protons, Neutrons & electrons]

Each shell consists of one or more electron orbitals, and each orbital consists of one or more sub-orbitals.

8 atomic energy shells with electrons

Electron Shells

R
Q
P
O
N
M
L
K



electron orbitals

8
7
6
5
4
3
2
1

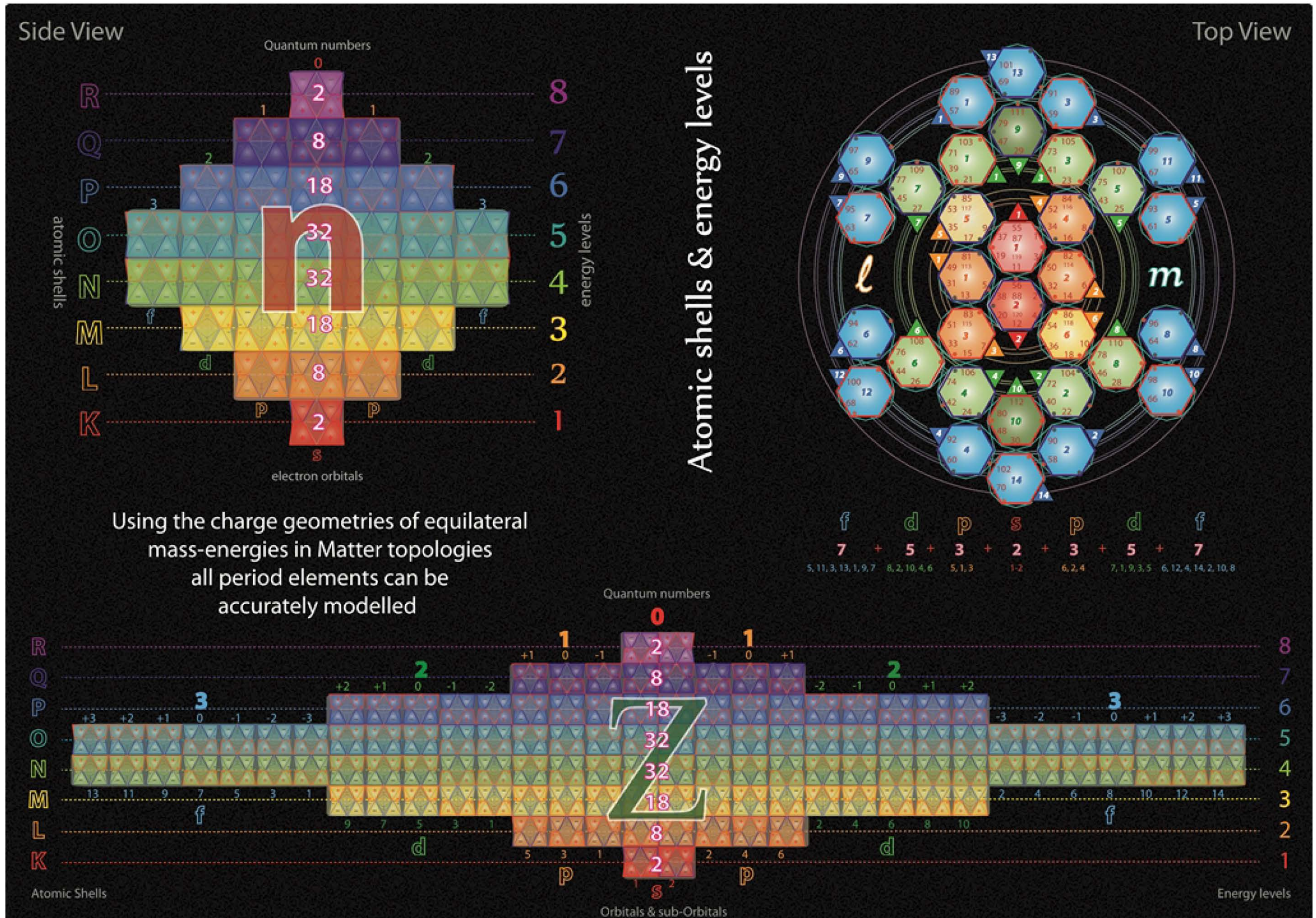
Principal Quantum Numbers

120 periodic elements in total

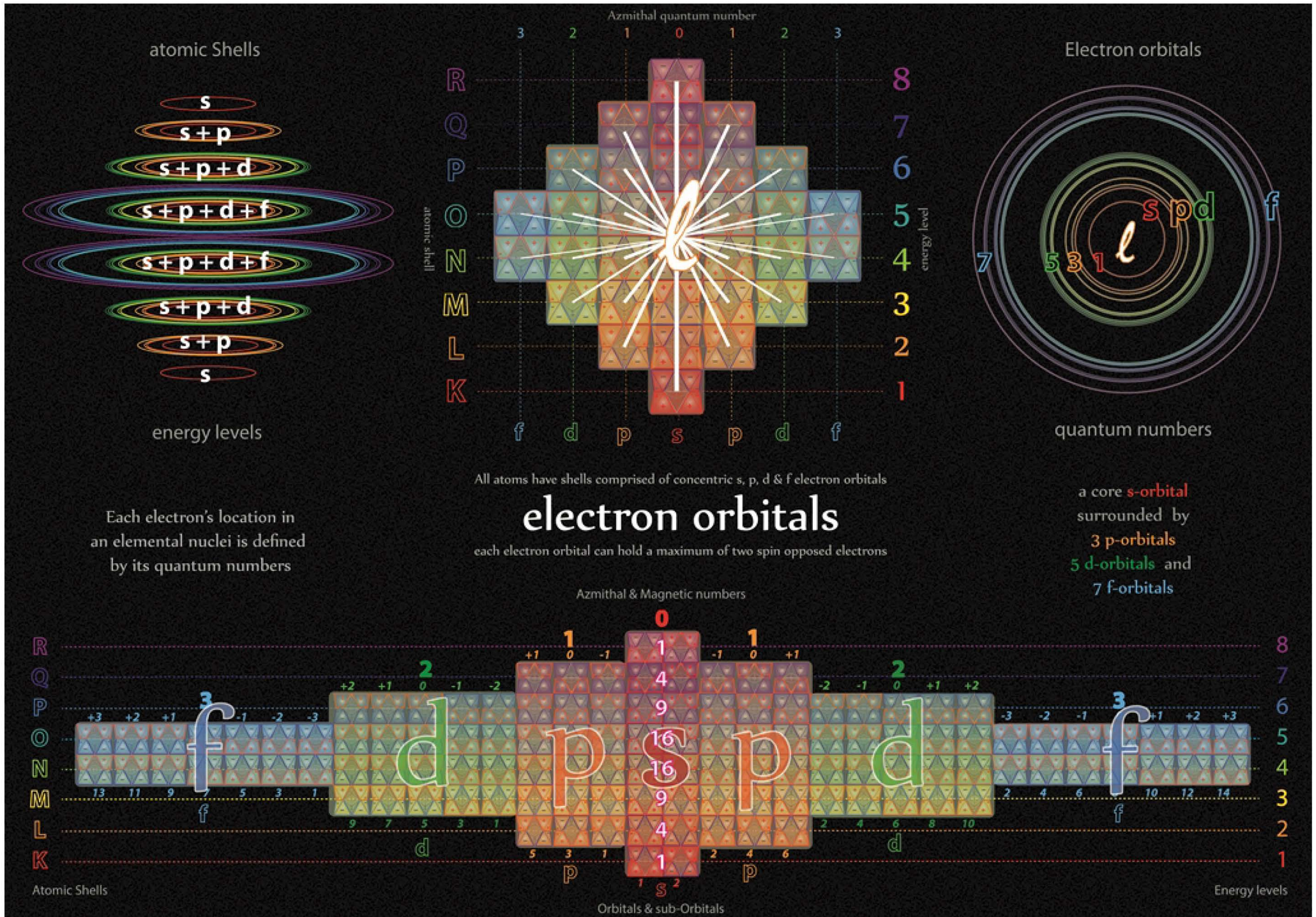
The number of deuterium nuclei that form each atomic shell in an elemental atom number is double that of Photon energy levels

Each atomic shell equates to a specific energy level for the Deuterium nuclei that comprise it with in turn affect the angular momentum of electrons in that shell

The electrons in the partially filled outermost atomic shell [or highest energy level] determine the chemical properties of the atom; they are called valence shell electrons.



Tetryonics 44.03 - Shells & energy levels



Each electron's location in an elemental nuclei is defined by its quantum numbers

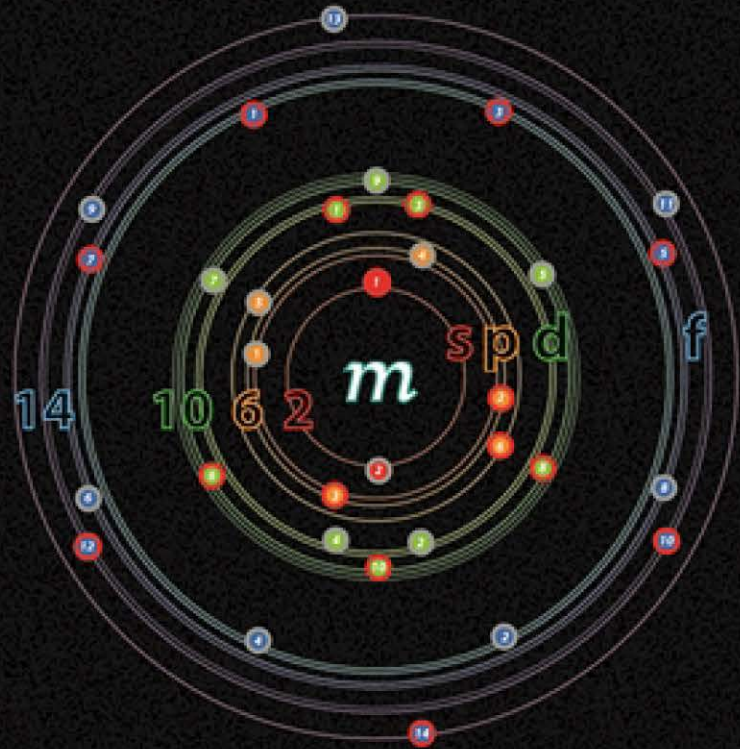
All atoms have shells comprised of concentric s, p, d & f electron orbitals

electron orbitals

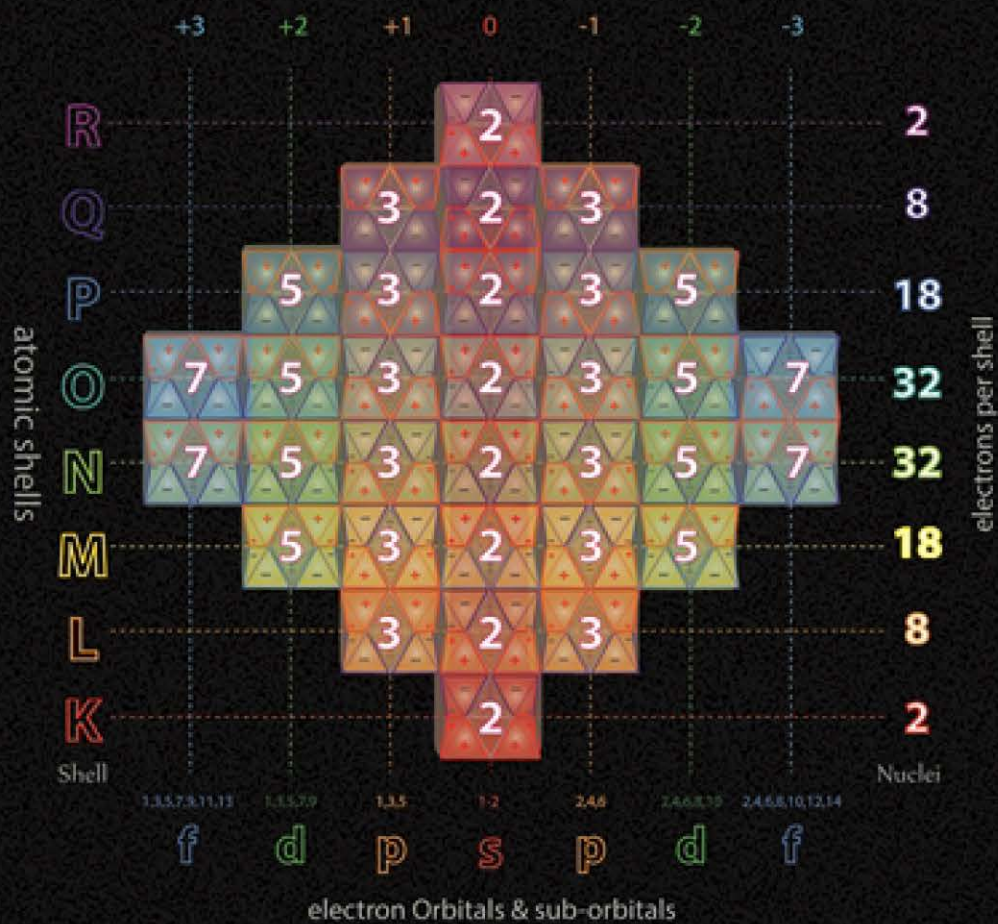
each electron orbital can hold a maximum of two spin opposed electrons

a core s-orbital surrounded by 3 p-orbitals, 5 d-orbitals and 7 f-orbitals

magnetic quantum numbers



Azimuthal & Magnetic numbers

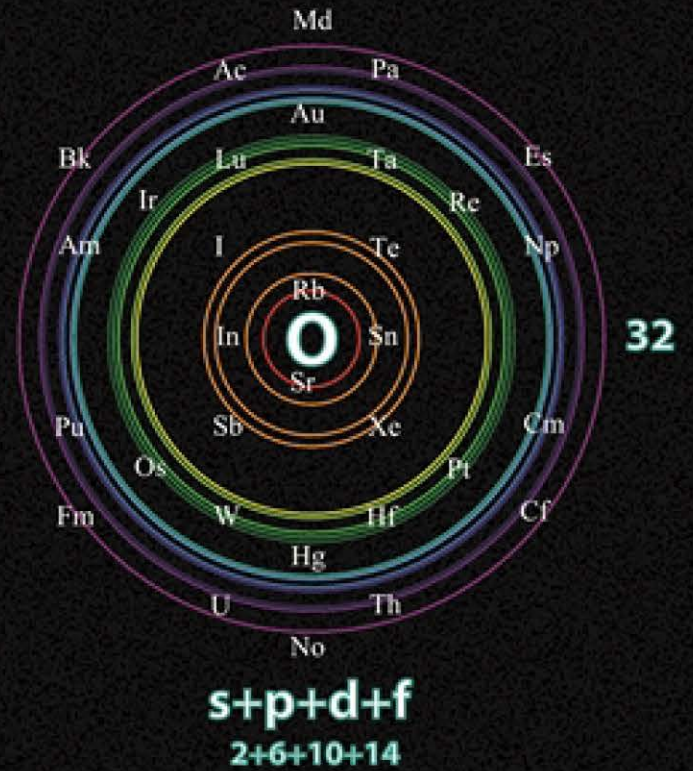
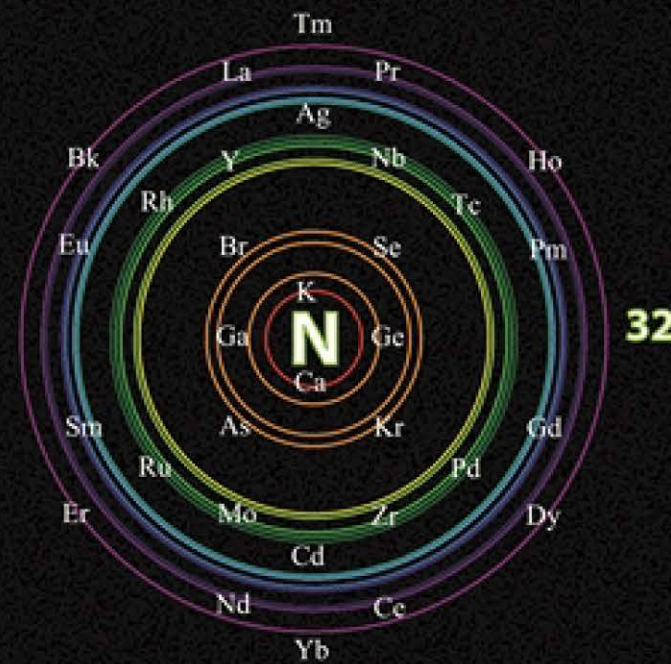


electron sub-orbitals

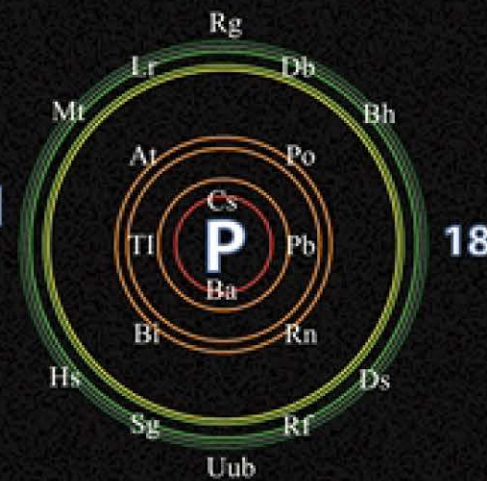
each atomic orbital can hold two spin opposed electrons



$s + p + d + f$
 $2 + 6 + 10 + 14$



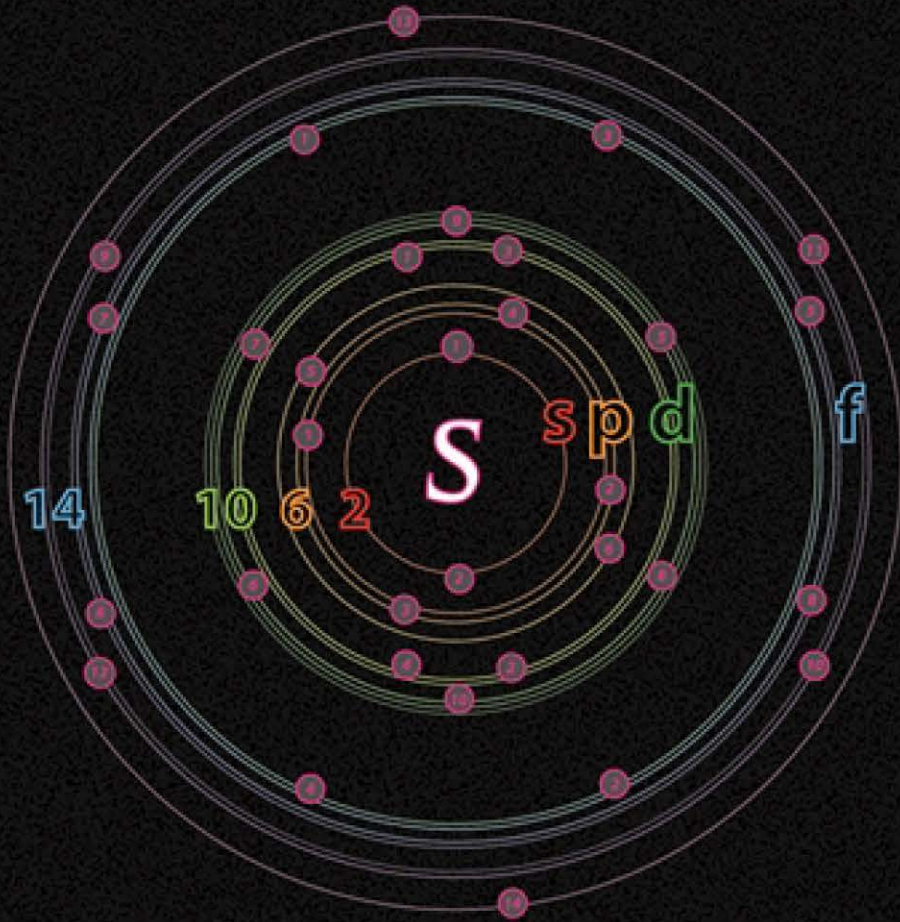
$s + p + d$
 $2 + 6 + 10$



$s + p$
 $2 + 6$

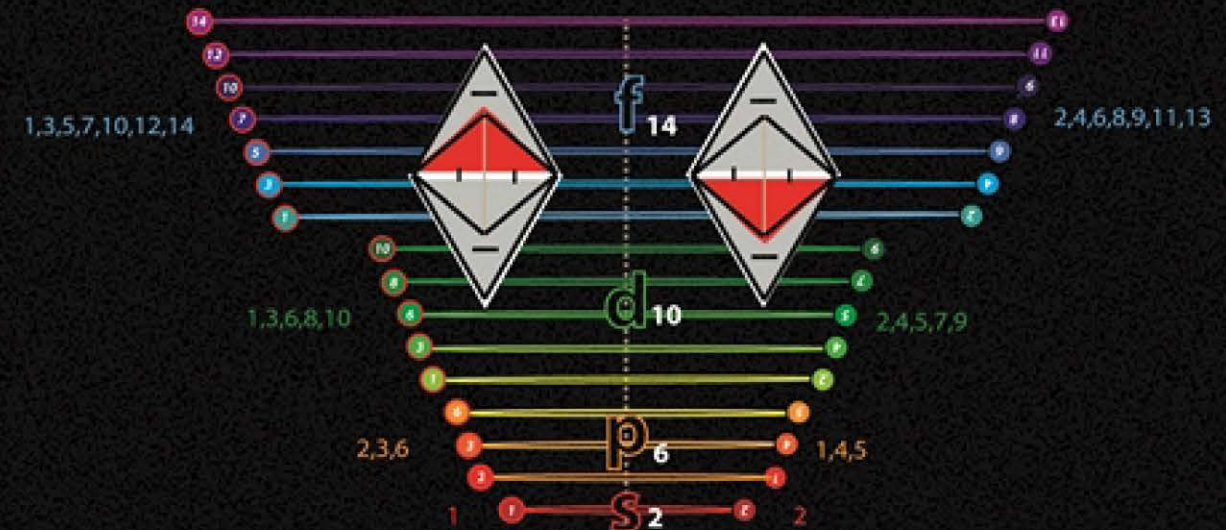
120 elements in 8 quantum levels
[+ Hydrogen as a free radical]

Electron SPIN in atoms

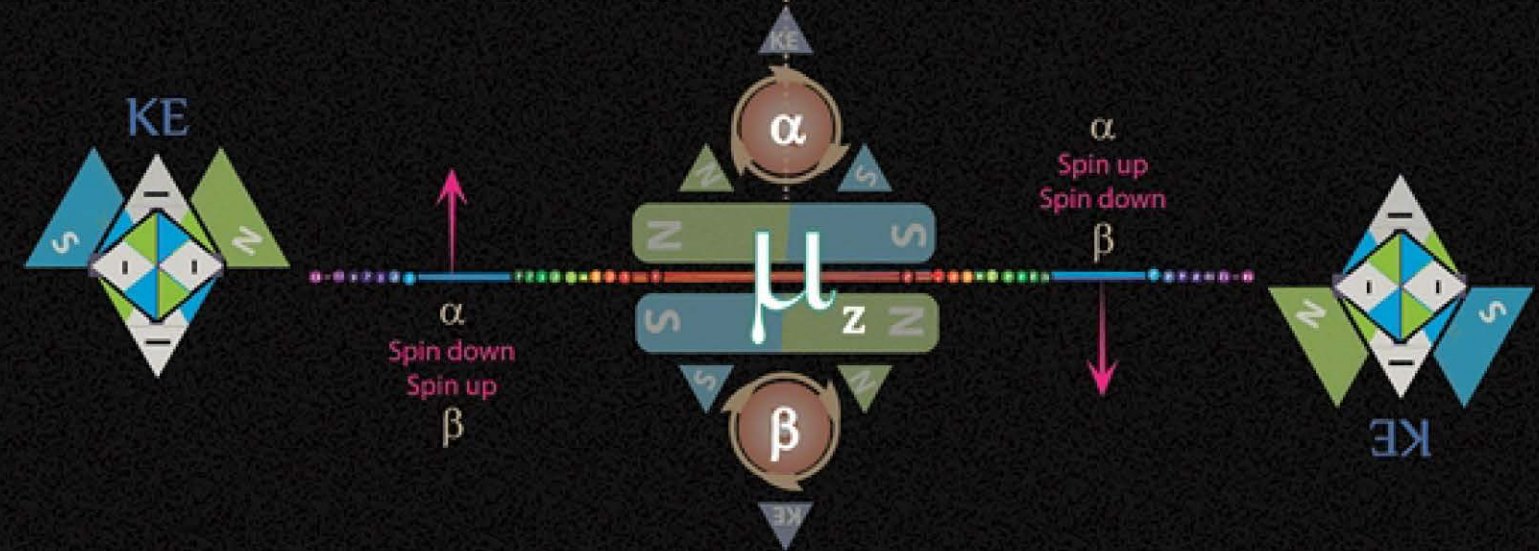
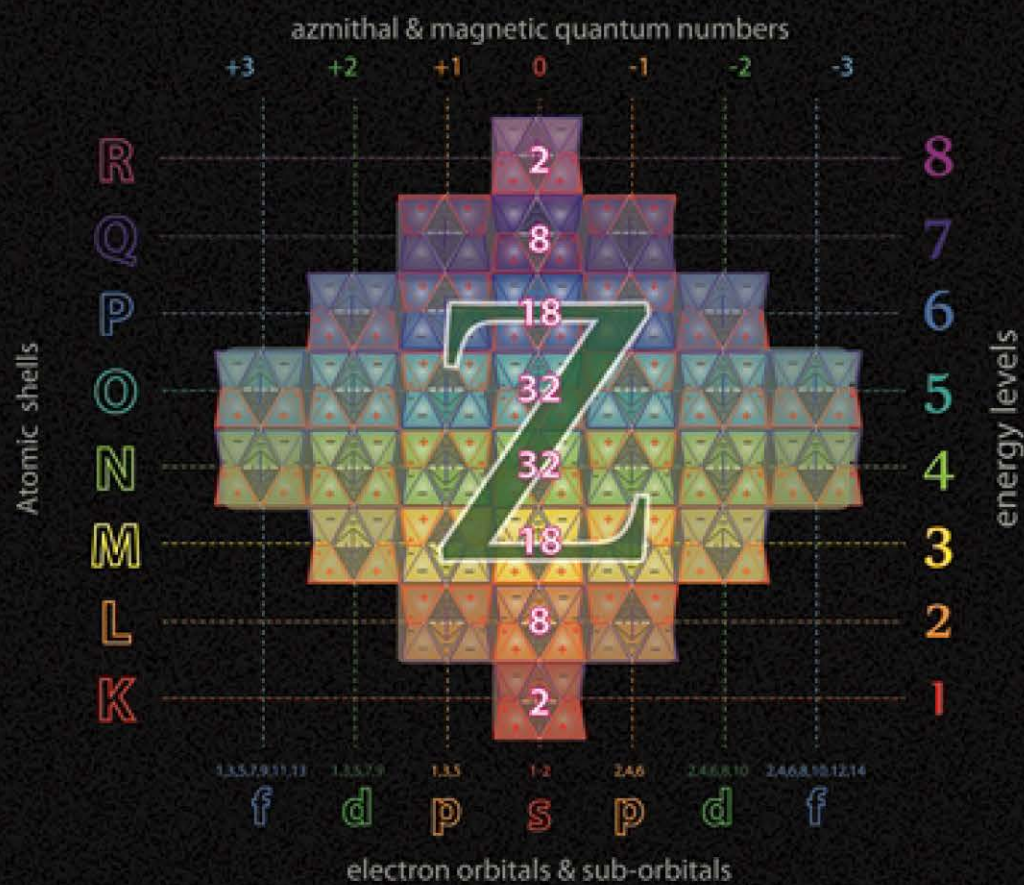


1 sub-Orbit	S	2 electrons
3 sub-Orbits	p	6 electrons
5 sub-Orbits	d	10 electrons
7 sub-Orbits	f	14 electrons

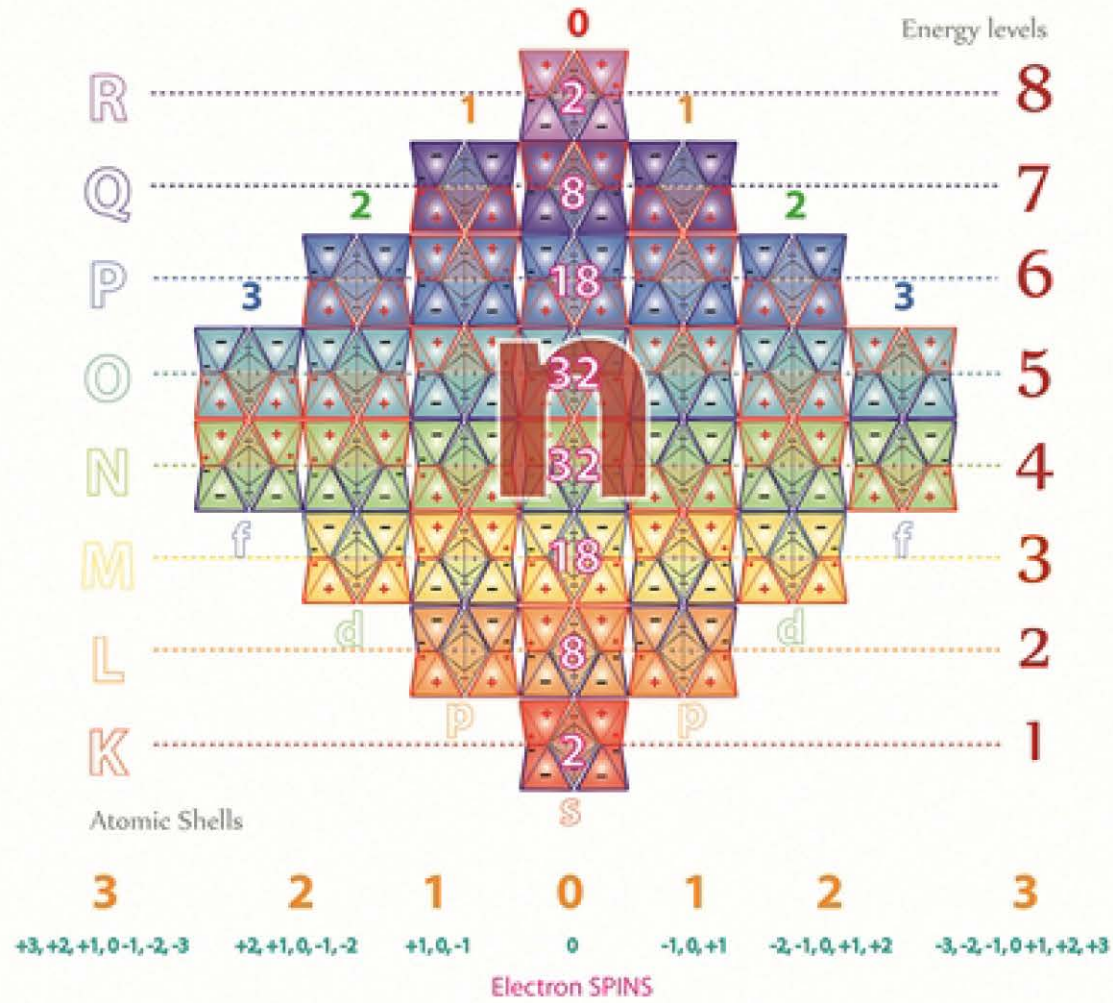
Hund's Rule
Each electron sub-orbital (Azimuthal number) can not have electrons with the same spin direction



electron spin is always referented to the Nuclear magneton



Quantum numbers



The properties of every atom's specific electron configuration can be described by four quantum numbers:

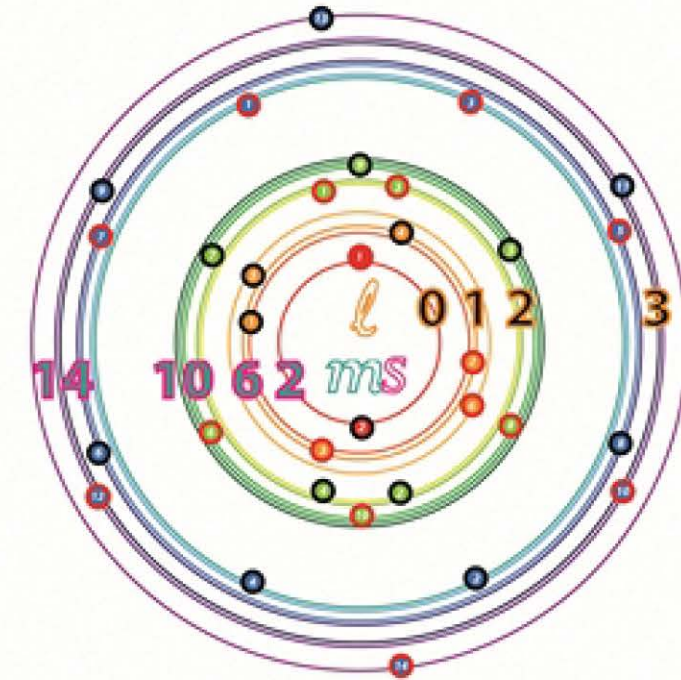
n (1-8)
Principal
($n = 1, 2, 3, 4 \dots$)

l (0-3)
Azimuthal
($l = 0, 1 \dots n-1$)

m (2l+1)
Magnetic
($m_l = -l, -l+1 \dots 0 \dots l-1, l$)

s ± 1/2
electron Spin
($m_s = -1/2$ or $+1/2$)

The Bohr model was a one-dimensional model that used one quantum number to describe the distribution of electrons

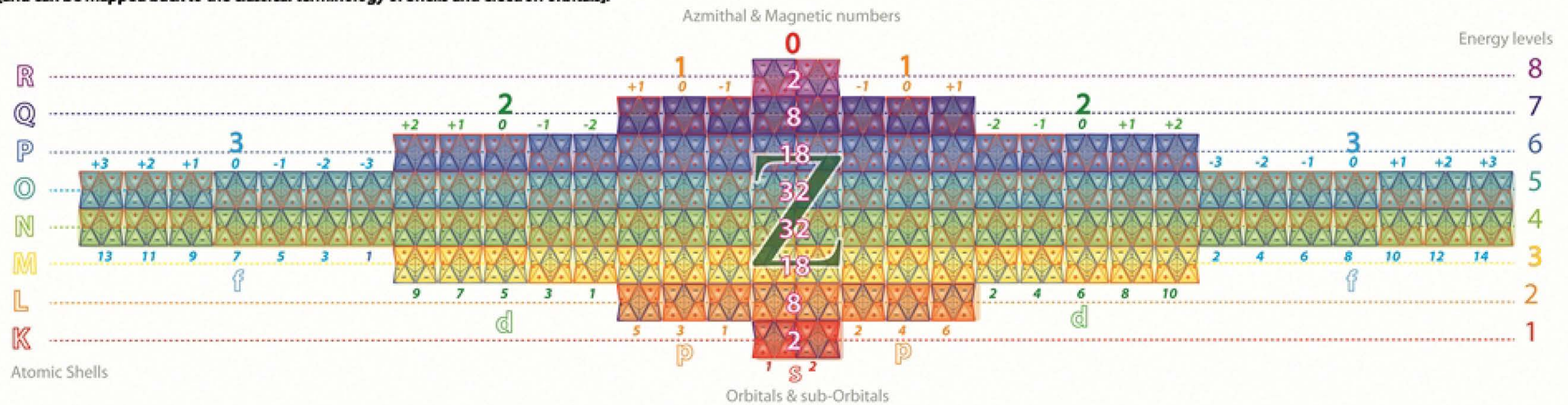


The three coordinates that come from Schrödinger's wave equations are the principal (n), angular (l), and magnetic (m) quantum numbers.

These quantum numbers describe the size, shape, and orientation in space of the orbitals of any particular atom mathematically.

These four numbers, n, l, m and s can be used to describe any electron in a stable atom [and can be mapped back to the classical terminology of Shells and electron orbitals].

Each electron's quantum numbers are unique and cannot be shared by another electron in that atom.



A stable atom has equal numbers of Protons, electrons [and Neutrons], all following the Pauli Exclusion Principle thus orientating their spins so that each element has a unique electron configuration

PRINCIPAL quantum number

The first describes the electron shell, or energy level, of an atom.

This is the only quantum number introduced by the Bohr model

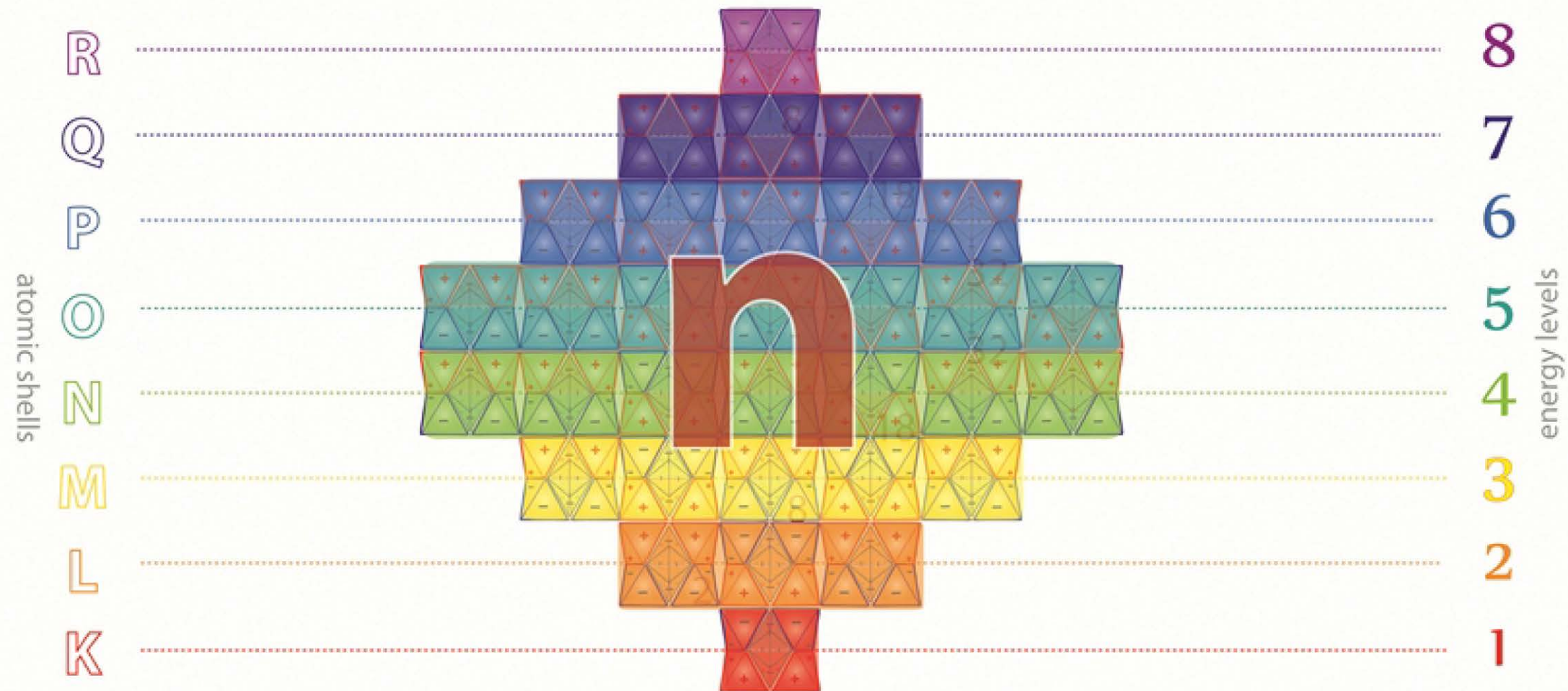
The principal quantum number can only have positive integer values

atomic shells

$$n(1-8)$$

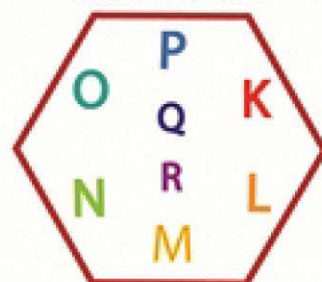
(n = 1, 2, 3, 4 ...)

energy levels



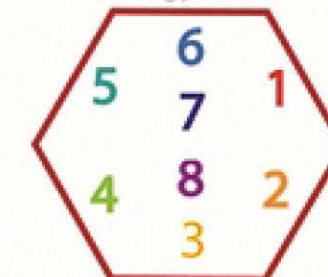
As energies of the Baryons comprising the atomic nuclei increases, the electron bound to each nuclei also possesses more KEM field energies and is therefore less tightly bound to the nucleus

Atomic Shells



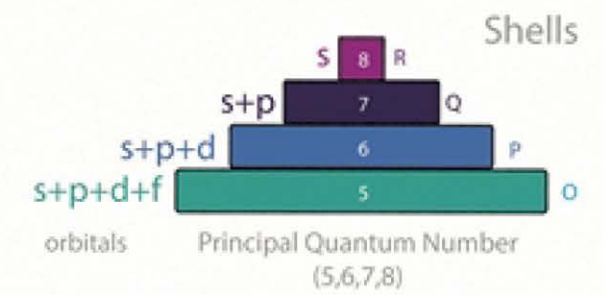
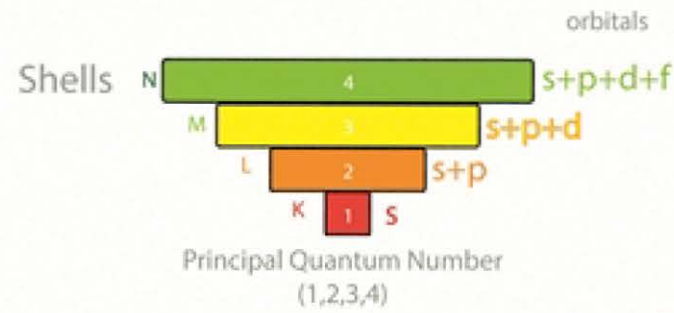
(K, L, M, N, O, P, Q, R)
Atomic shells relate directly to Principal quantum numbers
(1, 2, 3, 4, 5, 6, 7, 8)

Energy levels



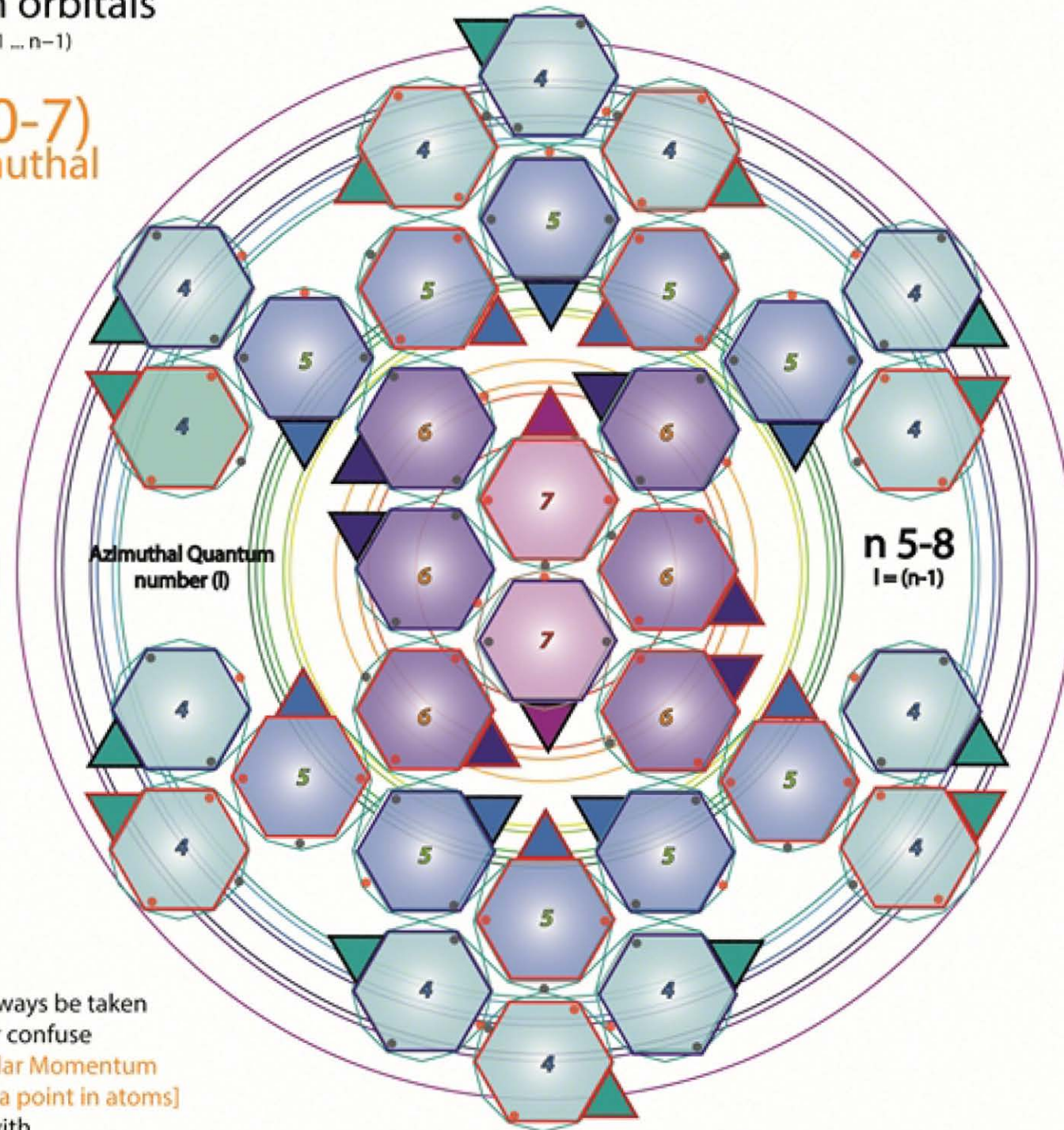
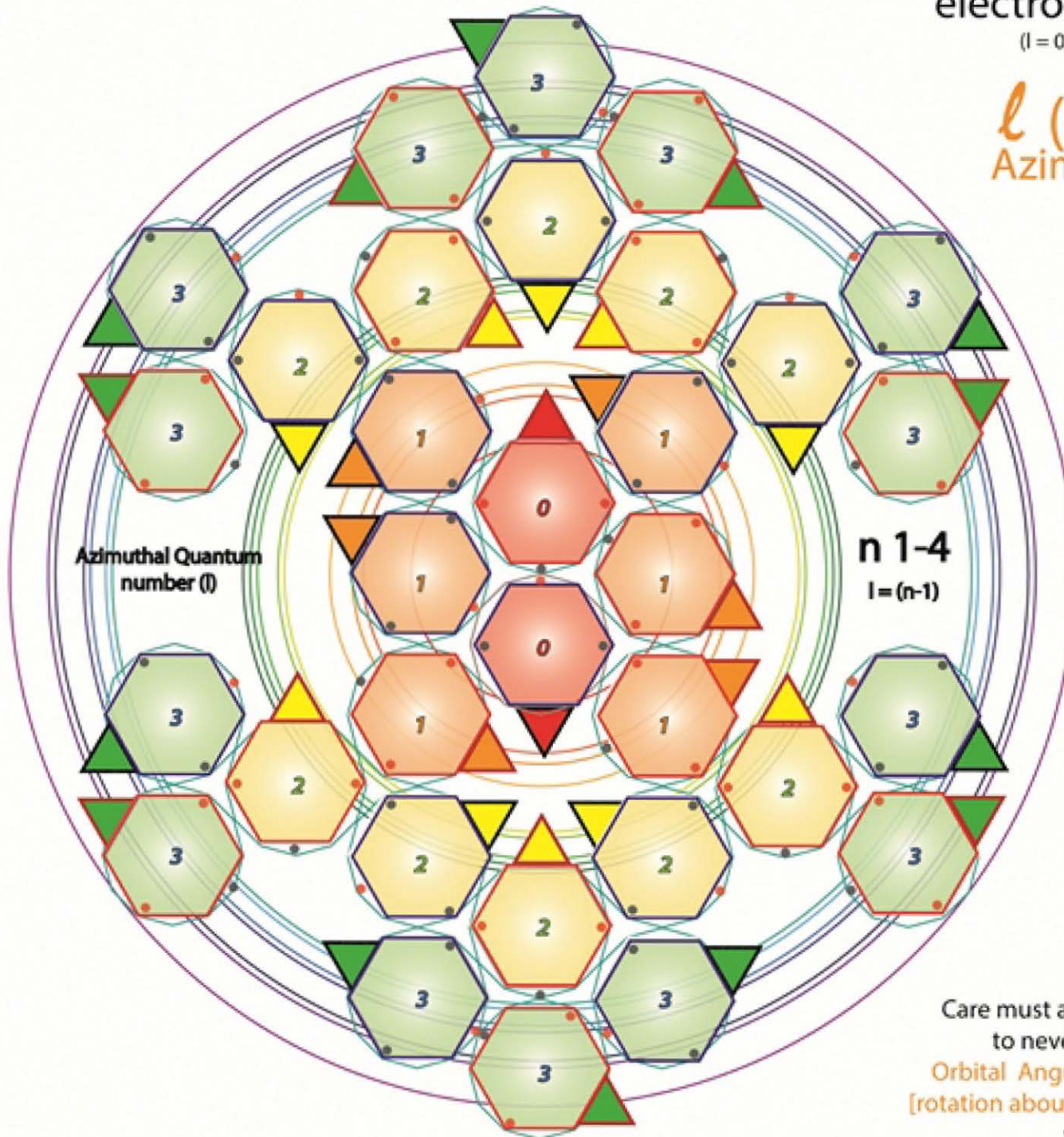
AZMITHAL quantum number

The azimuthal quantum number is a quantum number assigned to any atomic orbital that describes its orbital angular momentum and determines the shape of the electron orbital



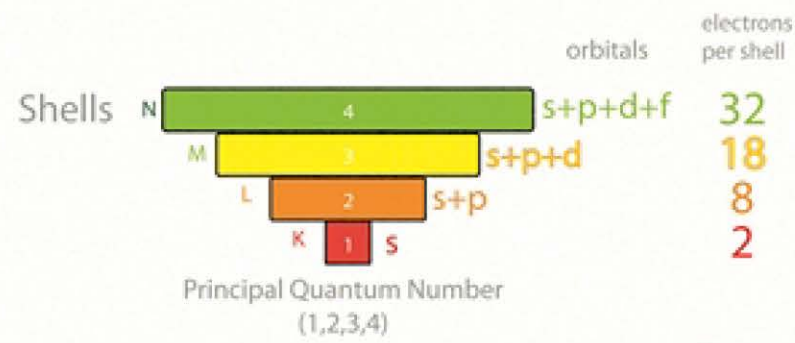
s p d f
electron orbitals
($l = 0, 1 \dots n-1$)

l (0-7)
Azimuthal

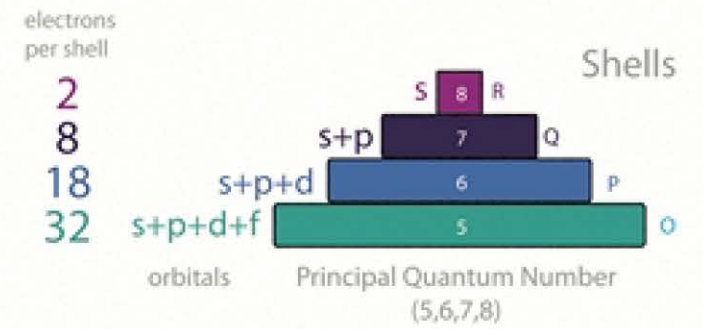


Care must always be taken to never confuse
Orbital Angular Momentum [rotation about a point in atoms]
with
Quantised Angular Momenta [equilateral Planck energy geometries]

MAGNETIC quantum number

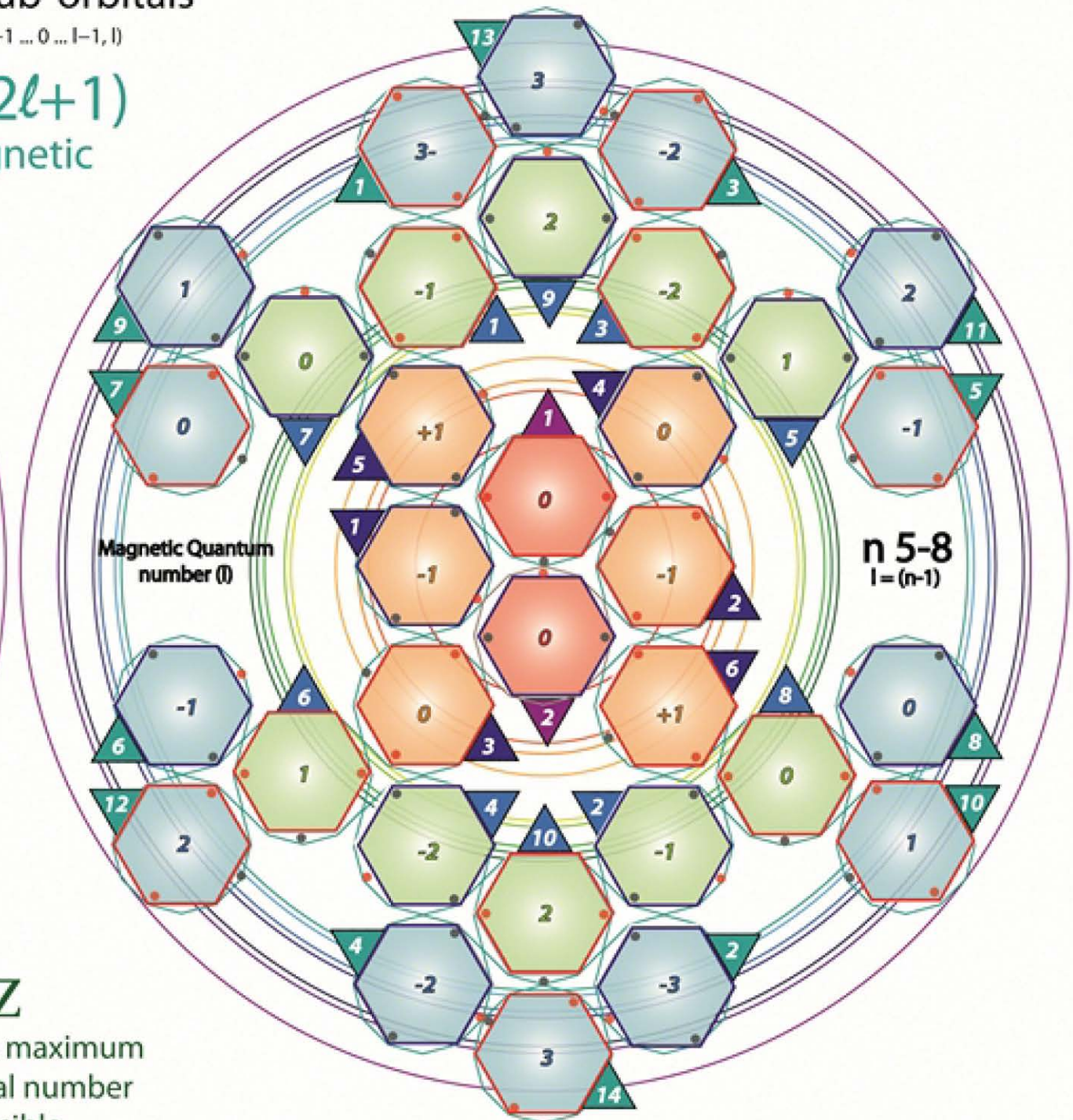
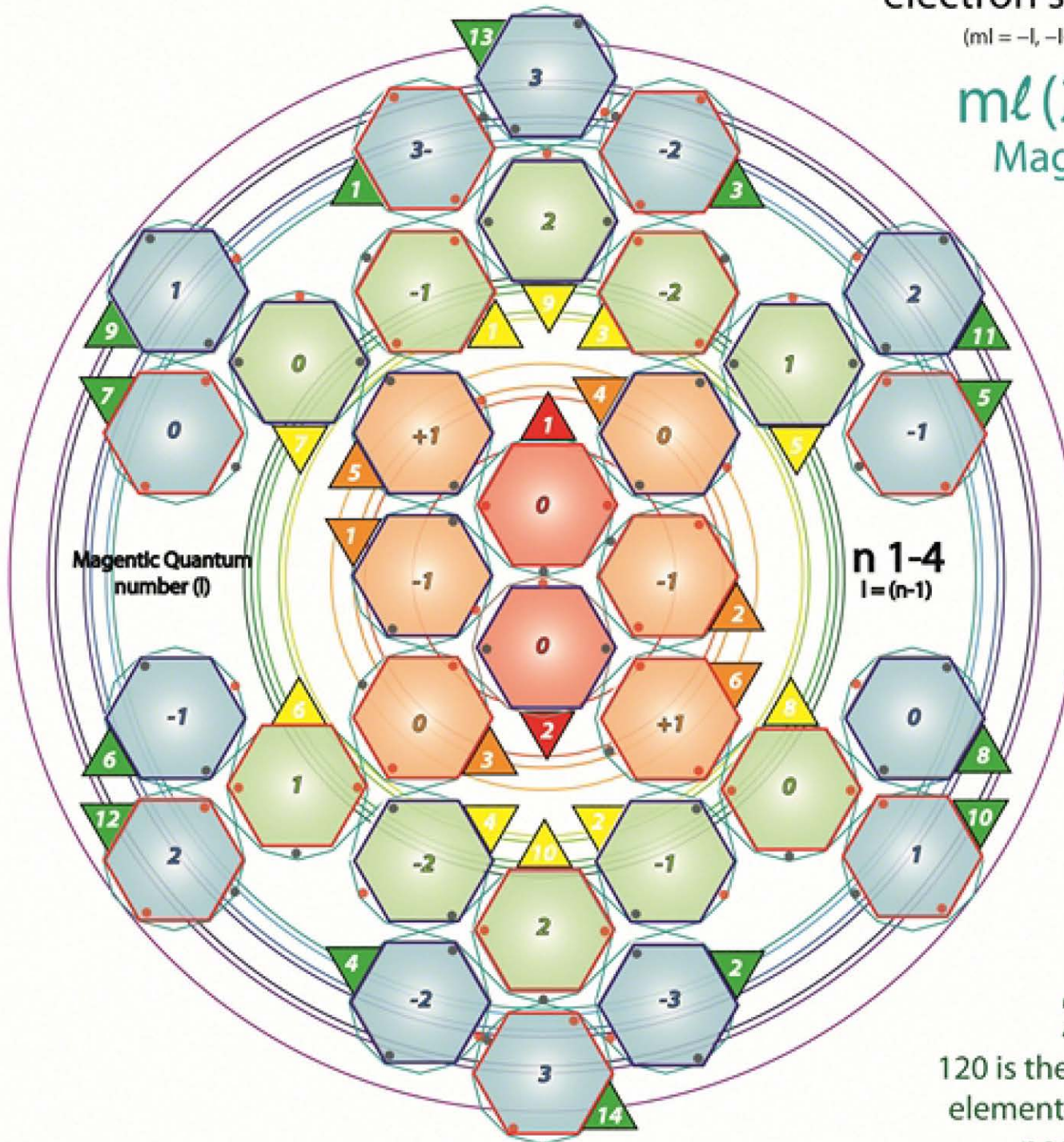


The magnetic quantum number denotes the energy levels available within any subshell
 Magnetic numbers do not continue to increase as the Principal numbers increase
 instead they reverse after n4 to reflect the charged quantum geometry of Elements
 and do not follow the current computer models in popular use



s p d f
 electron sub-orbitals
 (ml = -l, -l+1 ... 0 ... l-1, l)

ml (2l+1)
 Magnetic



Z
 120 is the maximum
 elemental number
 possible

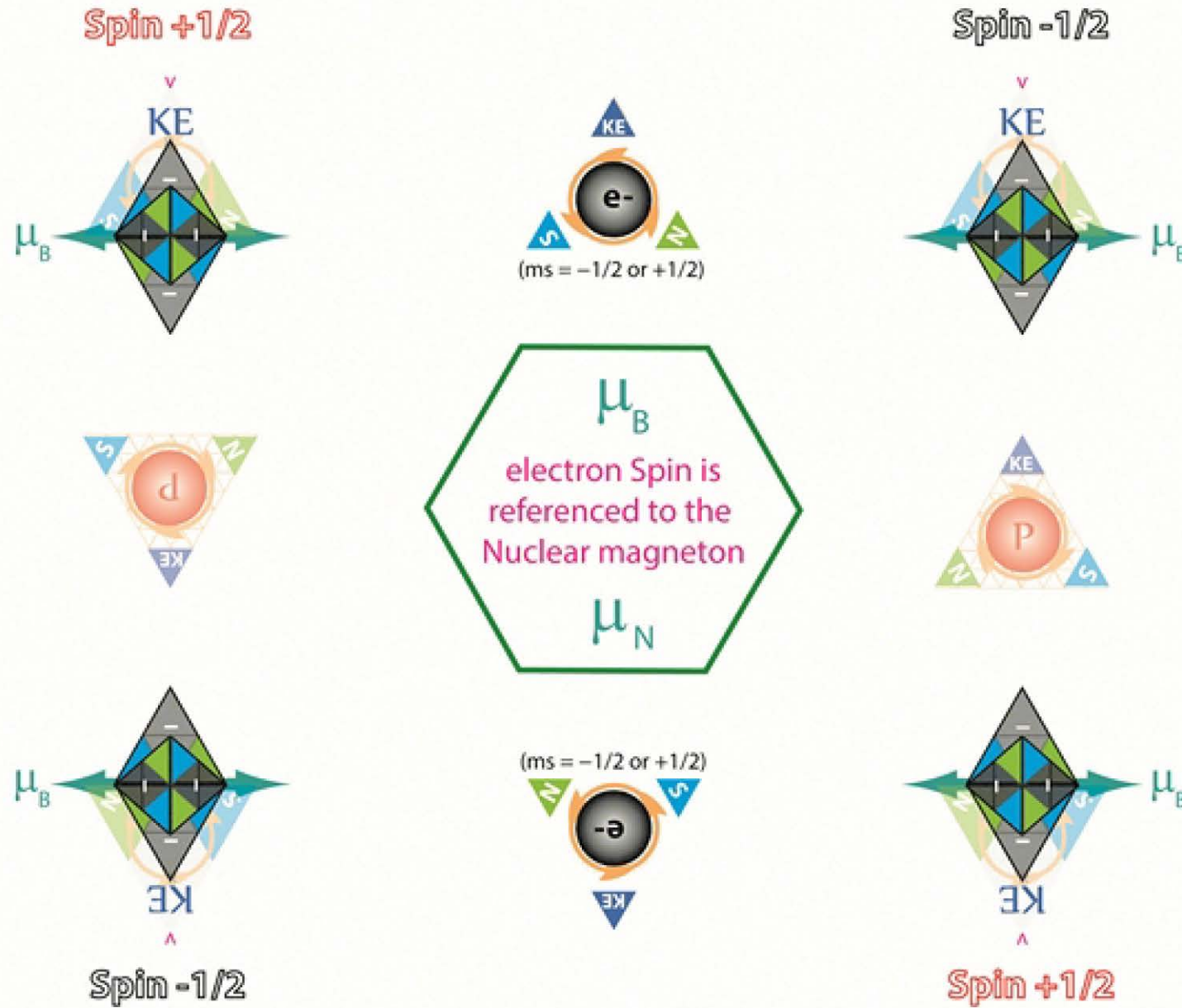
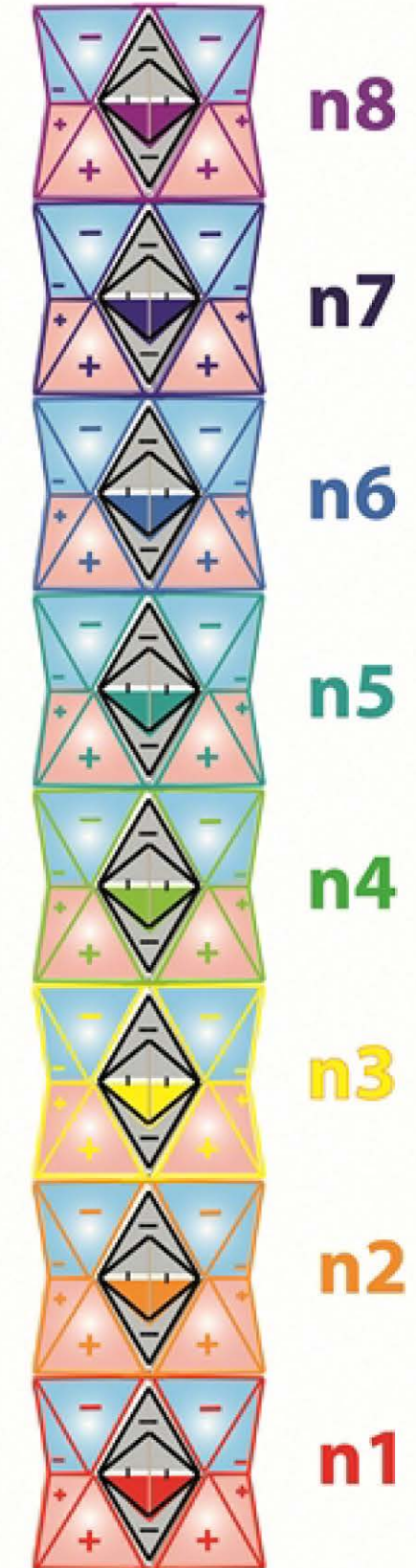
SPIN quantum number

The spin quantum number is a quantum number that parameterizes the intrinsic angular momentum (or spin angular momentum), of any given electron anywhere in an atomic nucleus

parallel magnetic moments
Spin UP
higher coupling energies

anti-parallel magnetic moments
Spin DOWN
lower coupling energies

Electron spin can orientate in either direction within Nuclei, providing the nett spins follow the Hund rule and Pauli exclusion principle



The nuclear energy levels of the Baryons comprising Elemental nuclei determine the energy-momenta of electrons bound to them

Modifying Hund's Rule

Electrons fill orbitals in an alternating sequential numbering pattern due to nucleon placement creating opposed direction electron spins

The increased stability of the atom, most commonly manifested in a lower energy state, arises because the high-spin state forces the unpaired electrons to reside in different spatial orbitals.

A commonly given reason for the increased stability of high multiplicity states is that the different occupied spatial orbitals create a larger average distance between electrons, reducing electron-electron repulsion energy. In reality, it has been shown that the actual reason behind the increased stability is a decrease in the screening of electron-nuclear attractions[1].

The total spin state is calculated as the total number of unpaired electrons + 1, or twice the total spin + 1 written as $2s+1$.

As a result of Hund's rule, constraints are placed on the way atomic orbitals are filled using the Aufbau principle.

Before any two electrons occupy an orbital in a subshell, other orbitals in the same subshell must first each contain one electron. Also, the electrons filling a subshell will have parallel spin before the shell starts filling up with the opposite spin electrons (after the first orbital gains a second electron).

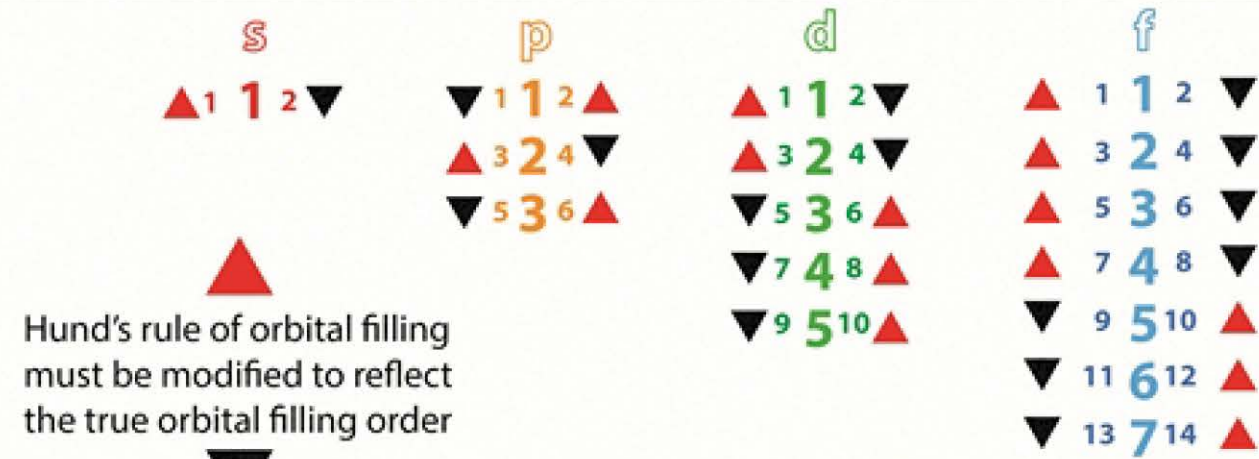
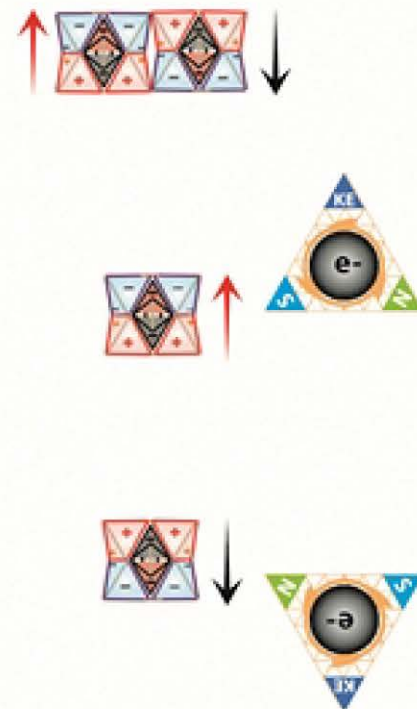
As a result, when filling up atomic orbitals, the maximum number of unpaired electrons (and hence maximum total spin state) is assured

Sub-orbitals fill in order of numbering

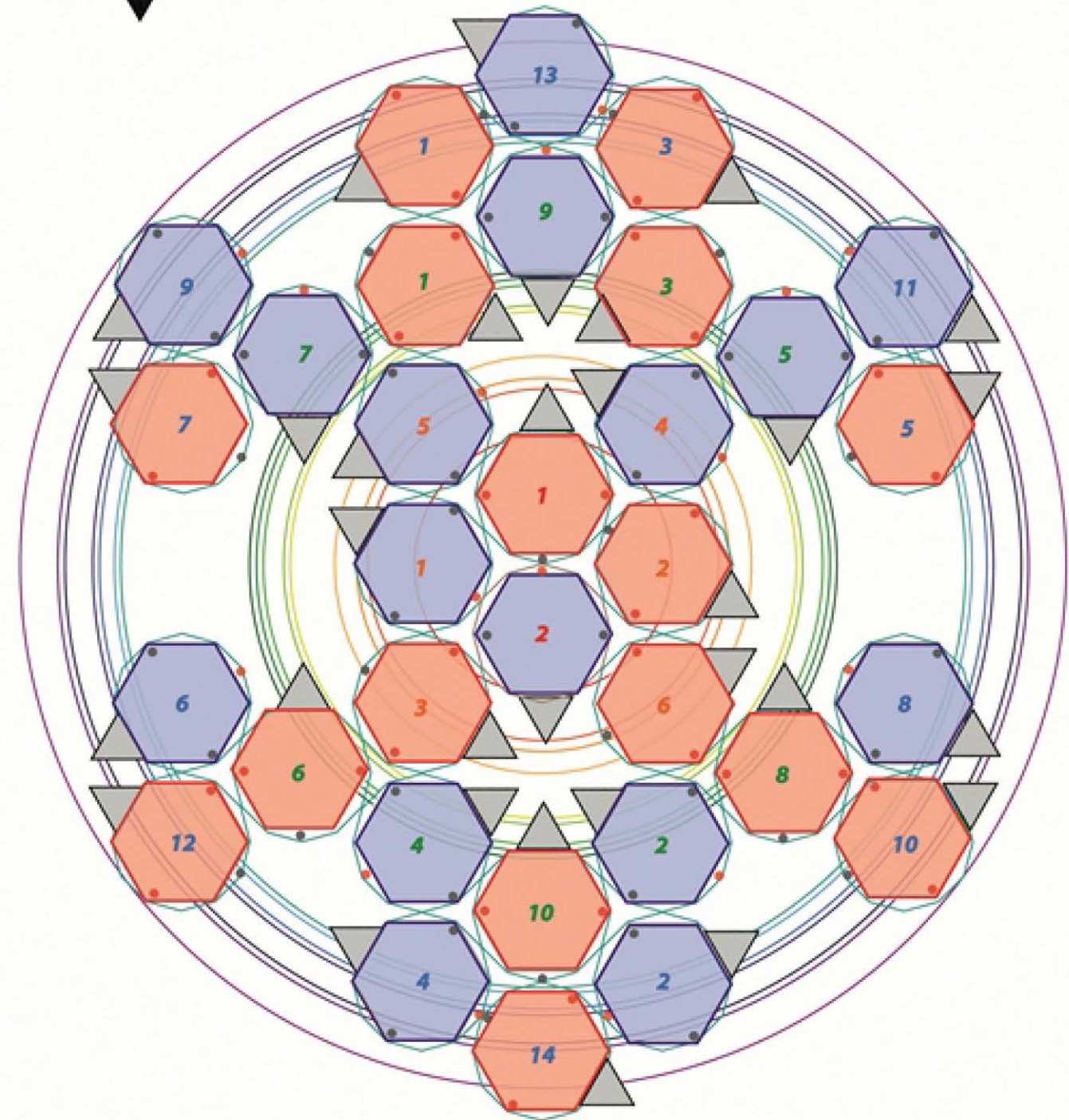
Electrons spins pair before next orbital is filled

ie.

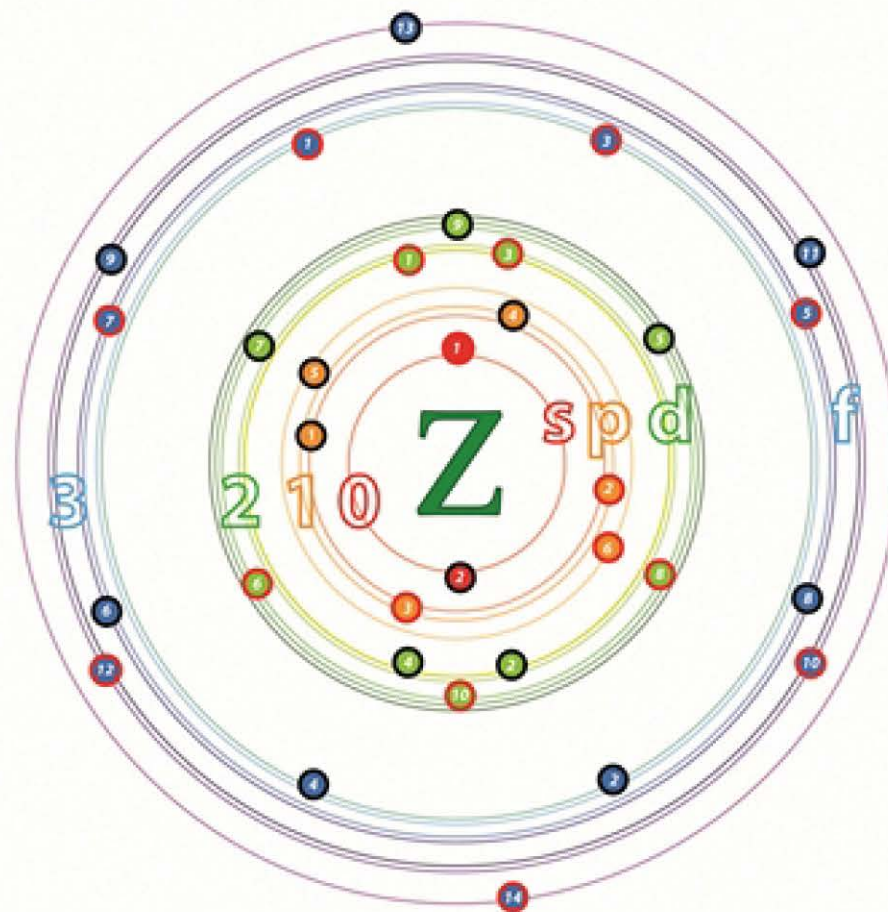
p1 [DOWN] and p2 [UP] fill before
p3 [UP] and p4 [DOWN] before
p5 [DOWN] and p6 [UP] etc



Hund's rule of orbital filling must be modified to reflect the true orbital filling order



Principle quantum Energies



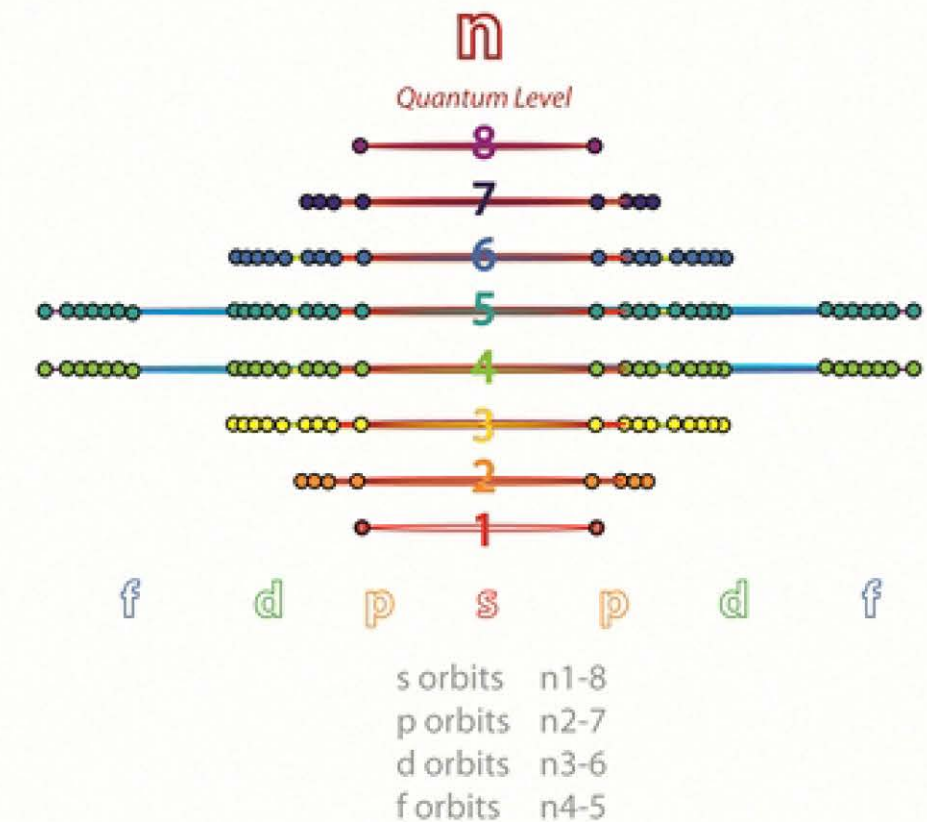
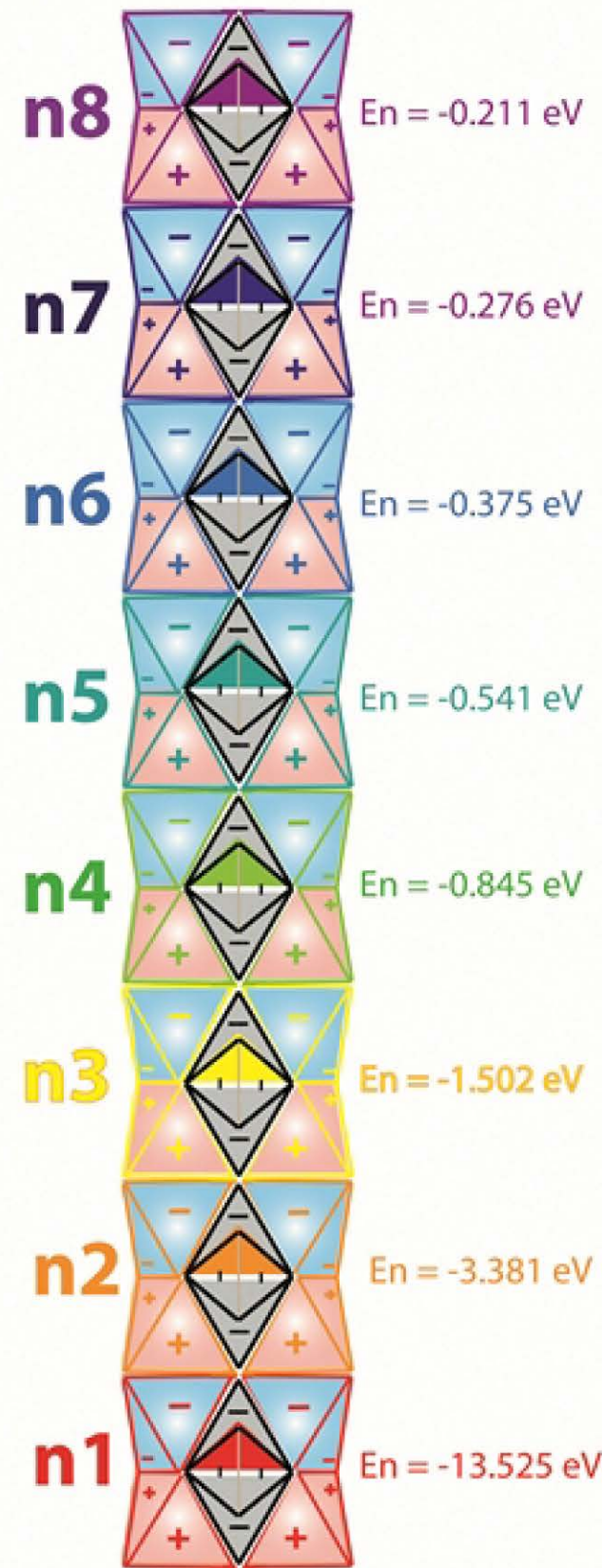
In an atom - electron energies are proportional to their intrinsic Kinetic Energies - which in turn are directly proportional to the quantum energy level of the nuclei which the electron binds to in their respective atomic shells

In a nucleus, lower energy orbits have less 'paired' nuclei supplying energy. The more energy you give a nuclei the faster it causes the bound electron to rotate. If you give the nuclei enough energy, it will impart enough energy to its electron for it to leave the system entirely.

The same is true for an electron orbital. Higher values of n mean more energy for the electron and the corresponding KEM field energies of the electron is larger, resulting in increased angular momentum.

Values of n start at 1 and go up by integer amounts.

If enough energy is added to the system by incident Photons a electron will leave the atom creating a positively charged nuclei [ionisation].



Eigenstate value

KEM field energy [per n] required to exceed 13.525 eV at which point the photo-electron has sufficient KE to break free of the Nucleus

$$E_n = \frac{E_1}{n^2} = \frac{-13.6eV}{n^2}, n = 1, 2, 3...$$

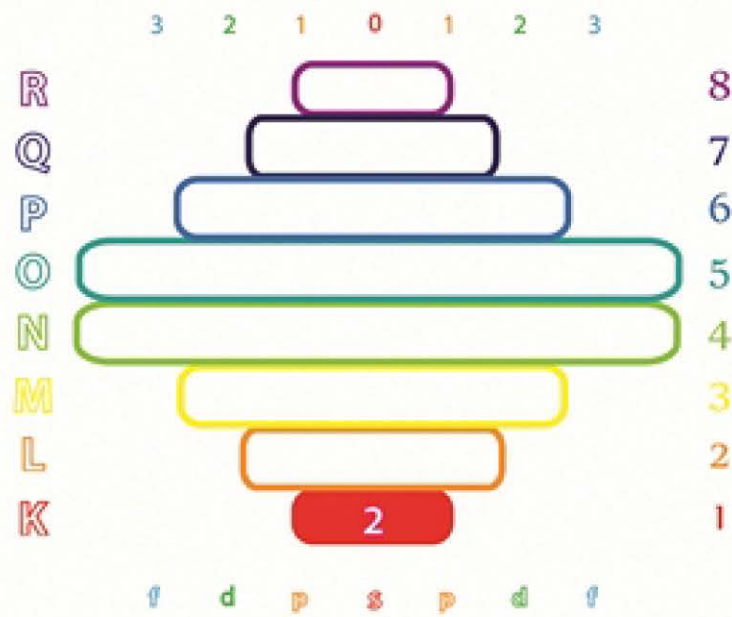
The possible Kinetic Energies (quantum levels) of an electron are directly related to the energy level of the Nuclei in each Quantum Level

Quantum Level 1

The energy levels of bound electrons is determined by Baryons

Z#	Name	Protons	electrons	Neutrons	
1	<i>1s1</i> Deuterium	1	1	1	2
2	<i>1s2</i> Helium	2	2	2	

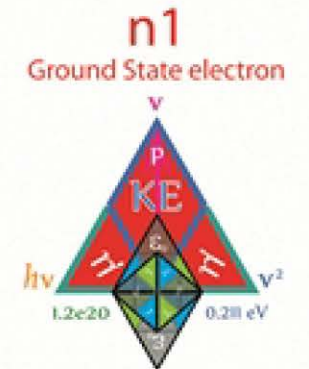
Deuterium [not Hydrogen] is the building block of elements



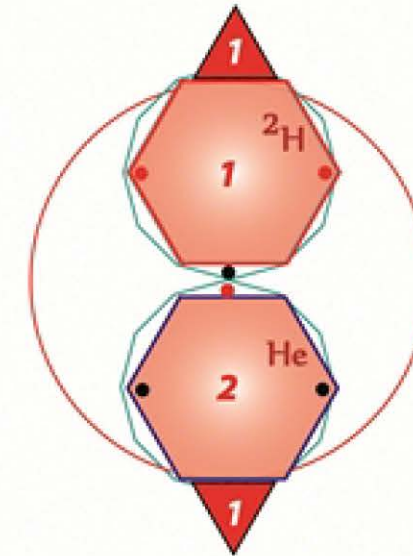
Z#	Name	Protons	electrons	Neutrons
1	<i>1s1</i> Hydrogen	1	1	0

Hydrogen is a free radical element

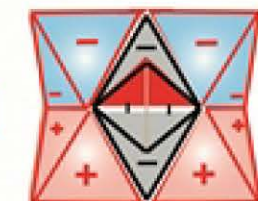
K shell



$$iE = -13.313 \text{ eV}$$



n1



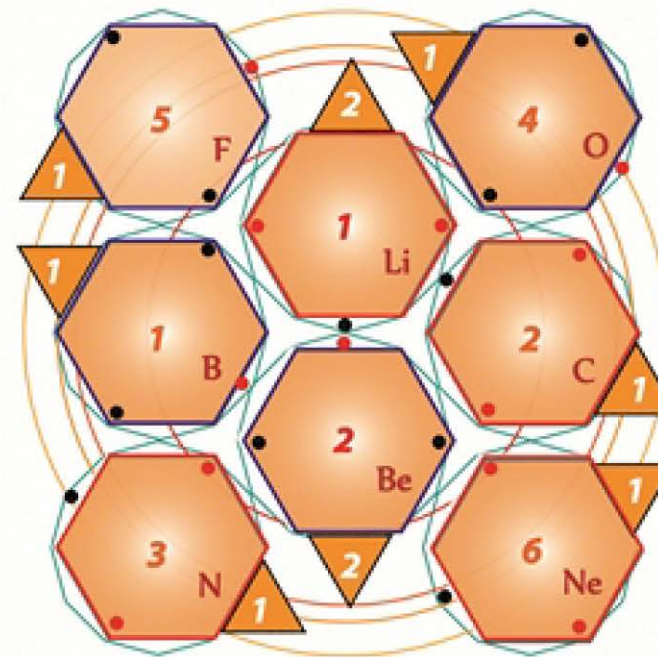
Quantum Level 2

The energy levels of bound electrons is determined by Baryons

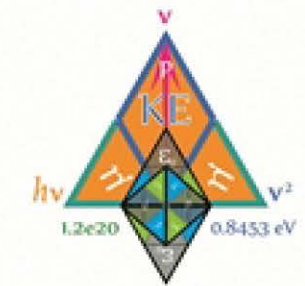
Z#	Name	Protons	electrons	Neutrons
3	2s1 Lithium	3	3	3
4	2s2 Beryllium	4	4	4
5	1p1 Boron	5	5	5
6	1p2 Carbon	6	6	6
7	1p3 Nitrogen	7	7	7
8	1p4 Oxygen	8	8	8
9	1p5 Fluorine	9	9	9
10	1p6 Neon	10	10	10

8

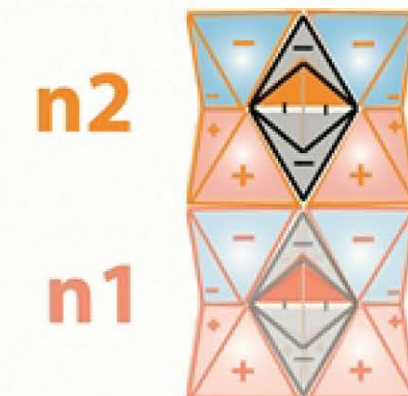
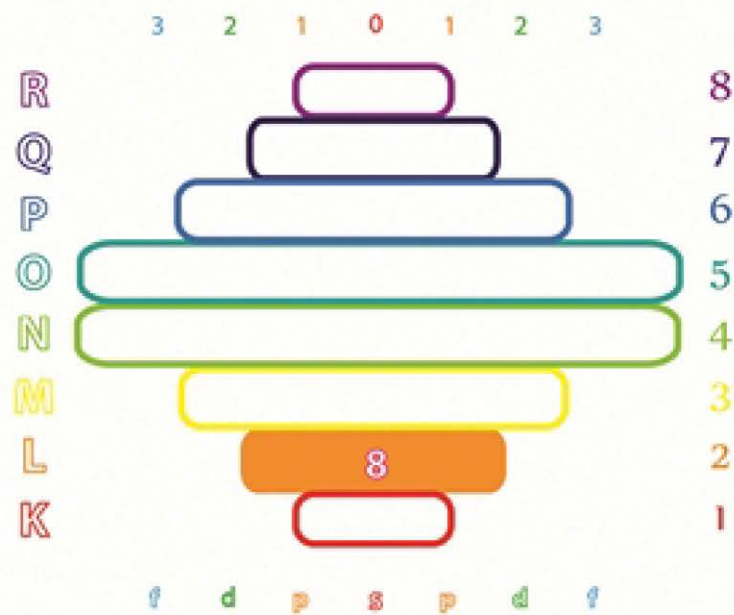
Deuterium [not Hydrogen] is the building block of elements



L shell
n2
Ground State electron



$$iE = -12.679 \text{ eV}$$



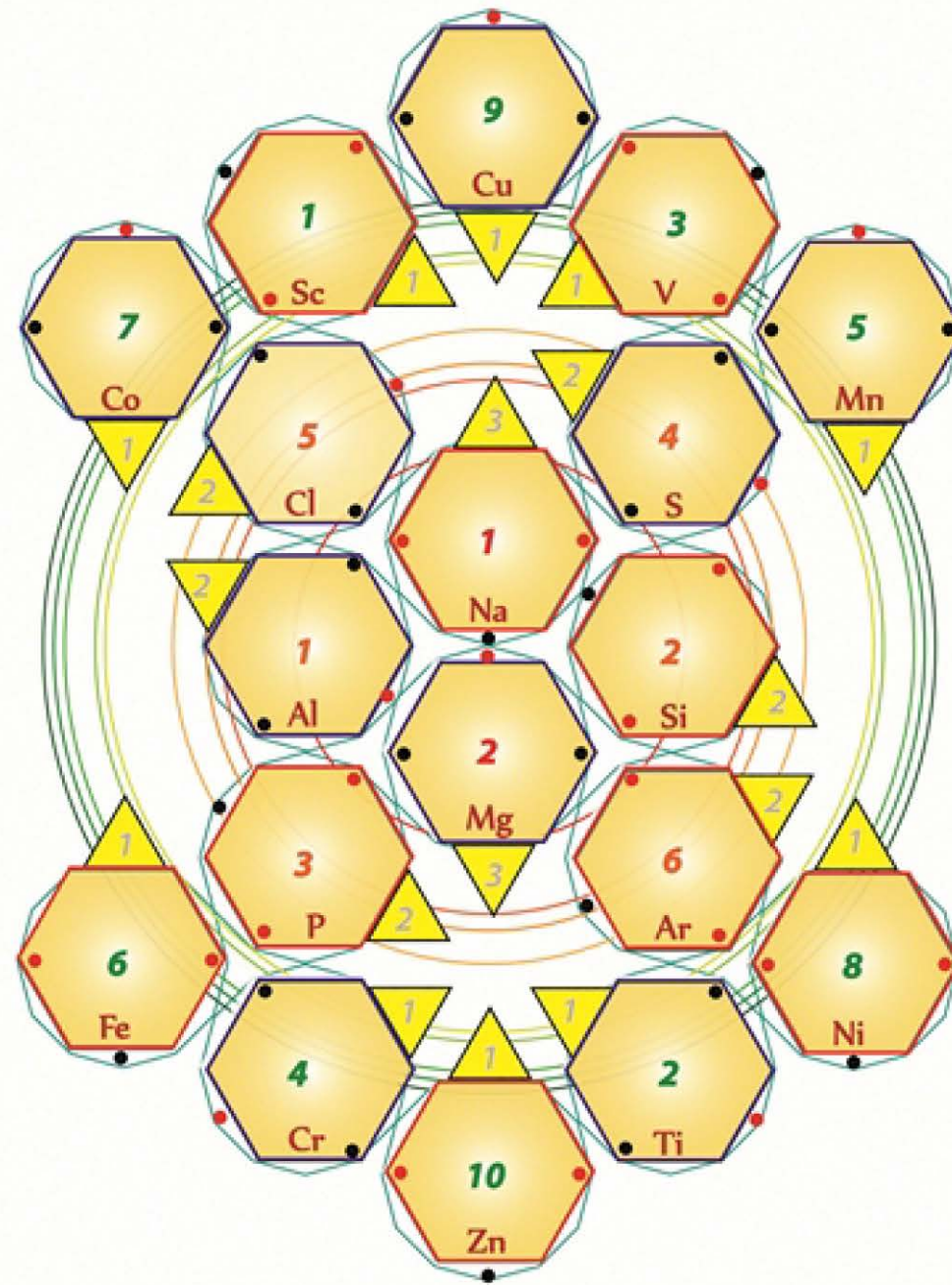
Quantum Level 3

The energy levels of bound electrons is determined by Baryons

Z#	Name	Protons	electrons	Neutrons
11	3s1 Sodium	11	11	11
12	3s2 Magnesium	12	12	12
13	2p1 Aluminium	13	13	13
14	2p2 Silicon	14	14	14
15	2p3 Phosphorus	15	15	15
16	2p4 Sulfur	16	16	16
17	2p5 Chlorine	17	17	17
18	2p6 Argon	18	18	18
21	3d1 Scandium	21	21	21
22	3d2 Titanium	22	22	22
23	3d3 Vanadium	23	23	23
24	3d4 Chromium	24	24	24
25	3d5 Manganese	25	25	25
26	3d6 Iron	26	26	26
27	3d7 Cobalt	27	27	27
28	3d8 Nickel	28	28	28
29	3d9 Copper	29	29	29
30	3d10 Zinc	30	30	30

18

Deuterium [not Hydrogen] is the building block of elements

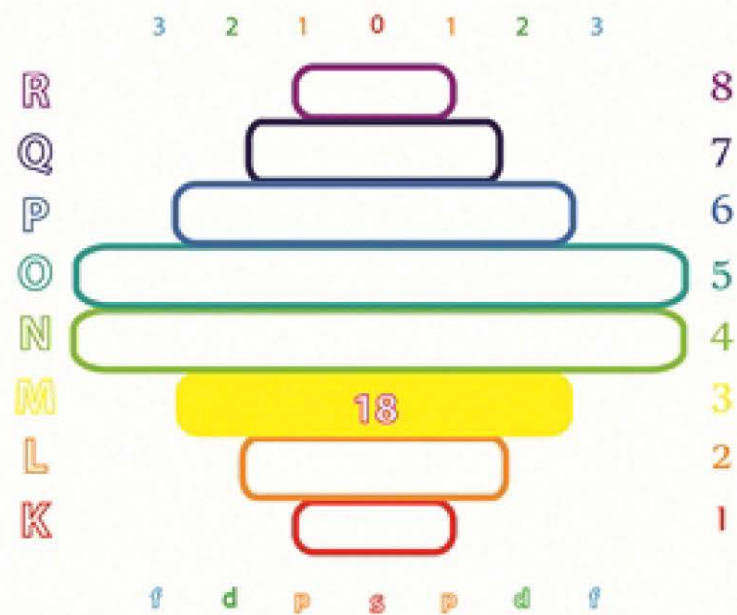


M shell
n3
Ground State electron



$$iE = -11.623 \text{ eV}$$

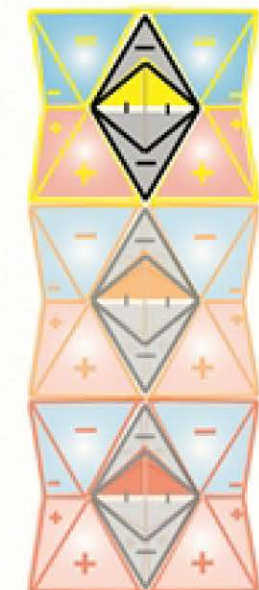
Energy level



n3

n2

n1

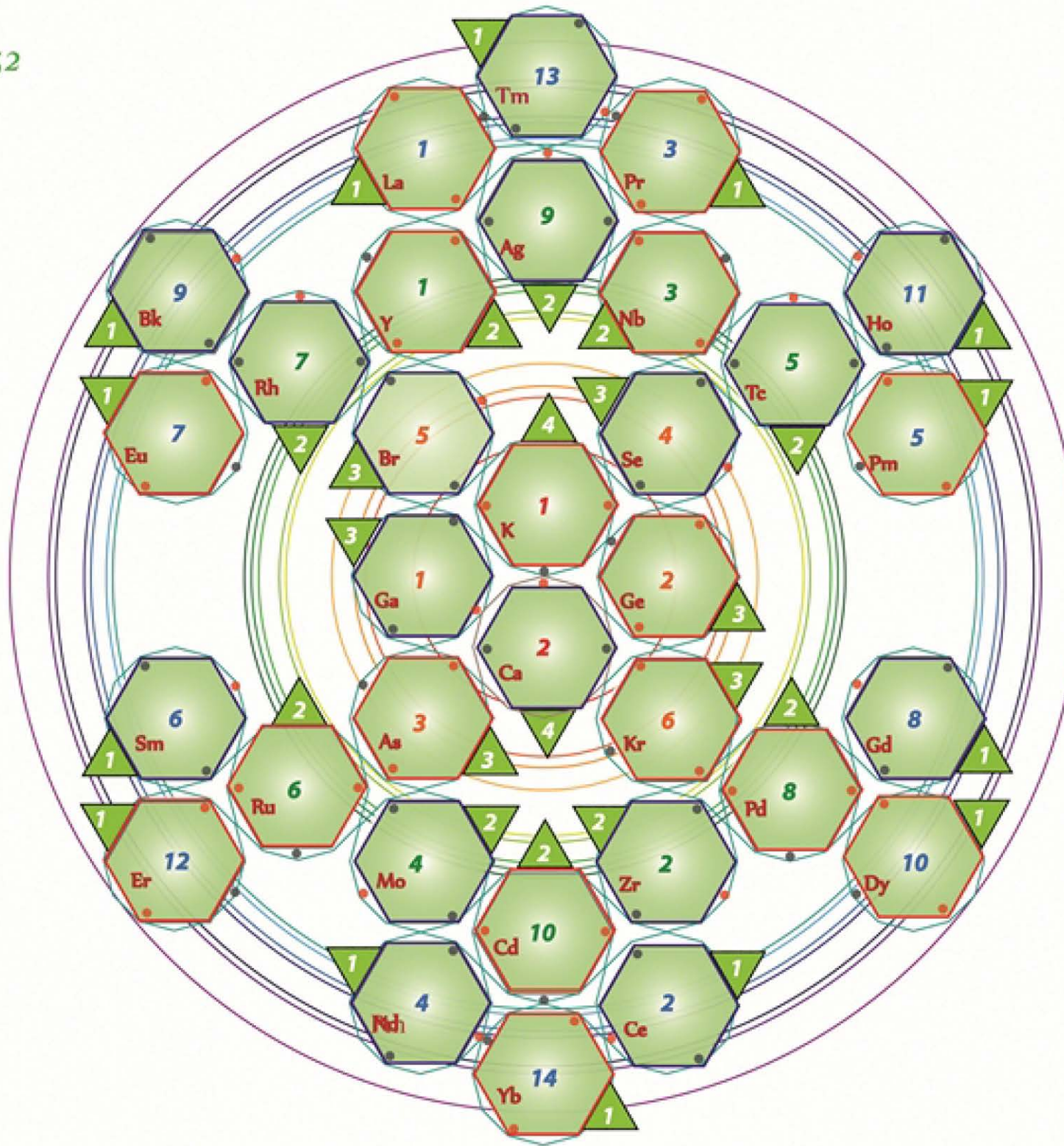


Quantum Level 4

The energy levels of bound electrons is determined by Baryons

Z #	Name	Protons	electrons	Neutrons
19	4s1 Potassium	19	19	19
20	4s2 Calcium	20	20	20
31	4p1 Gallium	31	31	31
32	4p2 Germanium	32	32	32
33	4p3 Arsenic	33	33	33
34	4p4 Selenium	34	34	34
35	4p5 Bromine	35	35	35
36	4p6 Krypton	36	36	36
39	4d1 Yttrium	39	39	39
40	4d2 Zirconium	40	40	40
41	4d3 Niobium	41	41	41
42	4d4 Molybdenum	42	42	42
43	4d5 Technetium	43	43	43
44	4d6 Ruthenium	44	44	44
45	4d7 Rhodium	45	45	45
46	4d8 Palladium	46	46	46
47	4d9 Silver	47	47	47
48	4d10 Cadmium	48	48	48
57	4f1 Lanthanum	57	57	57
58	4f2 Cerium	58	58	58
59	4f3 Praseodymium	59	59	59
60	4f4 Neodymium	60	60	60
61	4f5 Promethium	61	61	61
62	4f6 Samarium	62	62	62
63	4f7 Europium	63	63	63
64	4f8 Gadolinium	64	64	64
65	4f9 Terbium	65	65	65
66	4f10 Dysprosium	66	66	66
67	4f11 Holmium	67	67	67
68	4f12 Erbium	68	68	68
69	4f13 Thulium	69	69	69
70	4f14 Ytterbium	70	70	70

32



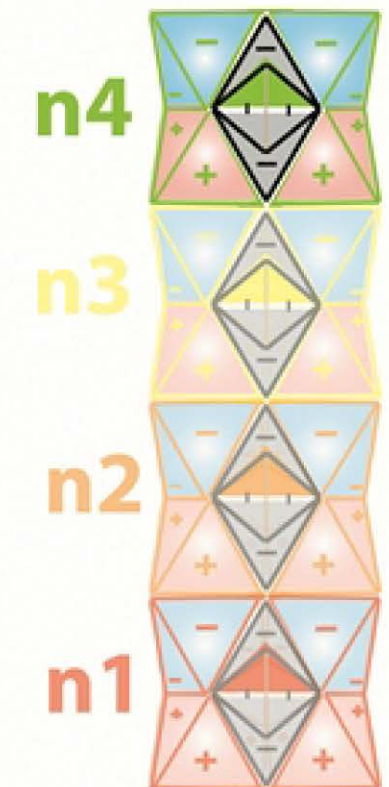
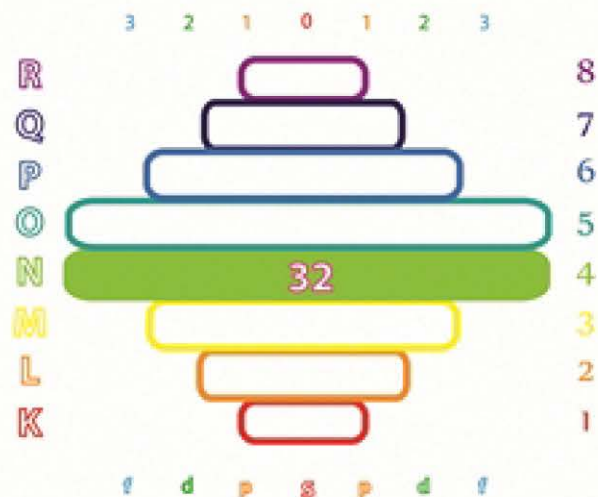
N shell
n4
Ground State electron



$$iE = -10.143 \text{ eV}$$



Deuterium [not Hydrogen] is the building block of elements

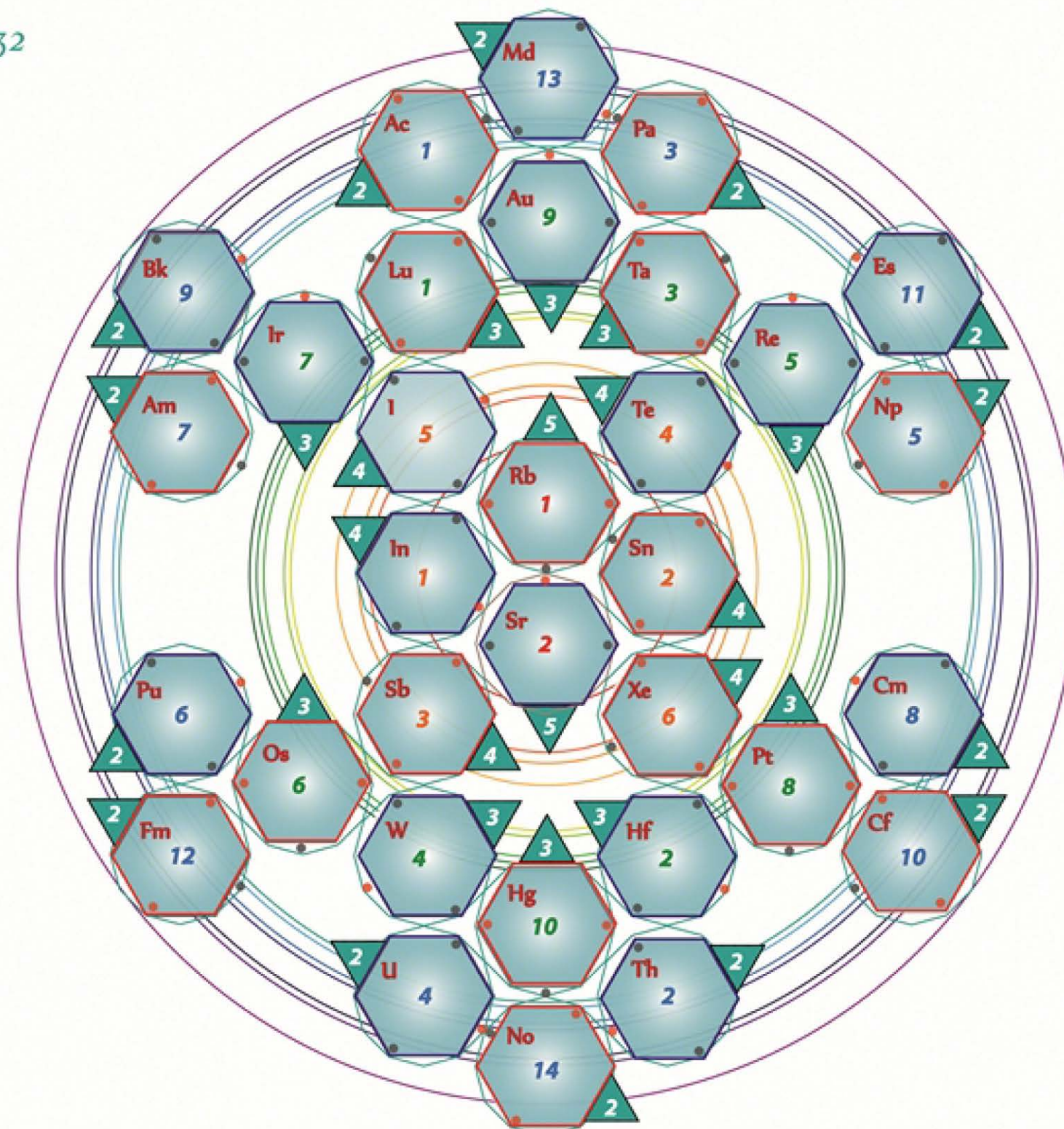


Quantum Level 5

The energy levels of bound electrons is determined by Baryons

32

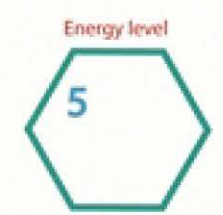
Z #	Name	Protons	electrons	Neutrons
37	<i>Ss1</i> Rubidium	37	37	37
38	<i>Ss2</i> Strontium	38	38	38
49	<i>Sp1</i> Indium	49	49	49
50	<i>Sp2</i> Tin	50	50	50
51	<i>Sp3</i> Antimony	51	51	51
52	<i>Sp4</i> Tellurium	52	52	52
53	<i>Sp5</i> Iodine	53	53	53
54	<i>Sp6</i> Xenon	54	54	54
71	<i>Sd1</i> Lutetium	71	71	71
72	<i>Sd2</i> Hafnium	72	72	72
73	<i>Sd3</i> Tantalum	73	73	73
74	<i>Sd4</i> Tungsten	74	74	74
75	<i>Sd5</i> Rhenium	75	75	75
76	<i>Sd6</i> Osmium	76	76	76
77	<i>Sd7</i> Iridium	77	77	77
78	<i>Sd8</i> Platinum	78	78	78
79	<i>Sd9</i> Gold	79	79	79
80	<i>Sd10</i> Mercury	80	80	80
89	<i>Sf1</i> Actinium	89	89	89
90	<i>Sf2</i> Thorium	90	90	90
91	<i>Sf3</i> Protactium	91	91	91
92	<i>Sf4</i> Uranium	92	92	92
93	<i>Sf5</i> Neptunium	93	93	93
94	<i>Sf6</i> Plutonium	94	94	94
95	<i>Sf7</i> Americium	95	95	95
96	<i>Sf8</i> Curium	96	96	96
97	<i>Sf9</i> Berkelium	97	97	97
98	<i>Sf10</i> Californium	98	98	98
99	<i>Sf11</i> Einsteinium	99	99	99
100	<i>Sf12</i> Fermium	100	100	100
101	<i>Sf13</i> Mendelevium	101	101	101
102	<i>Sf14</i> Nobelium	102	102	102



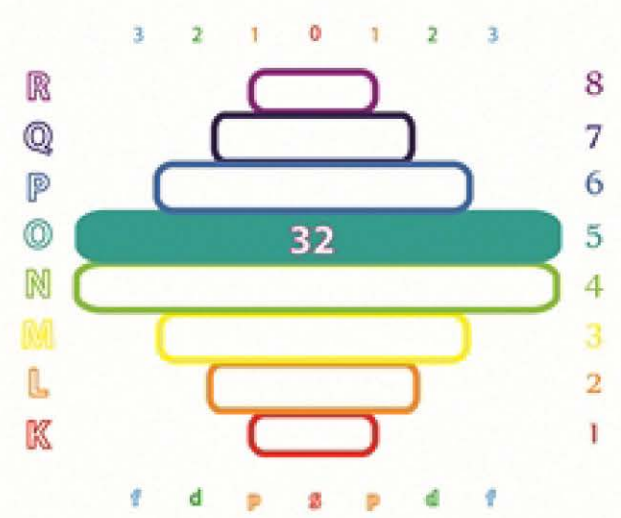
O shell
n5
Ground State electron



$iE = -8.241 \text{ eV}$



Deuterium [not Hydrogen] is the building block of elements



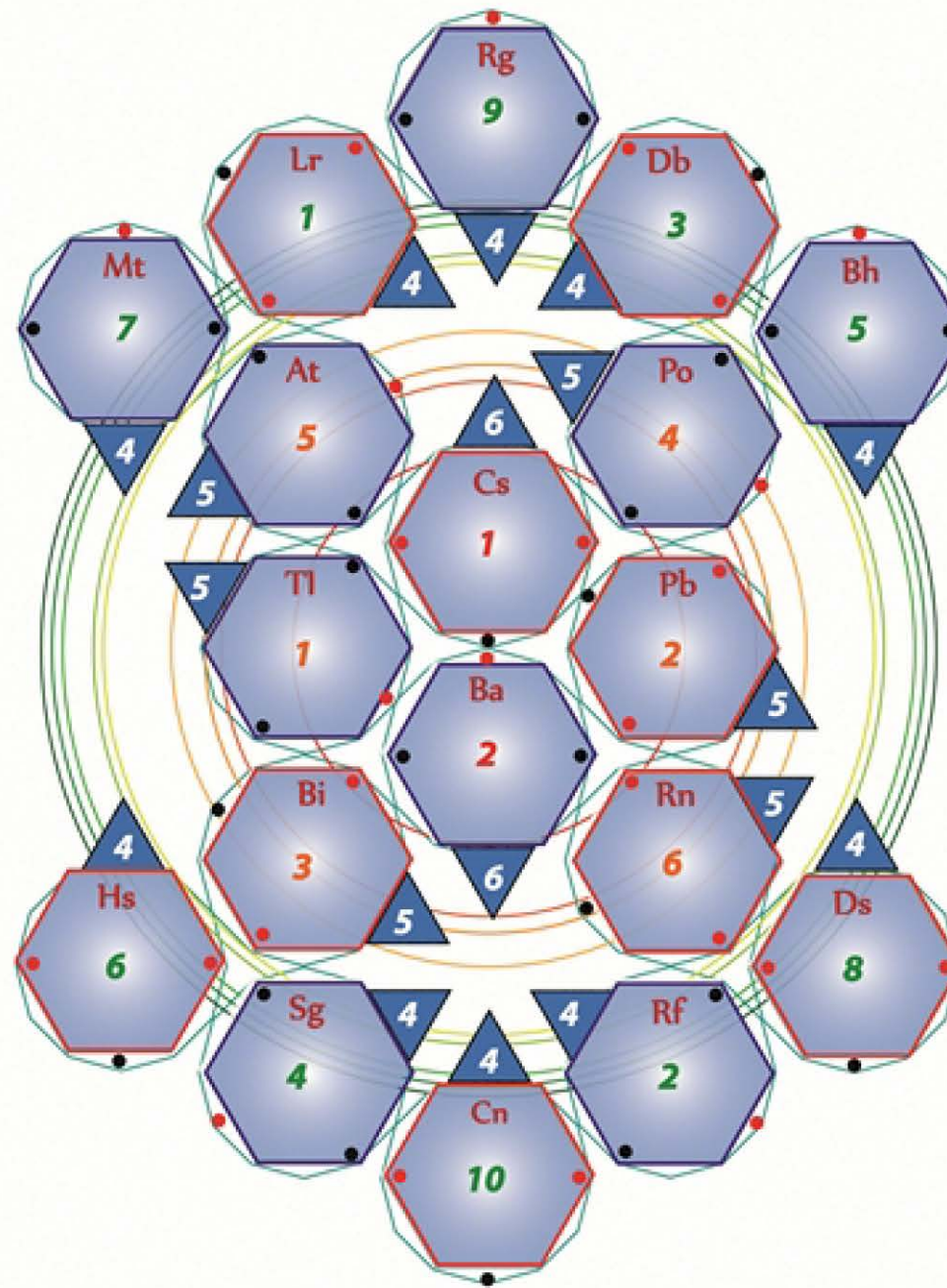
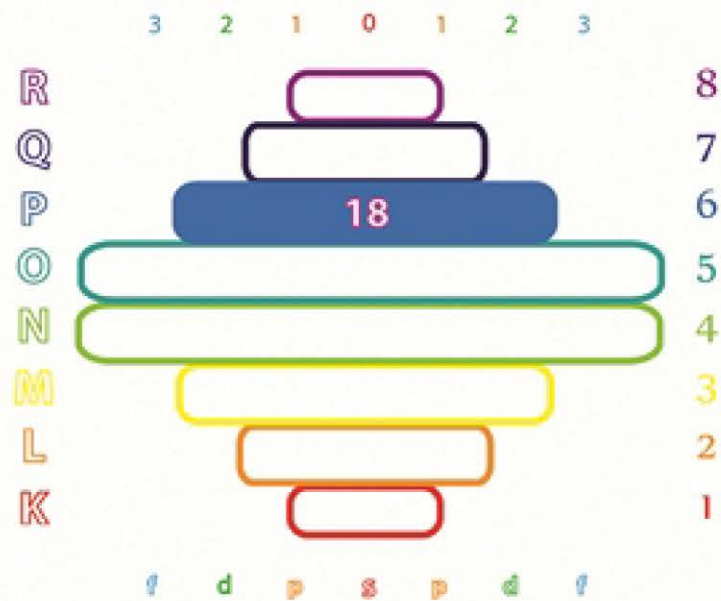
Quantum Level 6

The energy levels of bound electrons is determined by Baryons

Z #	Name	Protons	electrons	Neutrons
55	6s1 Caesium	55	55	55
56	6s2 Barium	56	56	56
81	6p1 Thallium	81	81	81
82	6p2 Lead	82	82	82
83	6p3 Bismuth	83	83	83
84	6p4 Polonium	84	84	84
85	6p5 Astatine	85	85	85
86	6p6 Radon	86	86	86
103	6d1 Lawrencium	103	103	103
104	6d2 Rutherfordium	104	104	104
105	6d3 Dubnium	105	105	105
106	6d4 Seaborgium	106	106	106
107	6d5 Bohrium	107	107	107
108	6d6 Hassium	108	108	108
109	6d7 Meitnerium	109	109	109
110	6d8 Darmstadtium	110	110	110
111	6d9 Roetgenium	111	111	111
112	6d10 Copernicium	112	112	112

18

Deuterium [not Hydrogen] is the building block of elements



P shell

n6
Ground State electron



$$iE = -5.917 eV$$

n6

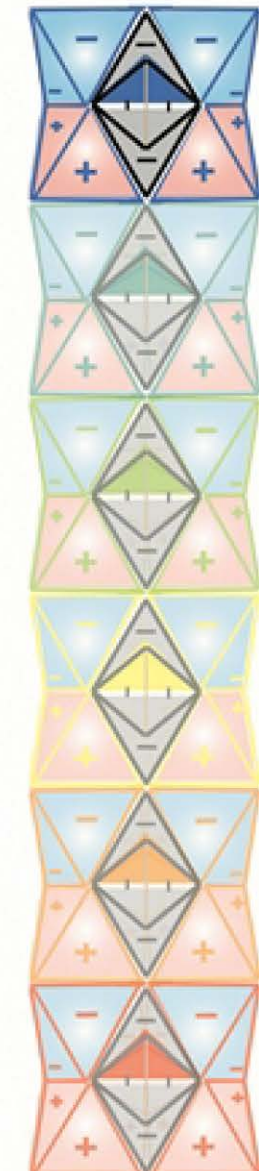
n5

n4

n3

n2

n1



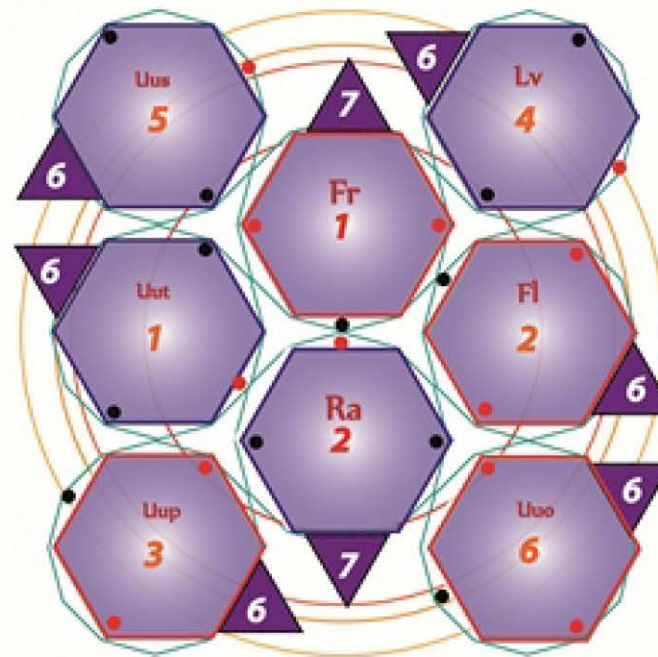
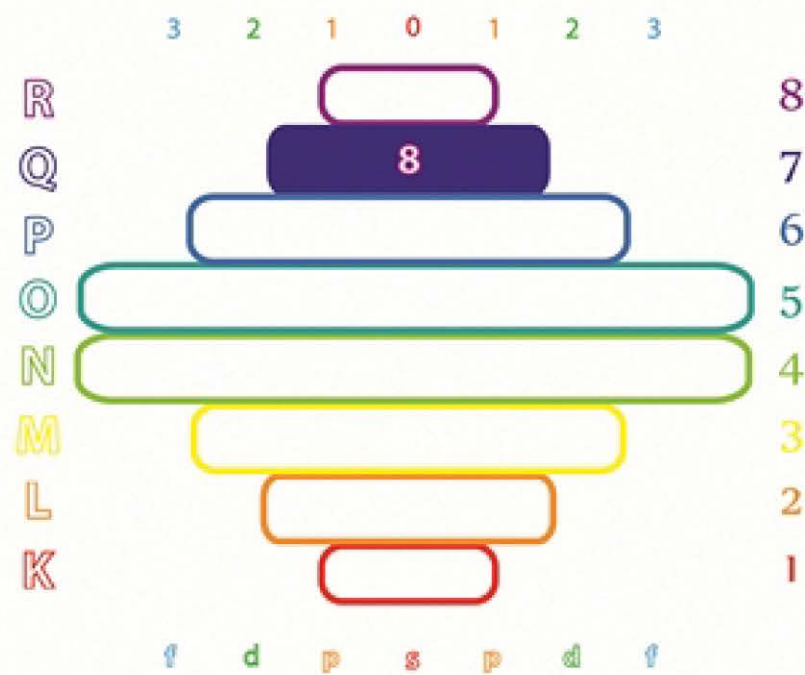
Quantum Level 7

The energy levels of bound electrons is determined by Baryons

Z #	Name	Protons	electrons	Neutrons
87	7s1 Francium	87	87	87
88	7s2 Radium	88	88	88
113	7p1 Ununtrium	113	113	113
114	7p2 Flerovium	114	114	114
115	7p3 Ununpentium	115	115	115
116	7p4 Livermorium	116	116	116
117	7p5 Ununseptium	117	117	117
118	7p6 Ununoctium	118	118	118

8

Deuterium [not Hydrogen] is the building block of elements



Q shell n7

Ground State electron



$$iE = -3.169 \text{ eV}$$

n7

n6

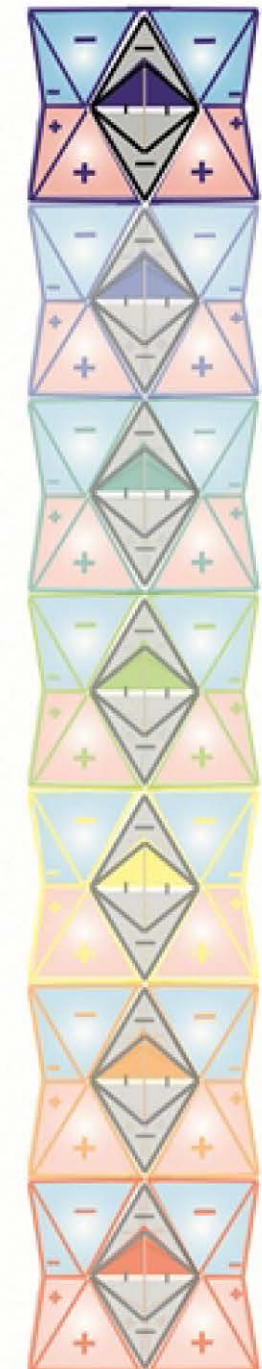
n5

n4

n3

n2

n1

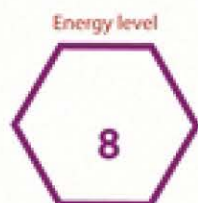
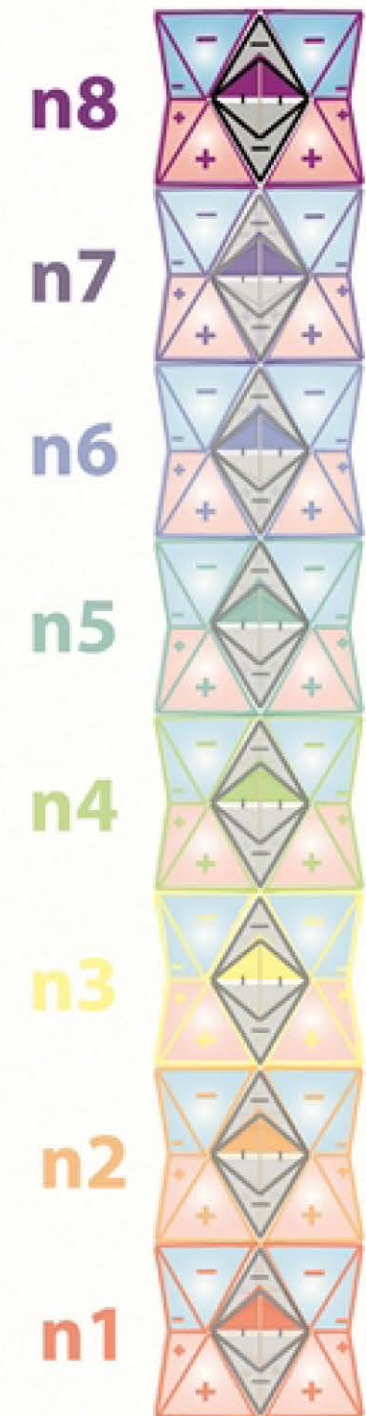
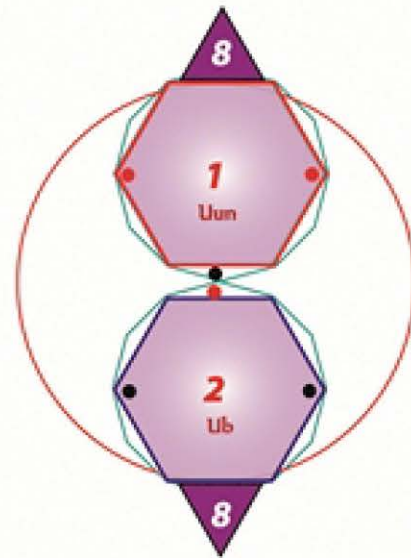
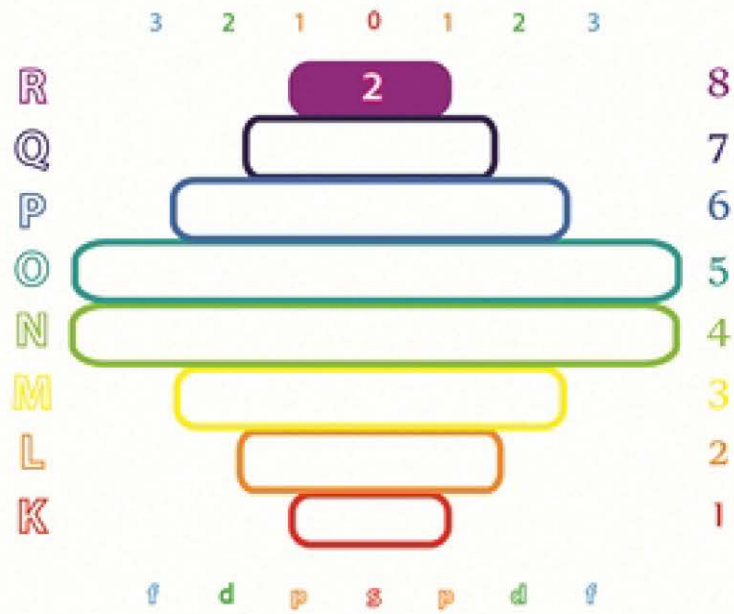
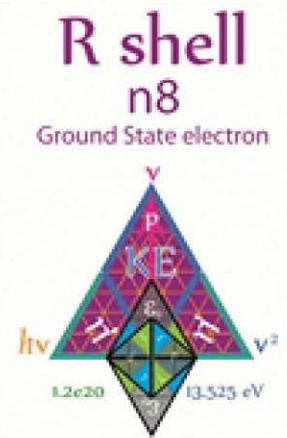


Quantum Level 8

The energy levels of bound electrons is determined by Baryons

Z#	Name	Protons	electrons	Neutrons
119	8s1 Ununnonium	119	119	119
120	8s2 Unbinilium	120	120	120

Deuterium [not Hydrogen] is the building block of elements



Quantum Level Jumps

Photon Absorption and Release

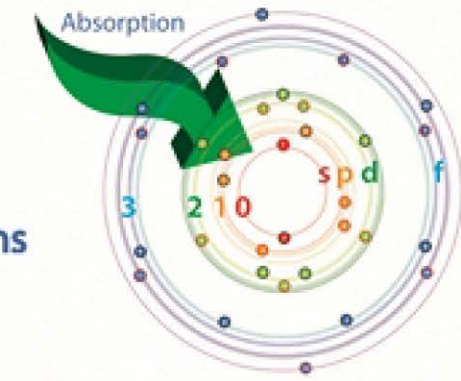
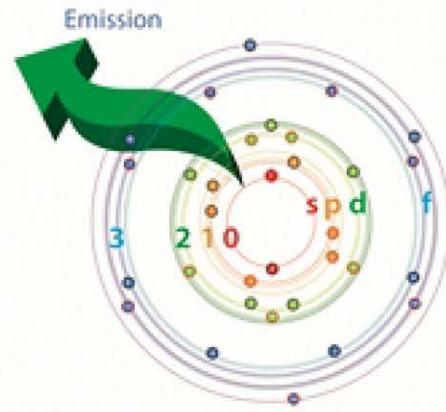
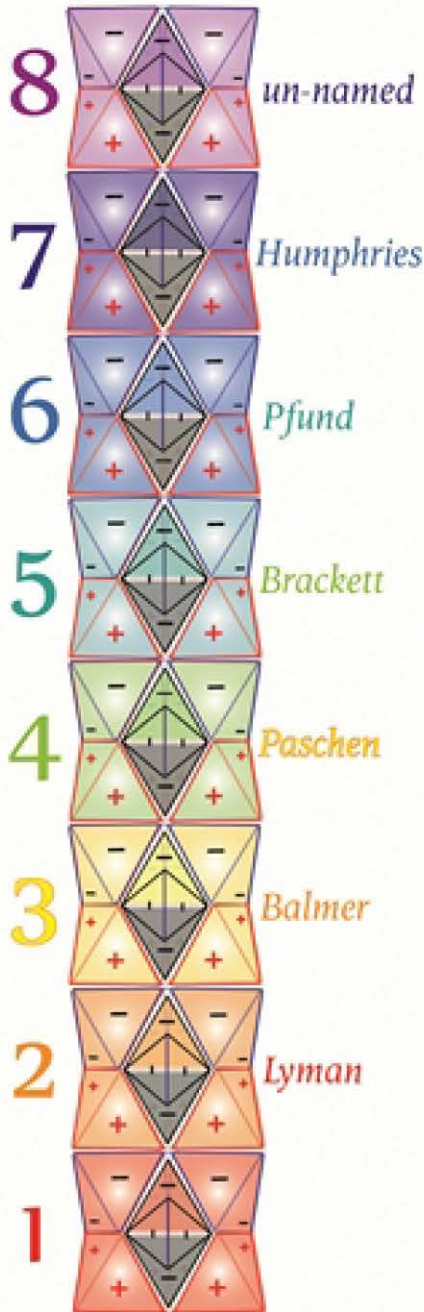


Photo-electrons can only transition between principal energy Baryons in the atomic nuclei in discrete steps [or quantum jumps] because Baryons determine the KEM energy levels of electrons in nuclei

[see Tetryonic QED for full details on spectral line mechanics]

Spectral line transitions



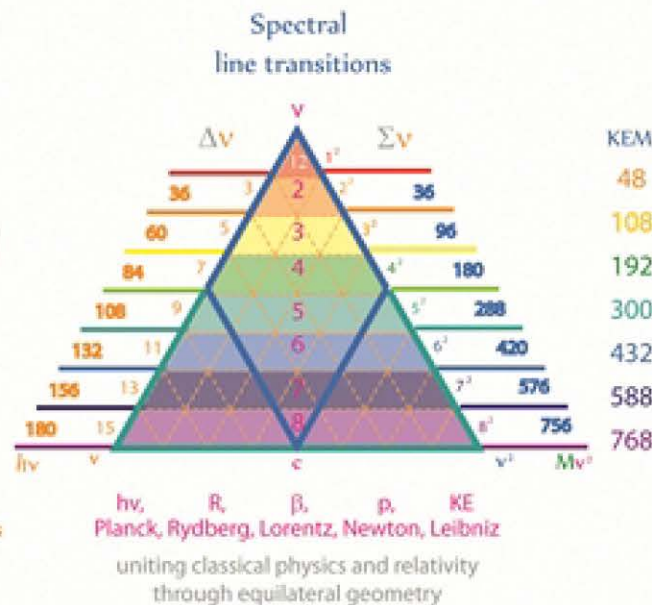
Initial Quantum level	8	768	756	720	660	576	468	336	180	0
	7	588	576	540	480	396	288	156	0	
	6	432	420	384	324	240	132	0		
	5	300	288	252	192	108	0			
	4	192	180	144	84	0				
	3	108	96	60	0					
	2	48	36	0						
	1	12	0							
			12	48	108	192	300	432	588	768
			1	2	3	4	5	6	7	8

Final Quantum level

$$\Delta p = \Delta Mv = hf$$

accelerating photo-electrons produce spectral lines

Quantum level jumps



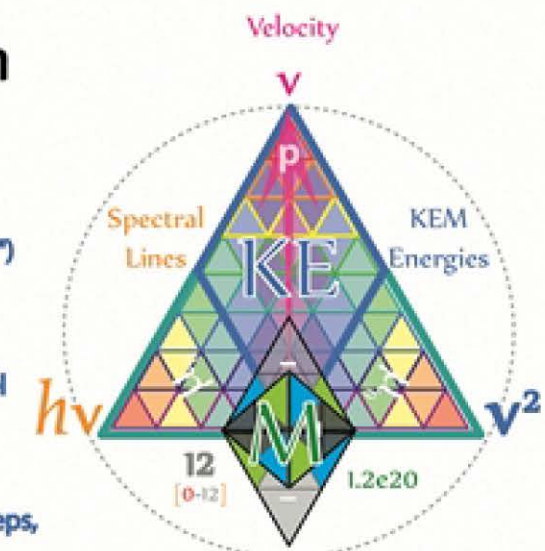
Nuclear energy emission~absorption

If atoms are left undisturbed, their electrons usually fill the lowest available energy levels and stay there, in their "ground state."

Occasionally, however, they may also be pushed up to some higher energy ("become excited") e.g. by a collision with a fast atom or electron, one which got extra speed from an electric voltage or from some source of heat.

An atom/electron elevated to one of its higher "excited levels" soon falls back to a lower level ("undergoes a quantum Jump"), emitting a photon whose energy corresponds to the difference between the levels.

That need not be the ground state: the atom/electron might descend to that state in several steps, emitting a photon at each step on the way.



Quantum transitions

(Orbital Shells - Bound energy states)

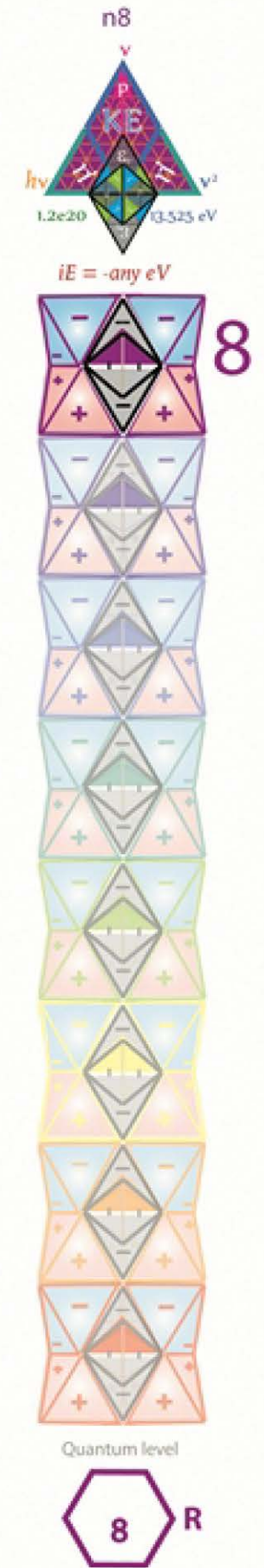
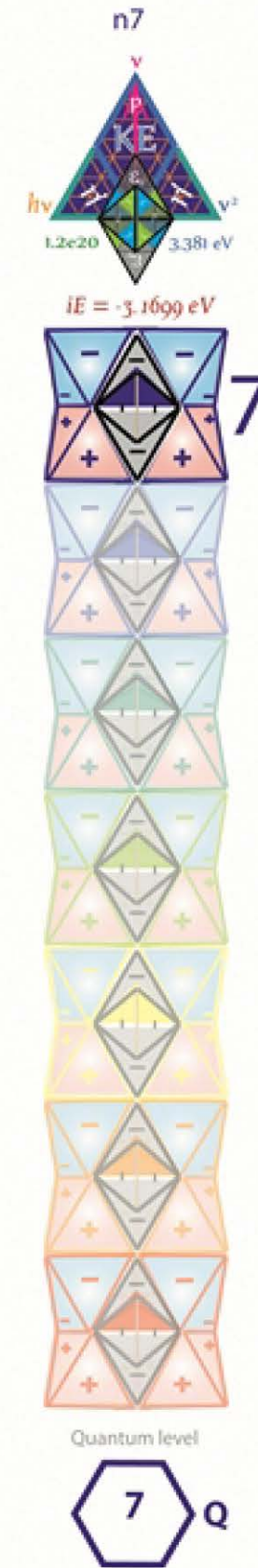
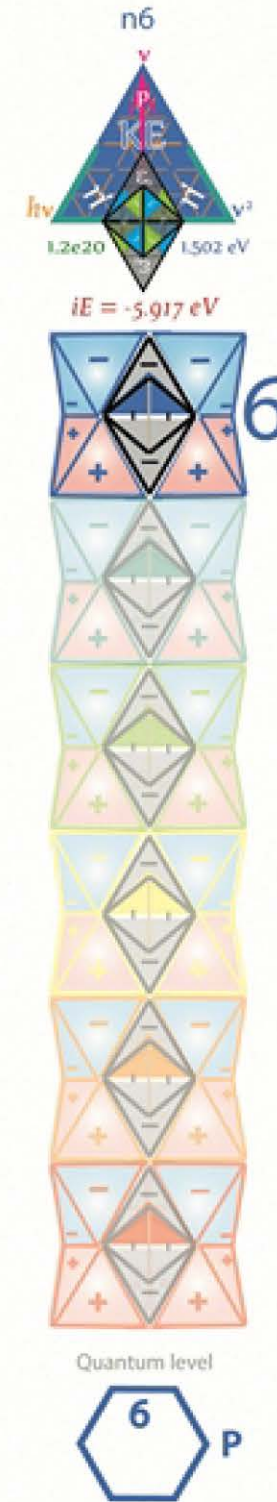
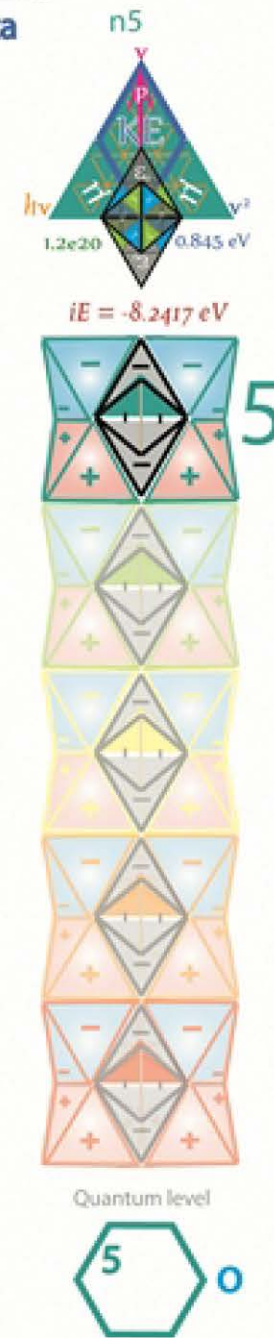
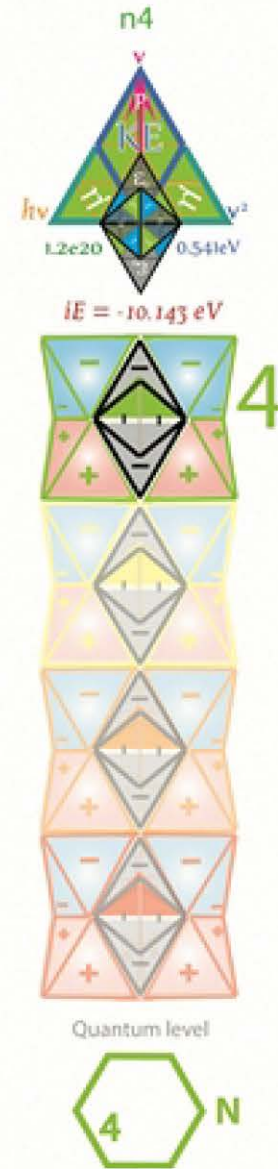
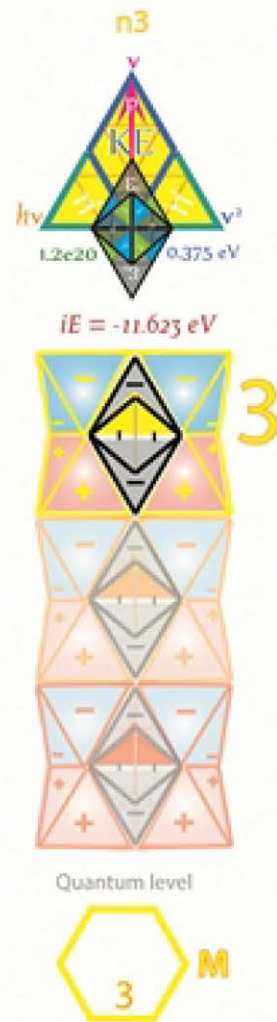
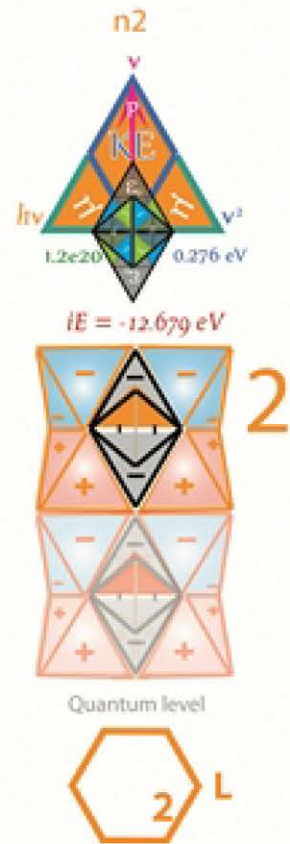
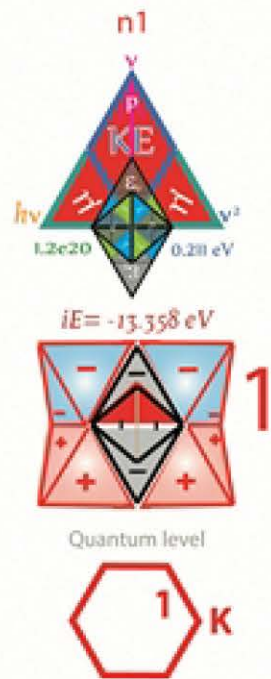
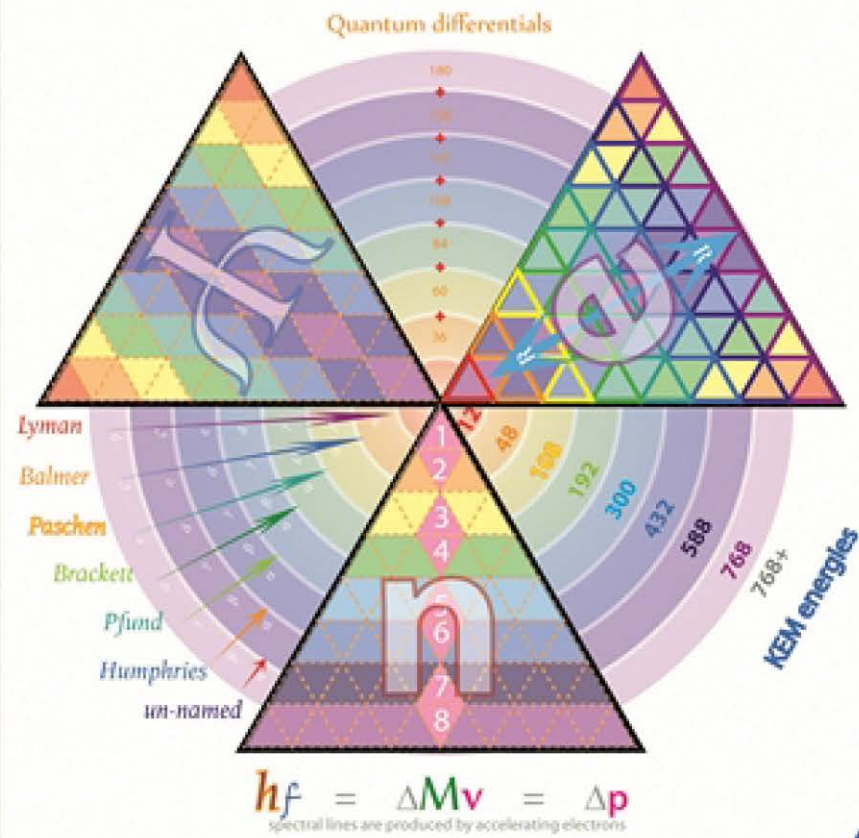


Quantum levels 1-8 are also referred to as Atomic Shells K-R



Photo-electrons can only transition in discrete steps [or quantum jumps] within atomic nuclei shells because Baryons determine the KEM energy levels of electrons in nuclei

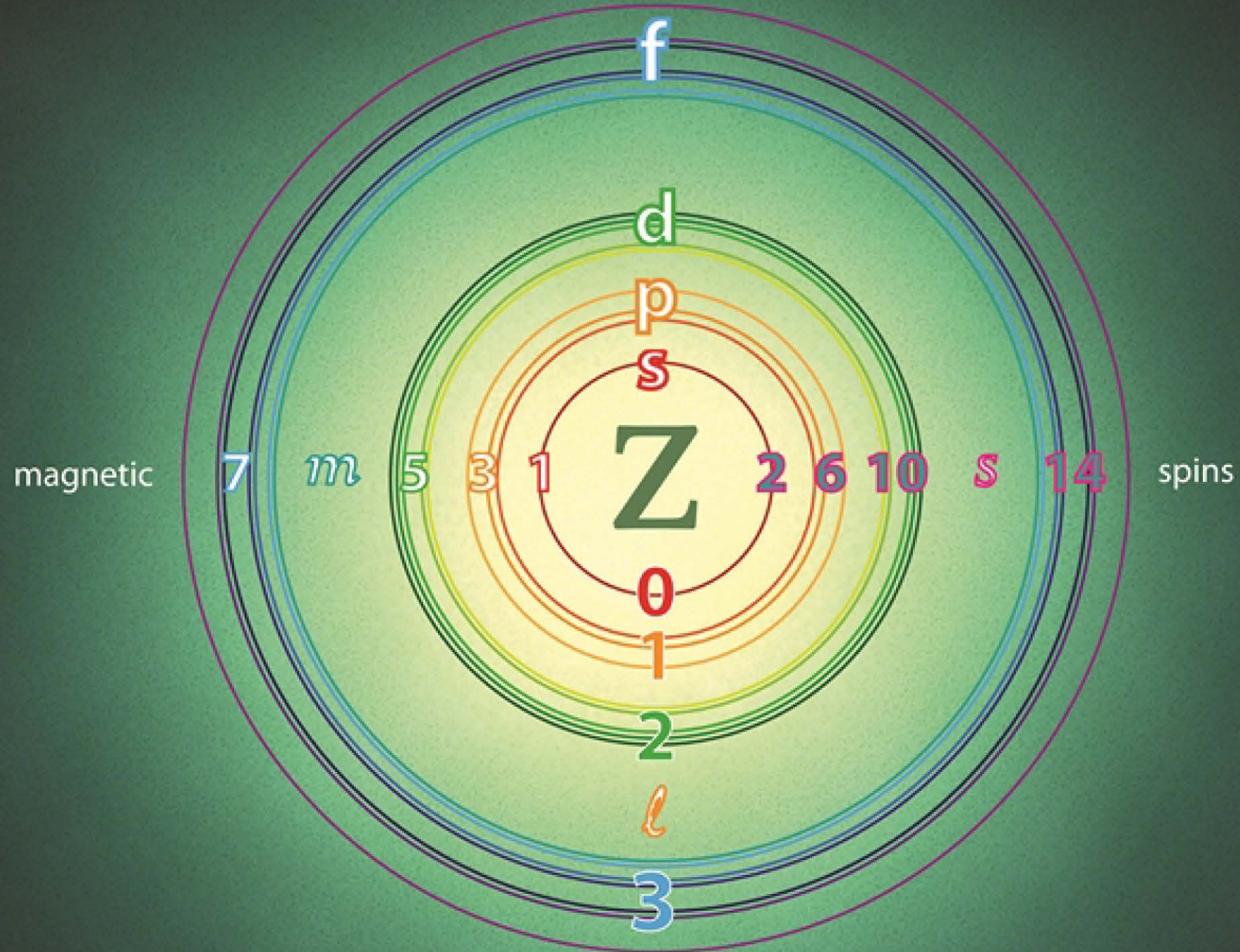
Any photo-electron bound in a Deuterium nuclei will have specific quantised KEM field energies and angular momenta



AZMITHAL

MAGNETIC

electron orbitals



ORBITALS

azmithal

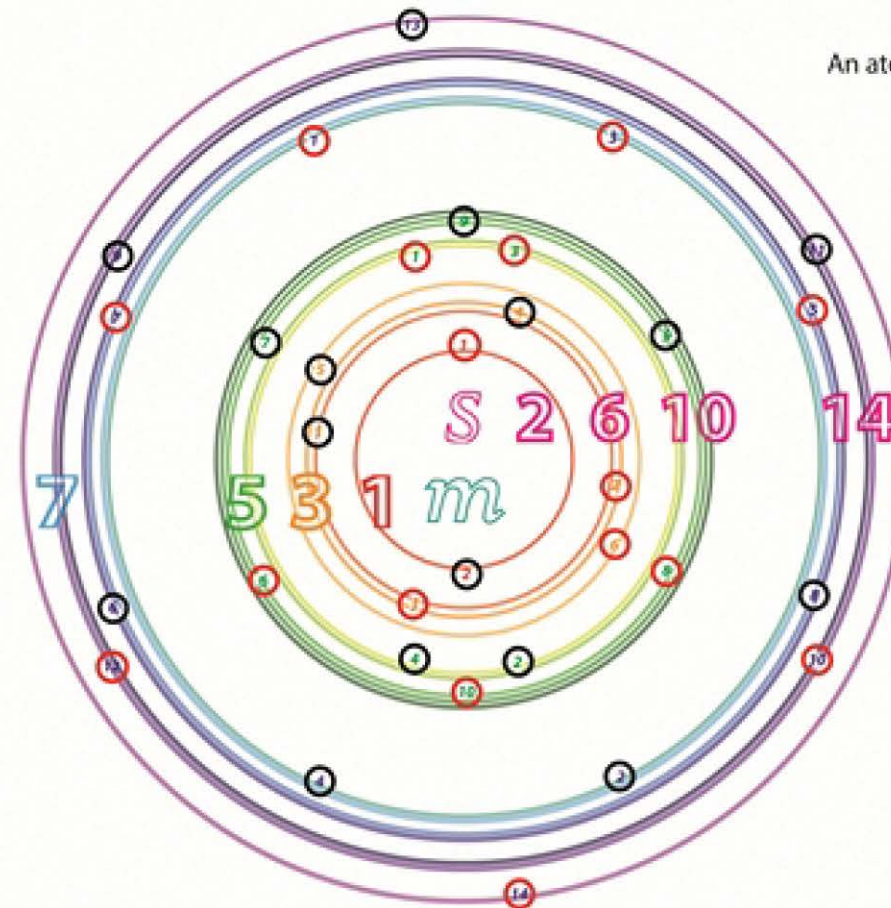
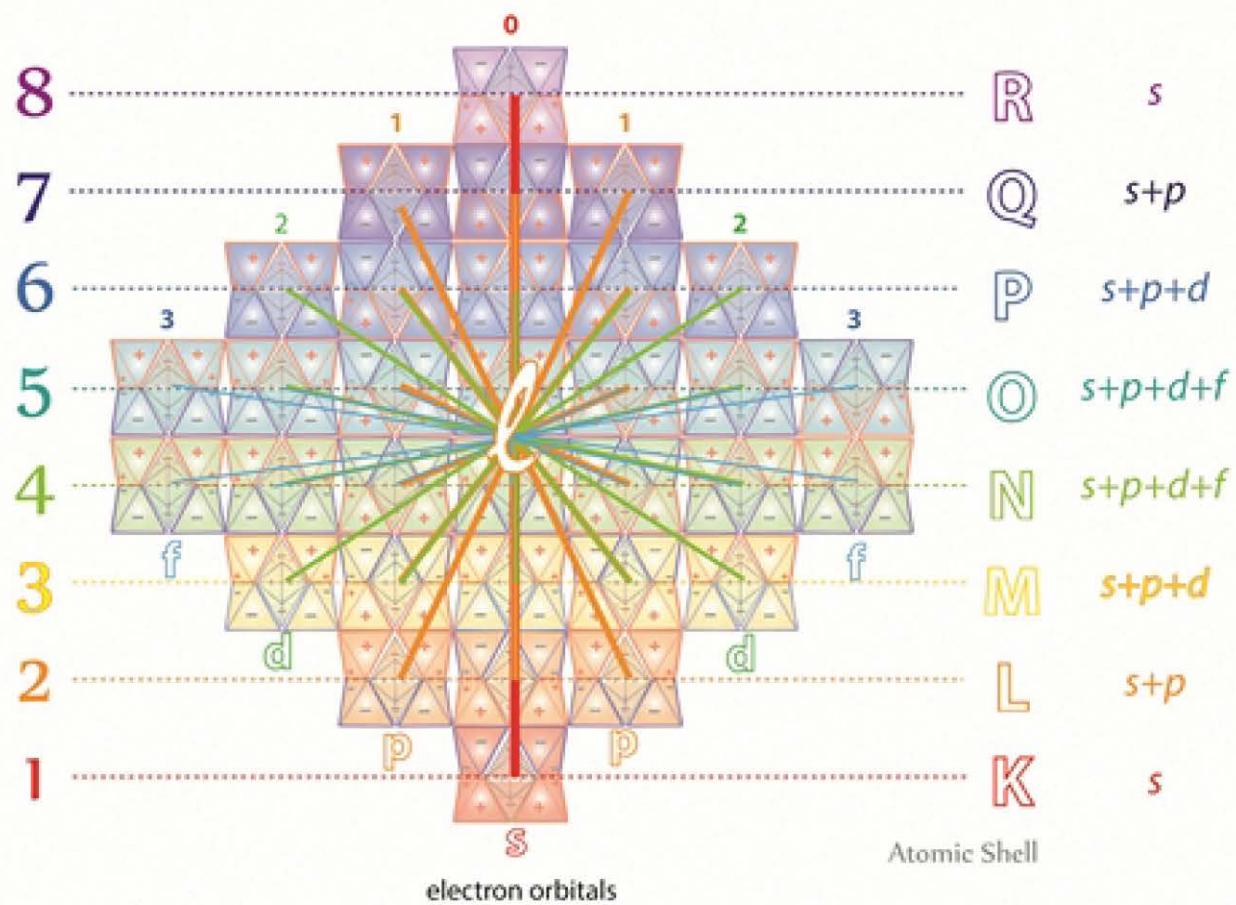
SUB-ORBITALS

Atomic Orbitals

Energy level

n

Quantum numbers



An atomic orbital is a mathematical function that describes the wave-like behavior of either one electron or a pair of electrons in an atom

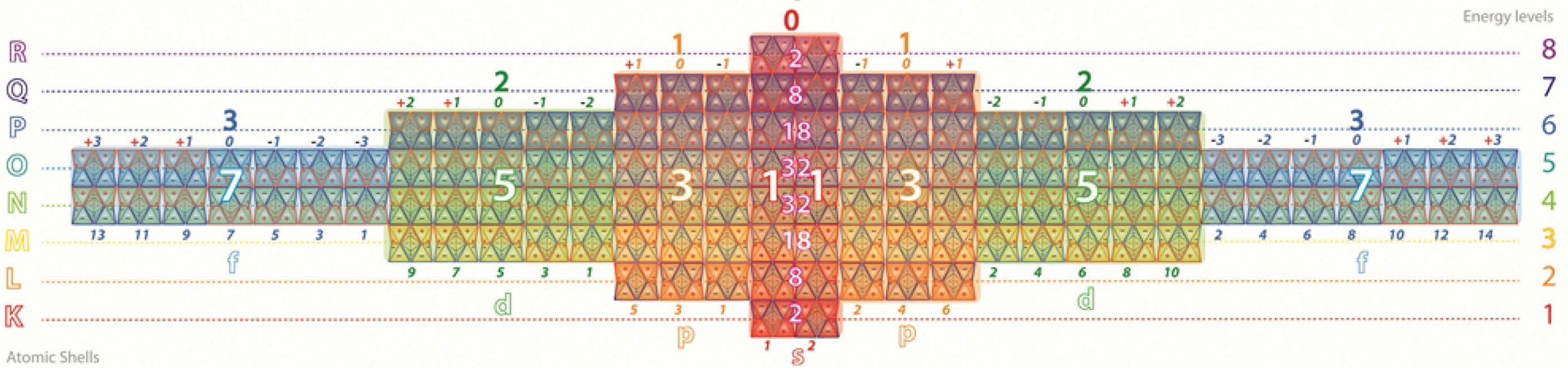
Atomic orbitals are typically categorized by n, l, and m quantum numbers, which correspond to the electron's energy, angular momentum, and an angular momentum vector component, respectively.

Historically used to define the pedagogical electron cloud model of an atom Tetryonics reveals the true geometry of atomic nuclei

Each orbital is defined by a different set of quantum numbers and contains a maximum of two spin opposed electrons.

Aufbau

Azimuthal & Magnetic numbers



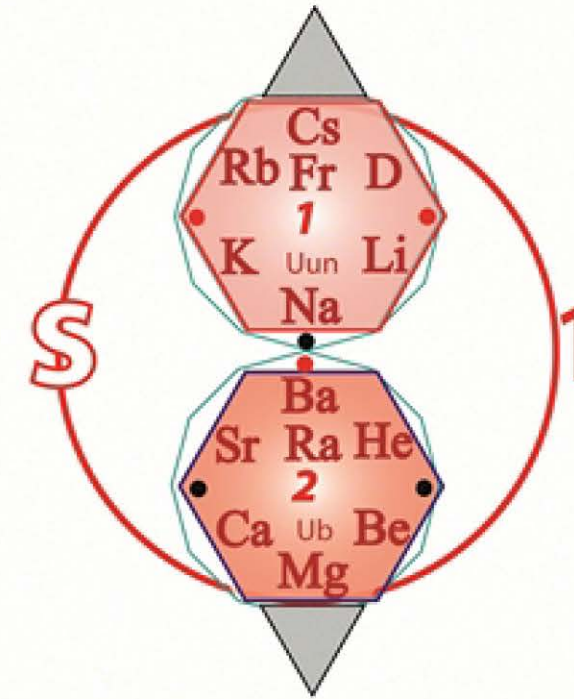
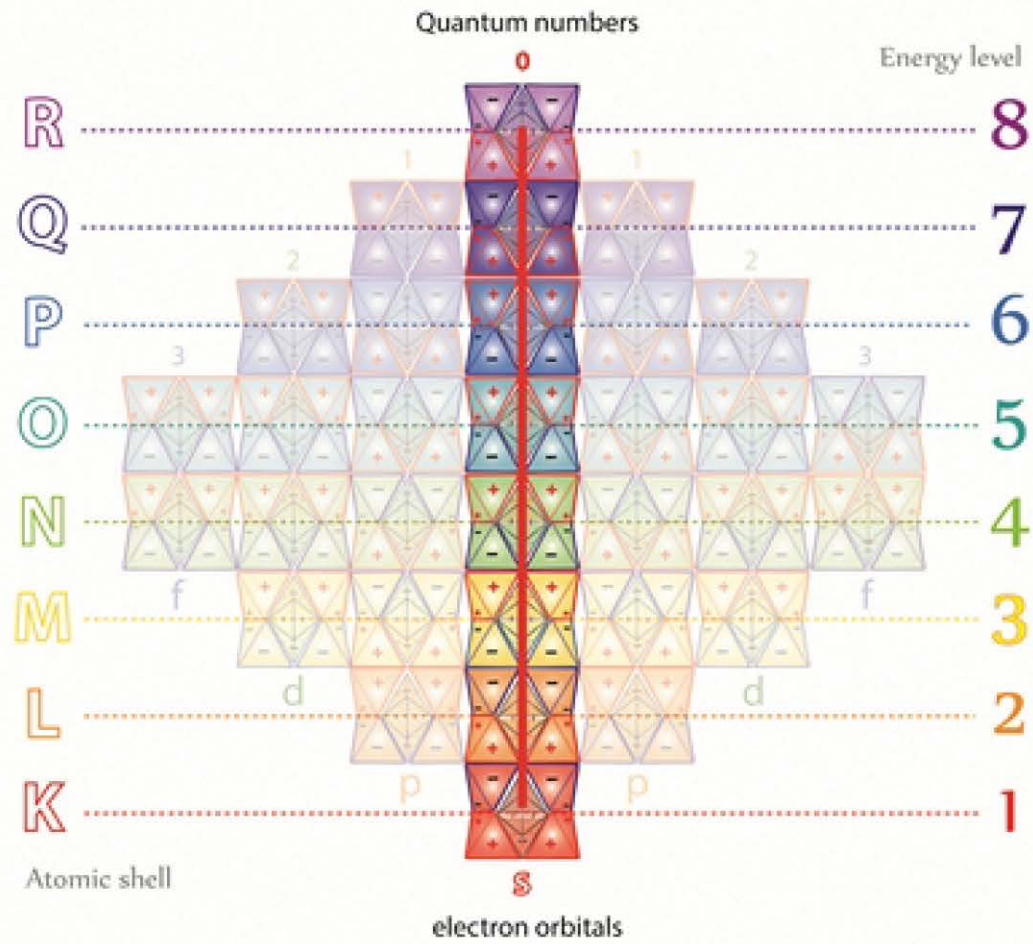
Orbitals & sub-Orbitals

Electron Spins can be either up or down providing they obey the Pauli exclusion principle

S Orbital

1 Orbit (2 electrons max)

Alkali Metals & Alkali Earths



azimuthal number

0

n

magnetic numbers

0

l

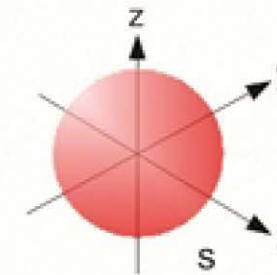
m

spins

-1/2

+1/2

s



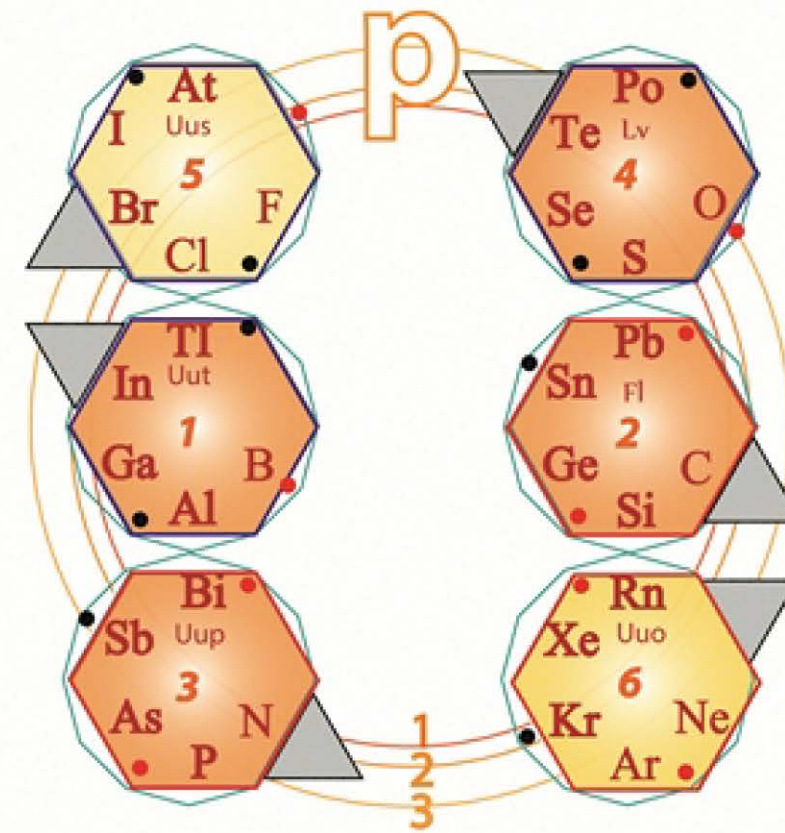
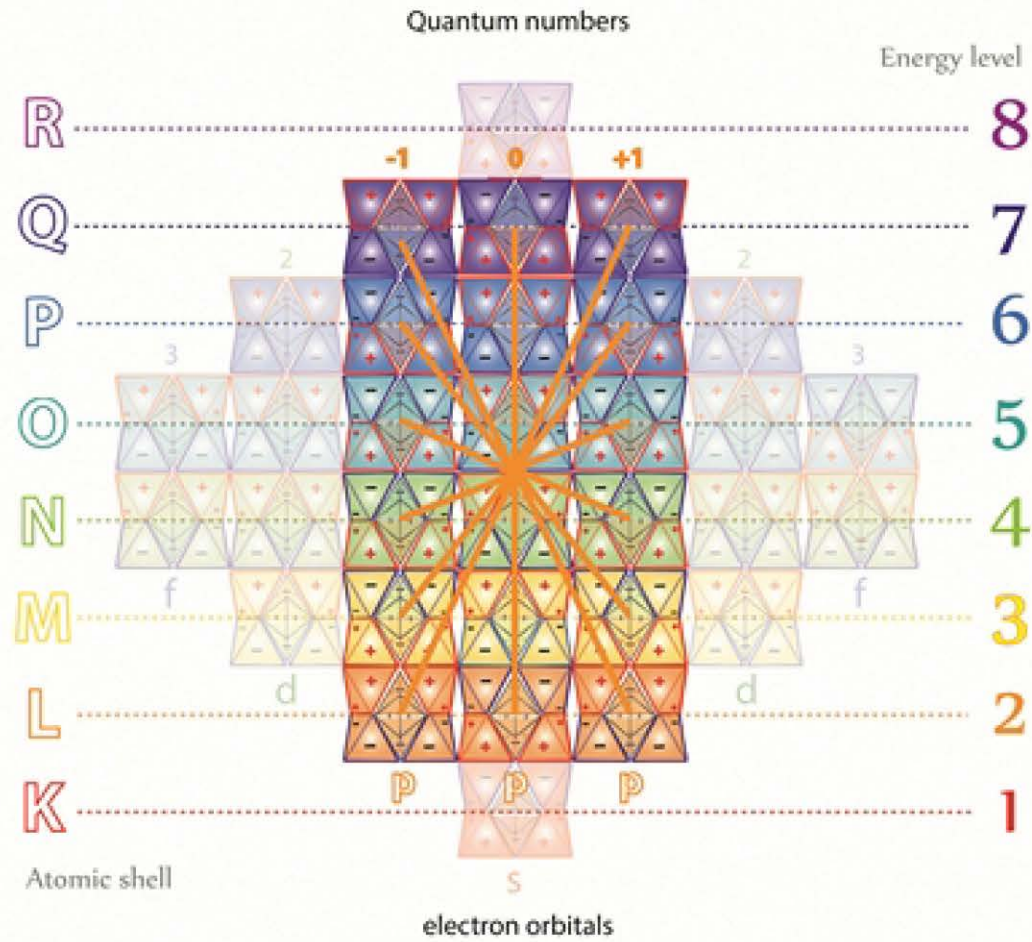
erroneous computer model of 's' electron orbitals



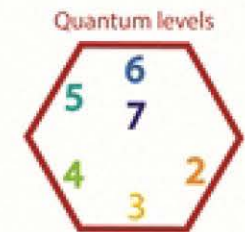
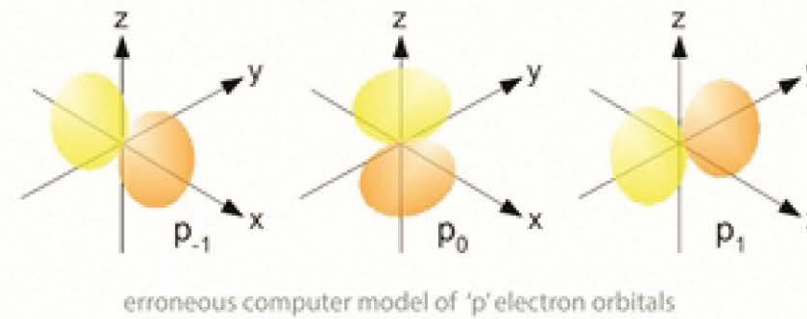
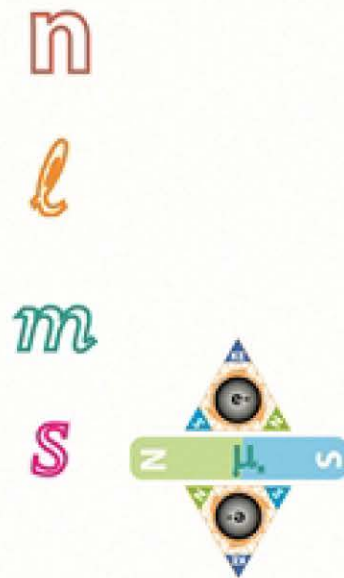
p Orbital

3 Orbits (6 electrons max)

Non-Metals, Halogens & Nobel gases

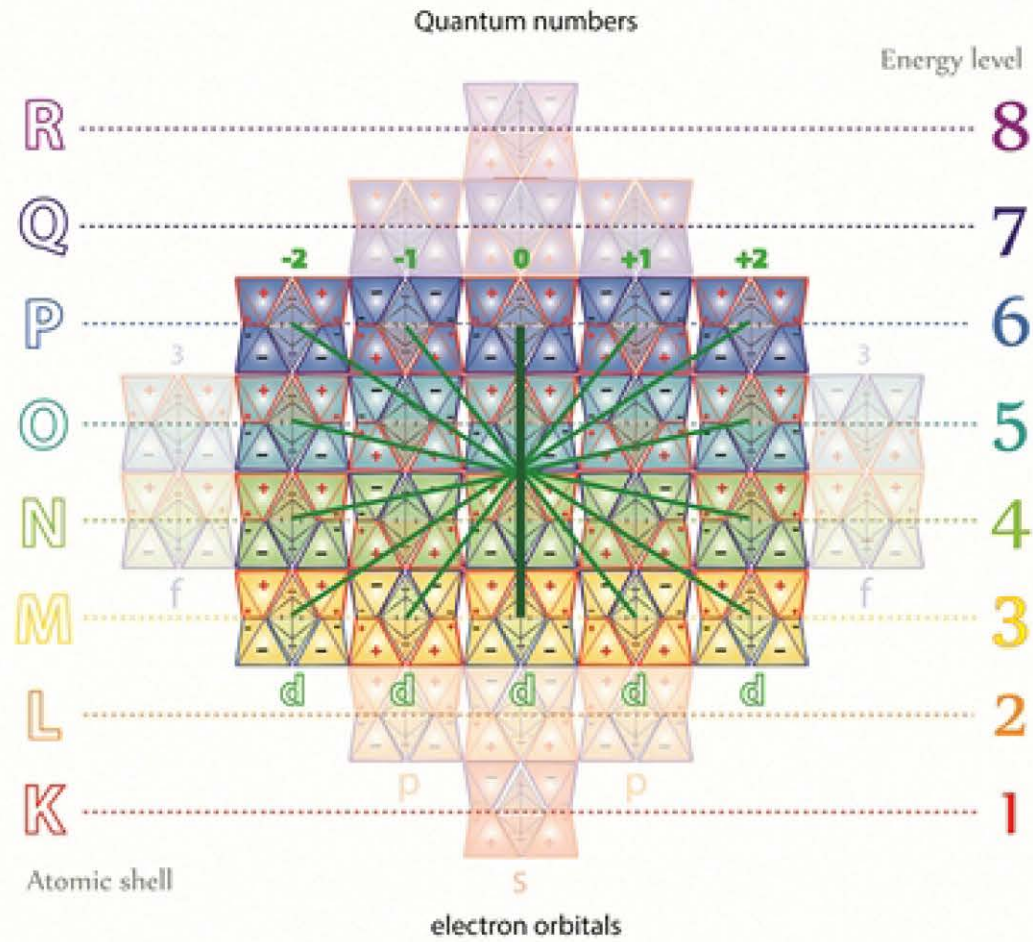


azimuthal number	1		
magnetic numbers	-1	0	+1
spins	-1/2	-1/2	-1/2
	+1/2	+1/2	+1/2



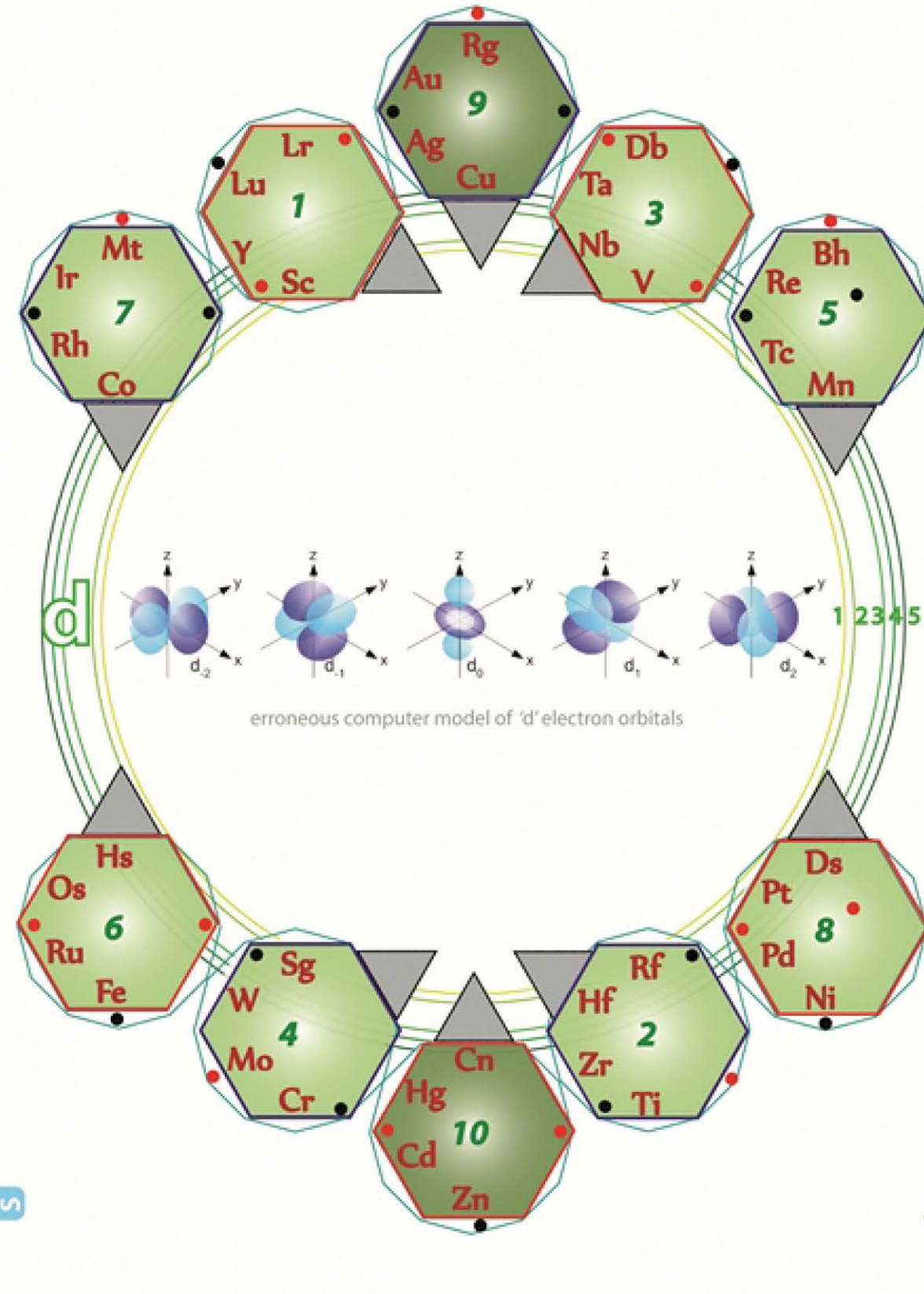
d Orbital

5 Orbits (10 electrons max)



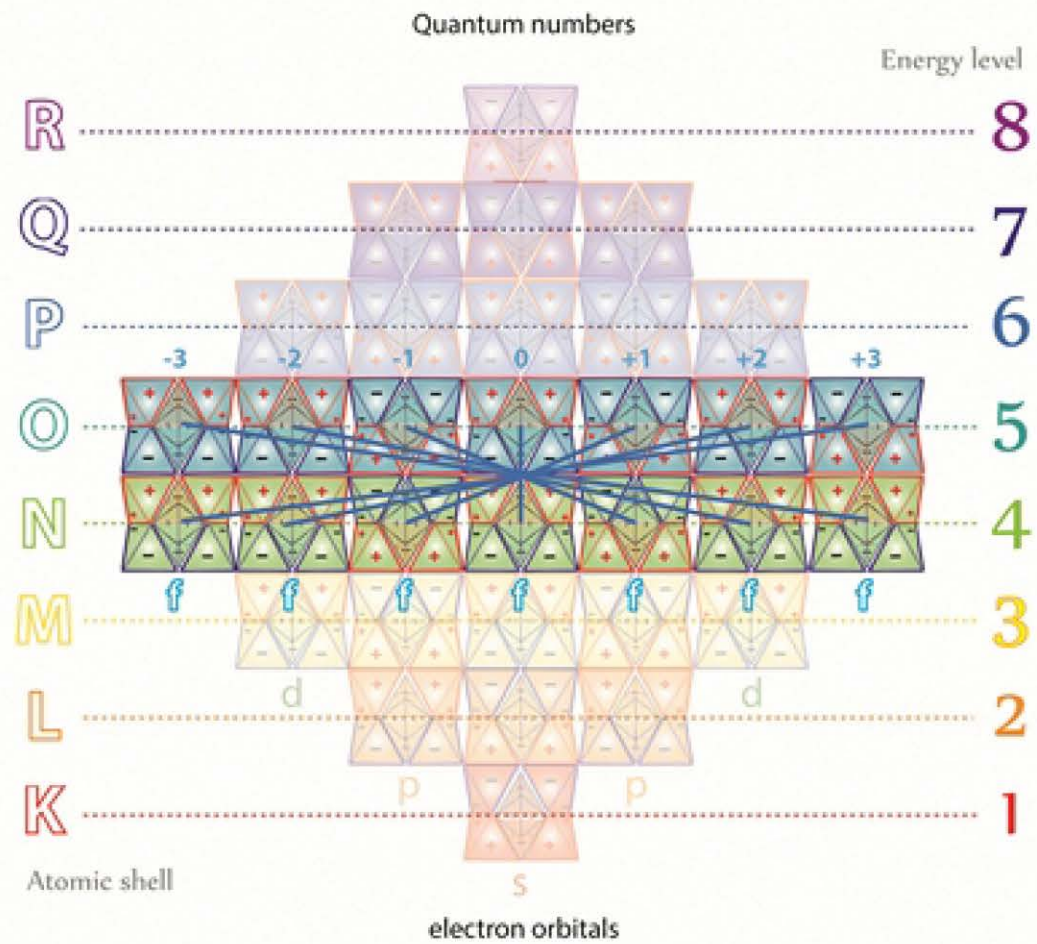
azimuthal number	2				
magnetic numbers	-2	-1	0	+1	+2
spins	-1/2	-1/2	-1/2	-1/2	-1/2
	+1/2	+1/2	+1/2	+1/2	+1/2

Transition & post-Transition Metals



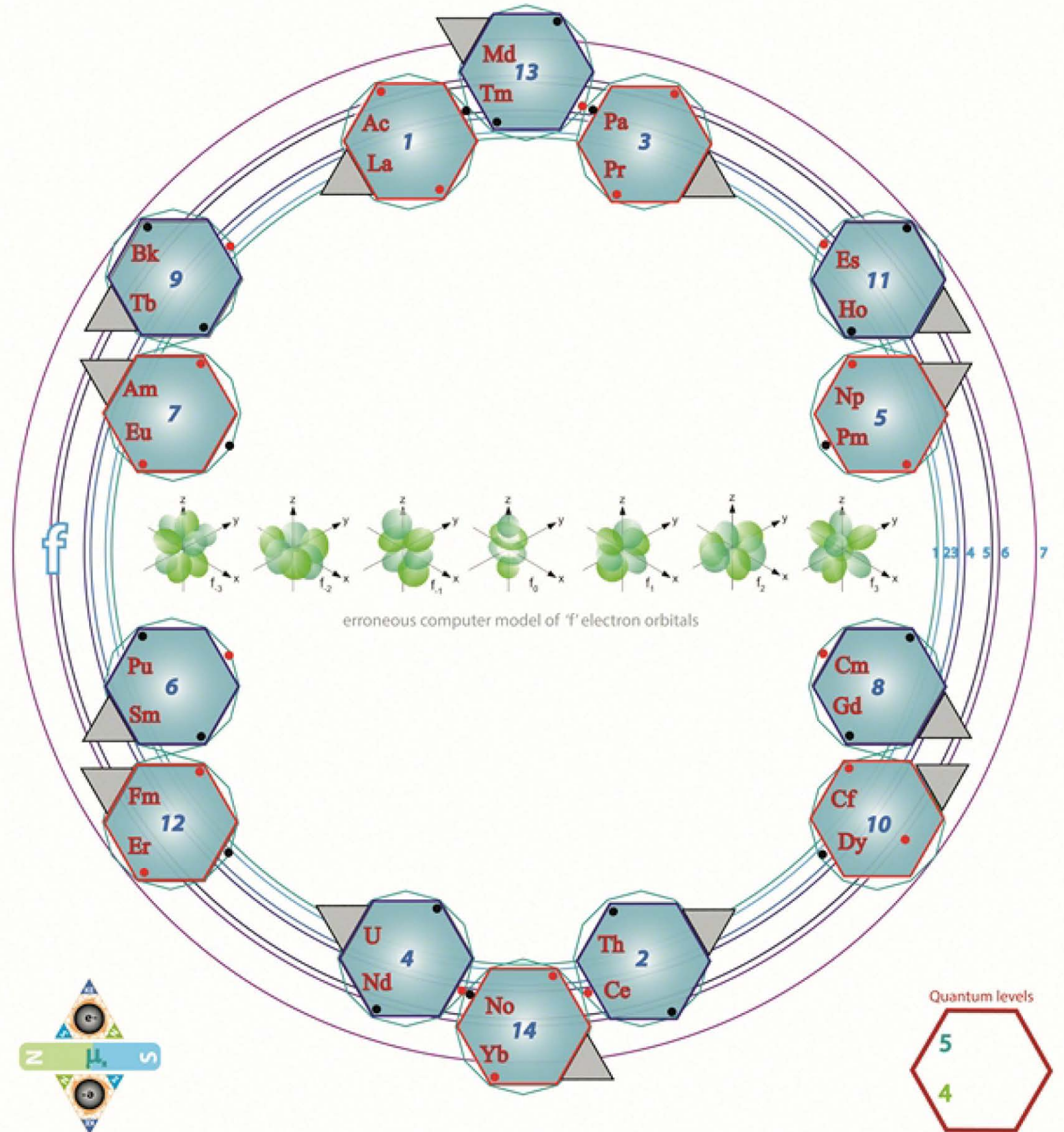
f Orbital

7 Orbits (14 electrons max)



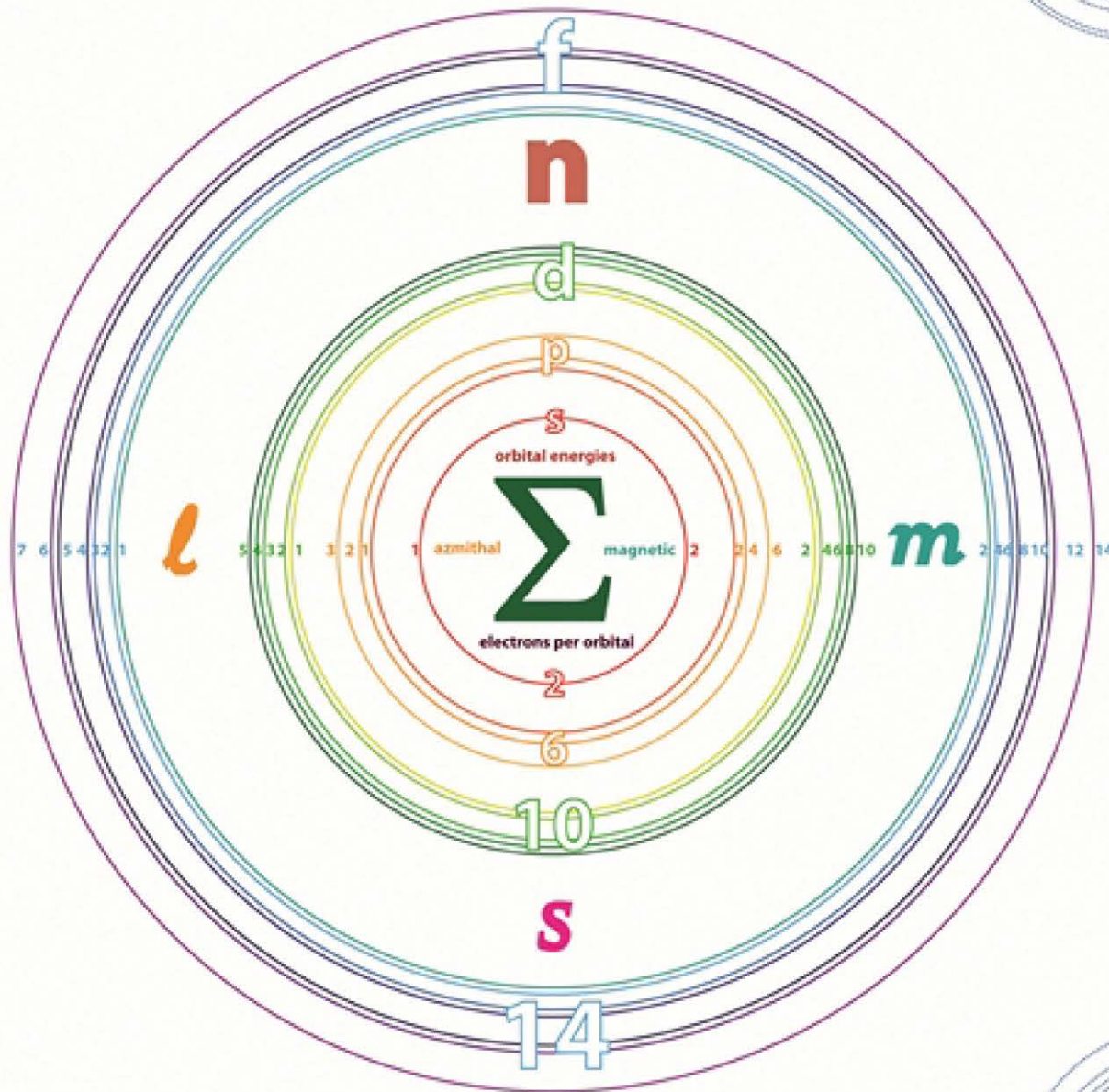
azimuthal number	3						
magnetic numbers	-3	-2	-1	0	+1	+2	+3
spins	-1/2	-1/2	-1/2	-1/2	-1/2	-1/2	-1/2
	+1/2	+1/2	+1/2	+1/2	+1/2	+1/2	+1/2

Lanthanoids & Actinoids

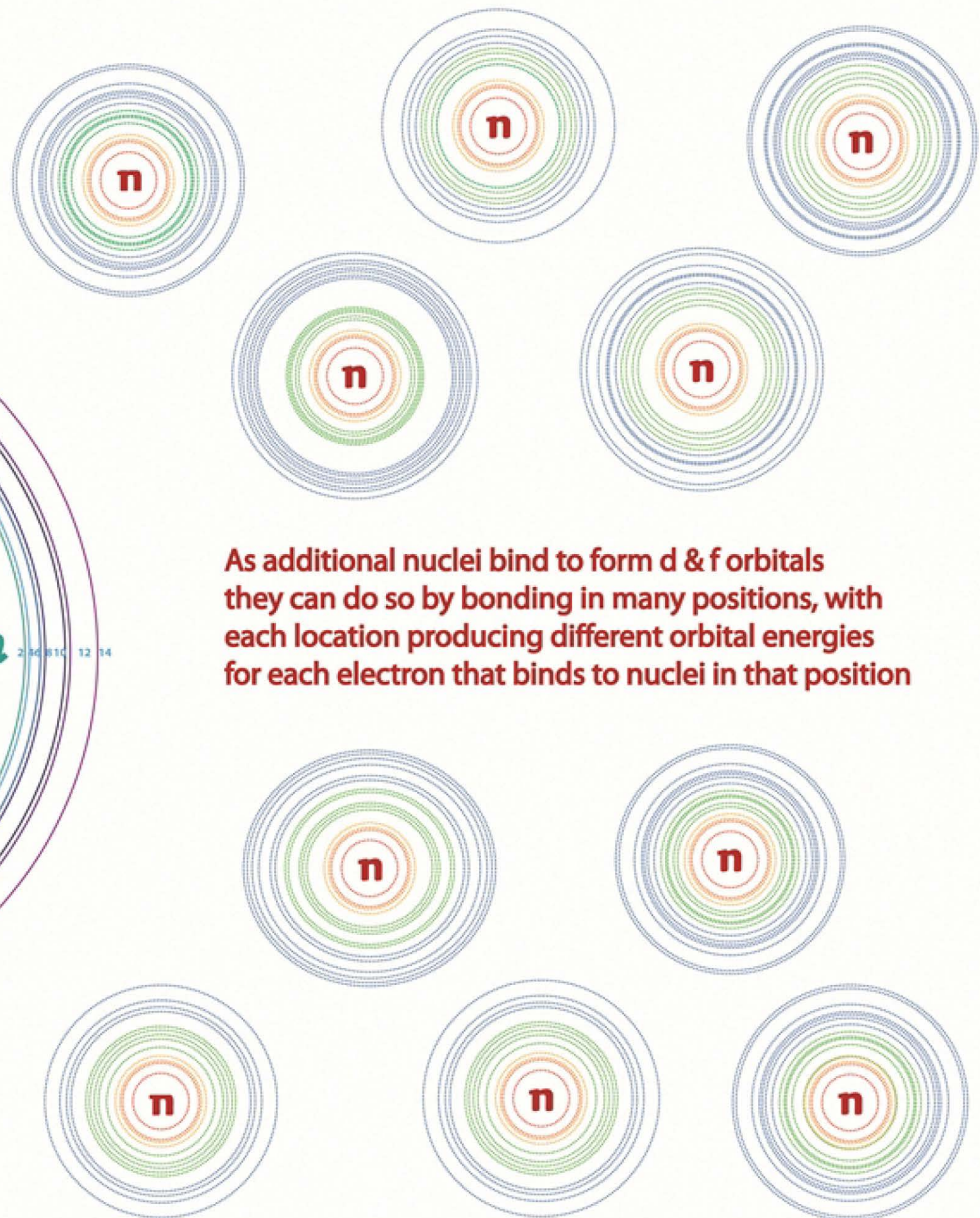


Orbital energy variations

All Elements have stable core electron configurations of s & p orbitals for each energy level as revealed through diffraction studies

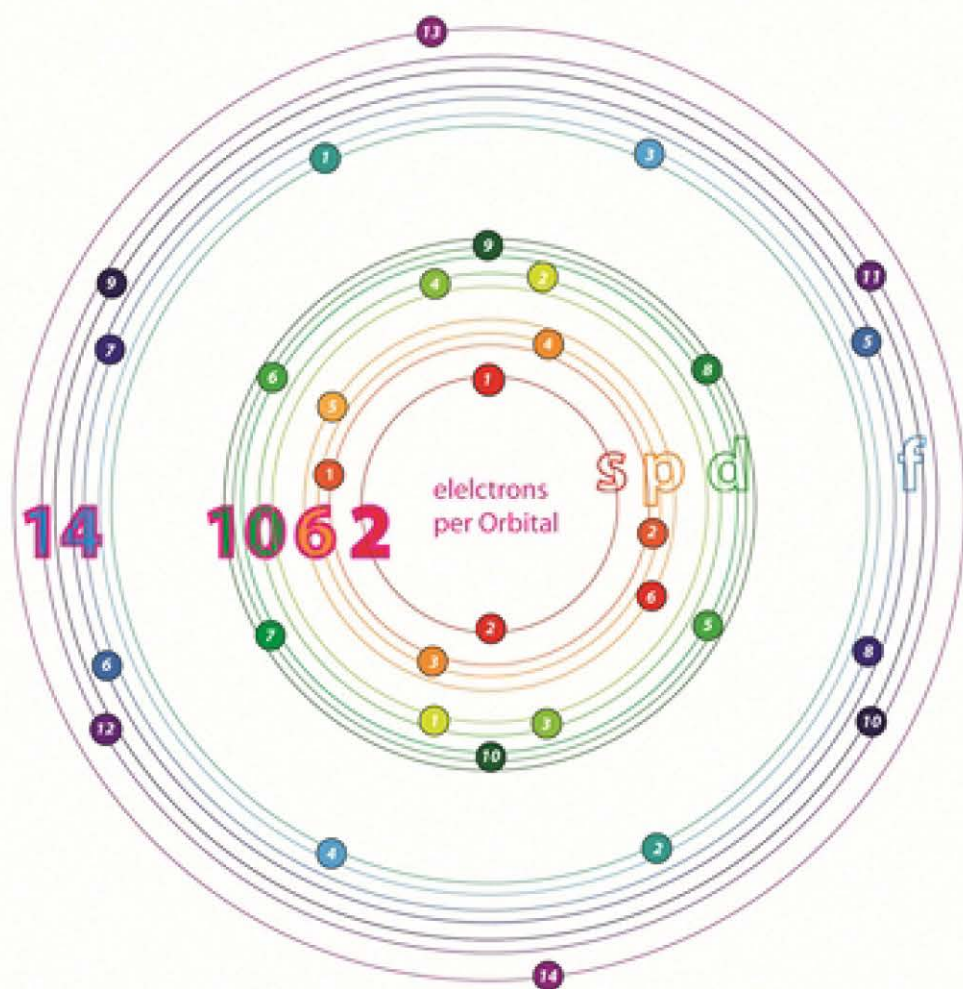


As additional nuclei bind to form d & f orbitals they can do so by bonding in many positions, with each location producing different orbital energies for each electron that binds to nuclei in that position

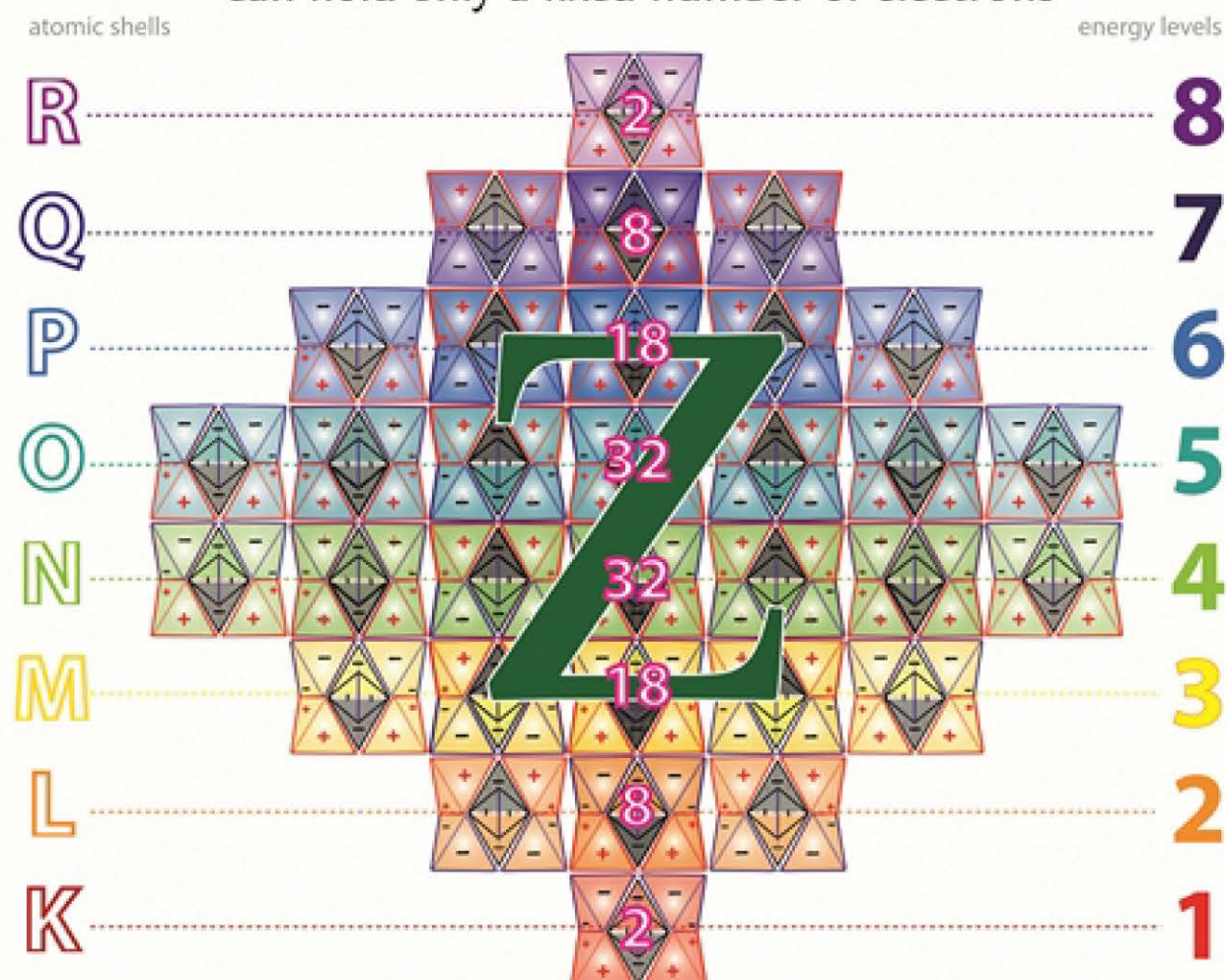


The final energy levels of each orbital is the result of the energy of the Baryons in the nuclei and the spin coupling energies of the photo-electrons bound to them

Electrons per shell



Each energy shell of a periodic element can hold only a fixed number of electrons



Rules governing the allowed combinations of Quantum Numbers

The three quantum numbers (n, l, and m) that describe an orbital are integers: 0, 1, 2, 3, and so on

- n (1-8) Principal**
(n = 1, 2, 3, 4, ...)
- l (0-3) Azimuthal**
(l = 0, 1, ..., n-1)
- ml (2l+1) Magnetic**
(ml = -l, -(l-1), ..., 0, ..., (l-1), l)
- ms : ±1/2 Spin Projection**
(ms = -1/2 or +1/2)

The principal quantum number (n) cannot be zero.
The angular quantum number (l) can be any integer between 0 and n - 1.
The magnetic quantum number (m) can be any integer between -l and +l.
The Spin of electrons in any nuclear sub-orbital can only be +1/2 (Spin UP) or -1/2 (Spin DOWN).

Z

1, 2, 3, 4, 5, 6, 7, 8
s, p, d, f
1, 3, 5, 7, 9, 11, 13 2, 4, 6, 8, 10, 12, 14
down up up down

Atomic Orbitals						
f	d	p	s	p	d	f
5, 11, 3, 13, 1, 9, 7	8, 2, 10, 4, 6	5, 1, 3	1-2	6, 2, 4	7, 1, 9, 3, 5	6, 12, 4, 14, 2, 10, 8
7	5	3	2	3	5	7
Quantum Numbers						

n	4-5	3-6	2-7	1-8	2-7	3-6	4-5
l	3	2	1	0	1	2	3
m	-3	-2	-1	1	+1	+2	+3
s	+1/2 -1/2	+1/2 -1/2	+1/2 -1/2	+1/2 -1/2	+1/2 -1/2	+1/2 -1/2	+1/2 -1/2

Erwin Schrödinger



(12 August 1887 – 4 January 1961)

Using Tetryonic charged geometries for mass-ENERGY-Matter,
an electron's position and velocity CAN be modelled simultaneously
(but any attempt to measure or interact with it, will affect its component energy-momenta)

Electron Position Uncertainty

Atomic orbitals are typically described as "hydrogen-like" (meaning one-electron) wave functions over any spatial region of measurement, categorized by n, l, and m quantum numbers, which correspond to the electron's energy, angular momentum, and a vector momentum component, respectively

Werner Heisenberg

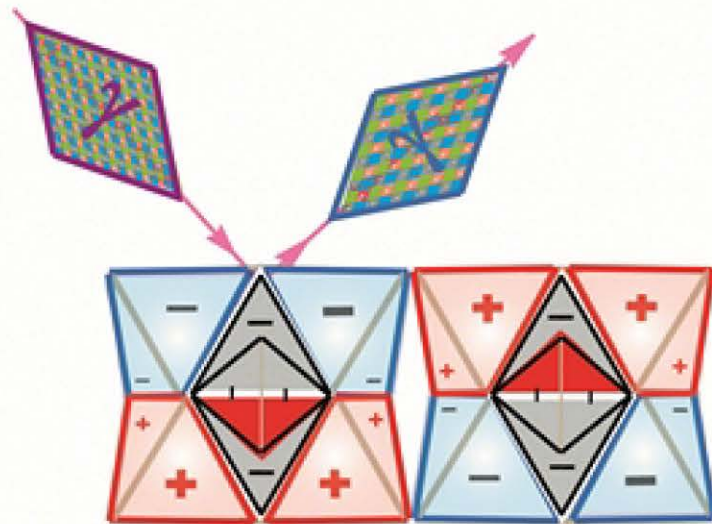


(5 December 1901 – 1 February 1976)

**Lepton's are physically Spin 1 fermion particles
that can easily be misconstrued as having entirely different
spin numbers without the correct physical topologies
to base the observed measurements on**

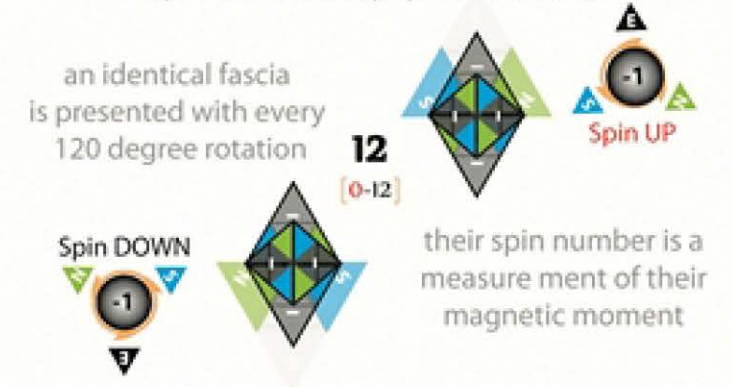
*Quantum Mechanics is a mathematical representation of
equilateral energy momenta interactions and the charged geometries
of mass-ENERGY-Matter*

**Determining the motion of electrons bound to atomic nuclei is
akin to measuring the motion of variable speed electric fan blades
mounted at various heights within a rotating carousel**



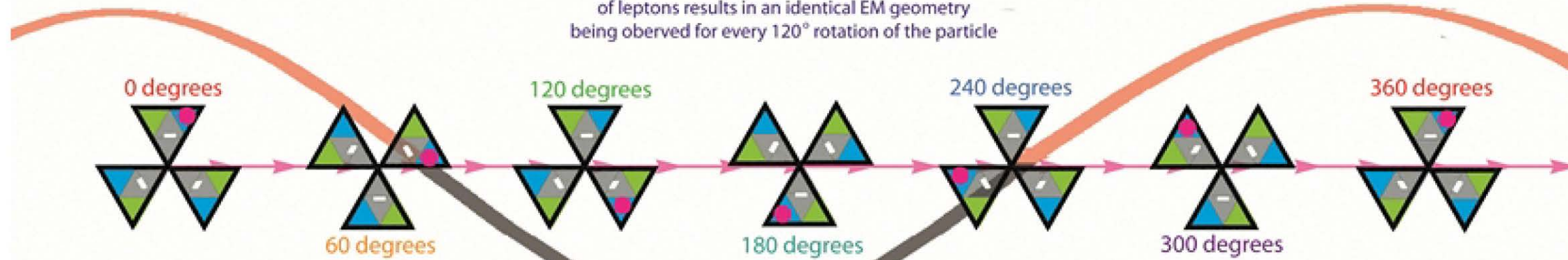
The energies of photo-electrons are determined by the Baryons they bind to & incident photons

Leptons are 12 loop quantum rotors



their spin number is a measure ment of their magnetic moment

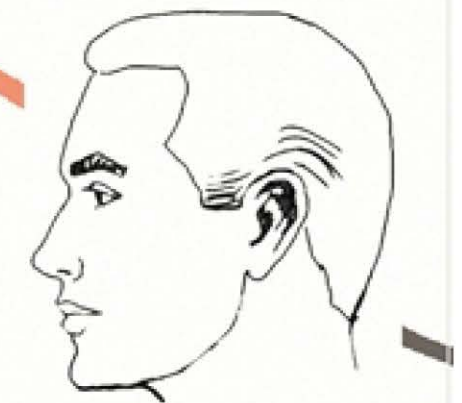
The unique 12 faceted topology of leptons results in an identical EM geometry being observed for every 120° rotation of the particle



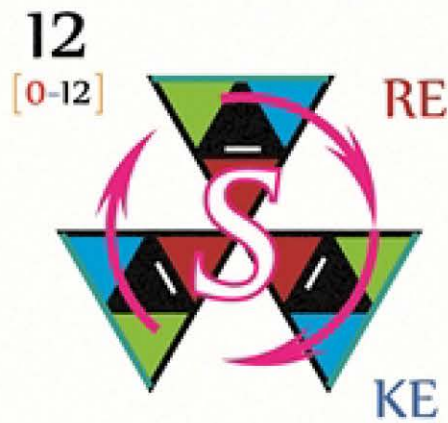
Every charged radial arm of a Lepton's Matter topology is identical to every other

Making accurate measurement and mathematical modelling of its rotational dynamics & mechanics incorrect without the correct physical topologies

Leading to the interpretation that the Lepton disappears and re-appears when being 'observed' or measured

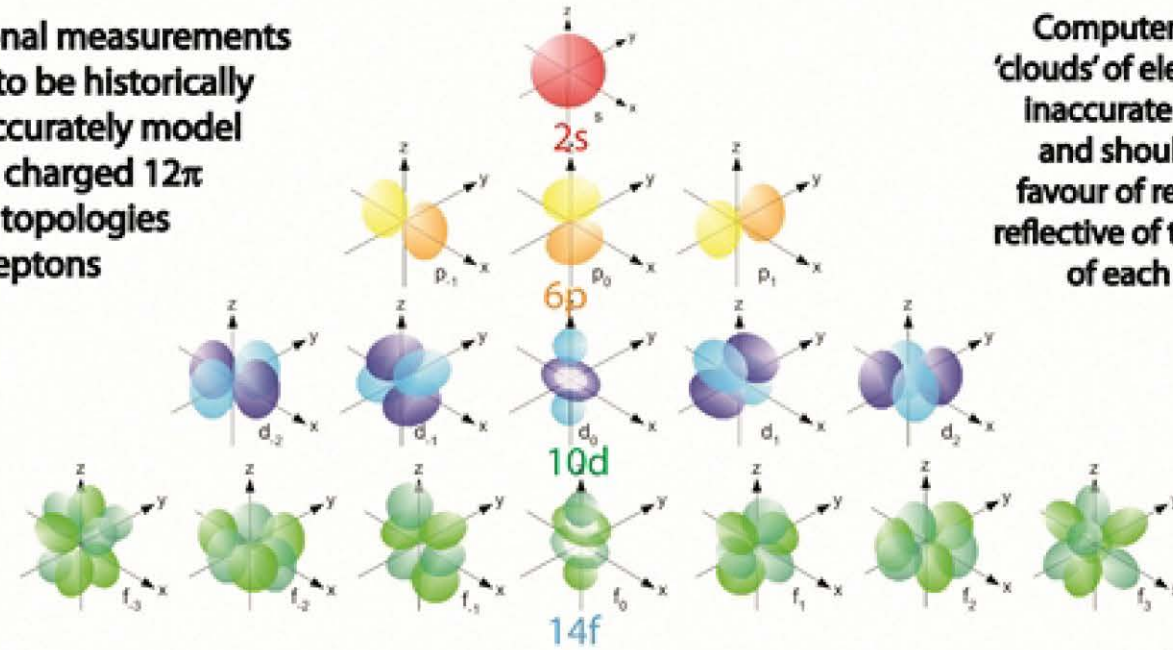
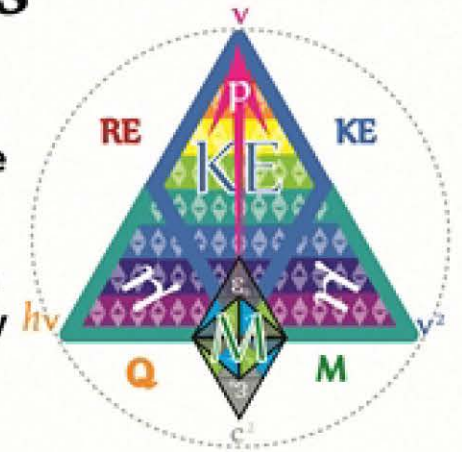


Electron modelling & probability calculations



Electron positional measurements have proven to be historically difficult to accurately model due to the charged 12π rotating topologies of leptons

Computer generated plots of 'clouds' of electron probabilities are inaccurate mis-representations and should be abandoned in favour of realistic atomic models reflective of the charged geometry of each periodic element



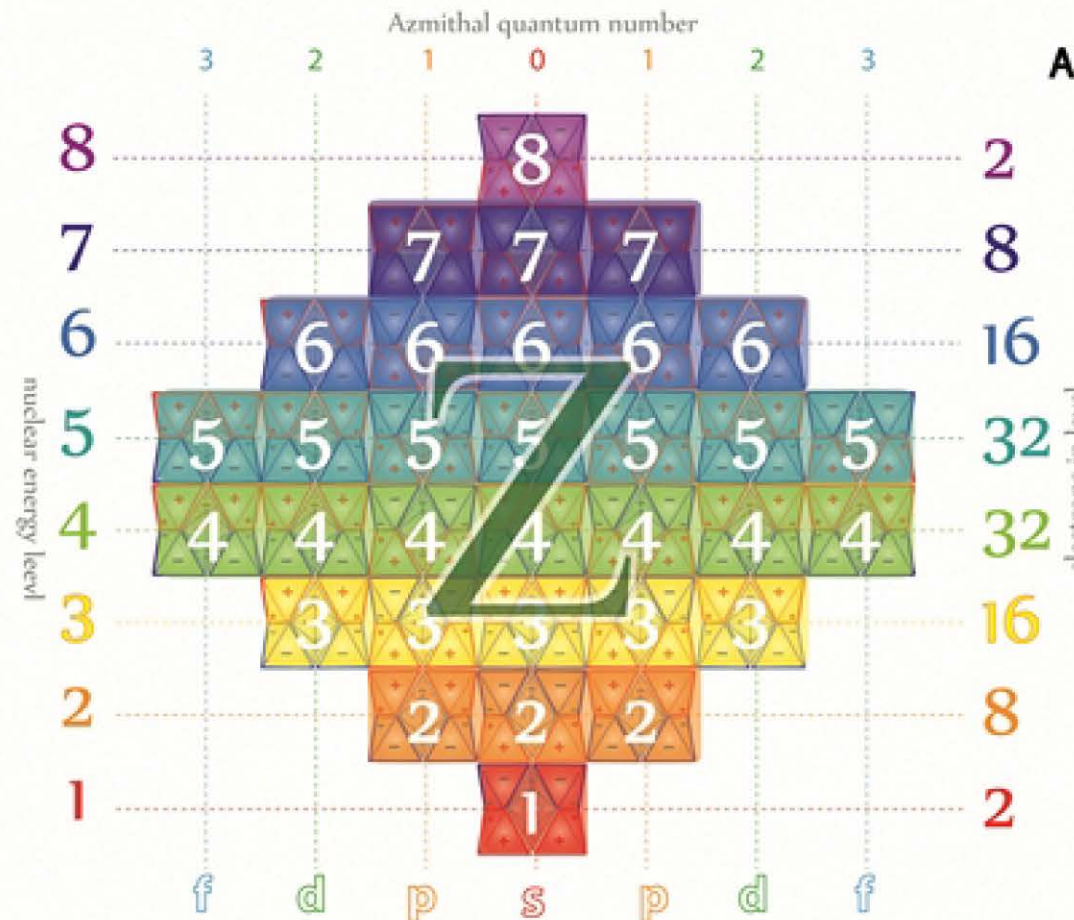
Every elemental atom can be viewed as a quantum carousel with a unique number of oscillating fans positioned around it.

Each fan has 3 blades and a fixed speed $n[1-8]$ related to its height above ground level, AND the carousel is turning around on its axis

All periodic elements are made from Deuterium nuclei



The baryonic energies of nuclei determines the energies of bound photo-electrons

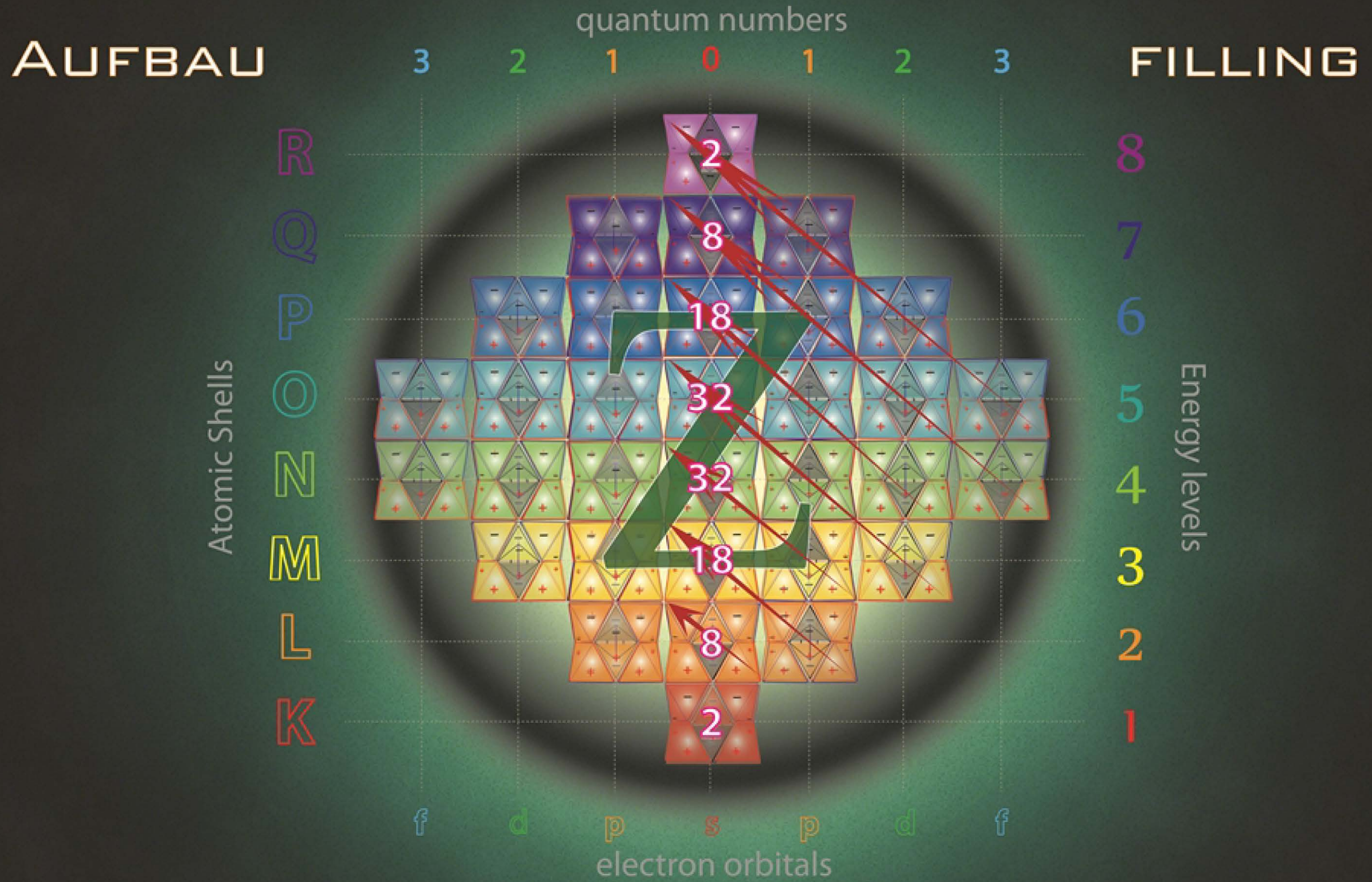


The current computer generated electron probability diagrams in popular use at present can now be shown to be a misrepresentative model of mathematical modelling of electron sub-orbital energies

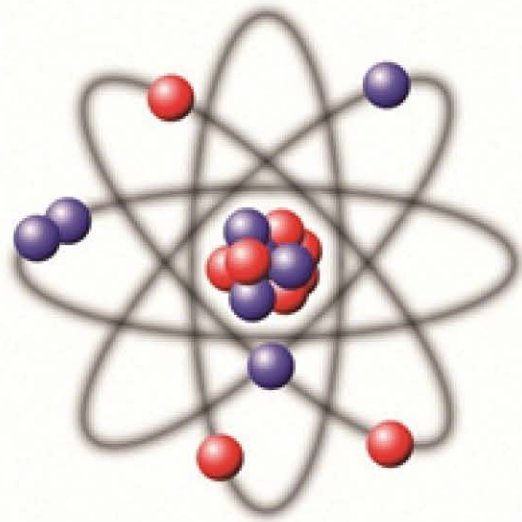
The nuclear quantum levels $[n]$, intrinsic quantised angular momentum $[h]$ and orbital angular momentum $[l]$ of each electron bound within atomic nuclei are all the direct result of the Baryonic energies of the nuclei they are bound to

Each level of the quantum carousel can contain only a limited number of fans each running at a specific speed

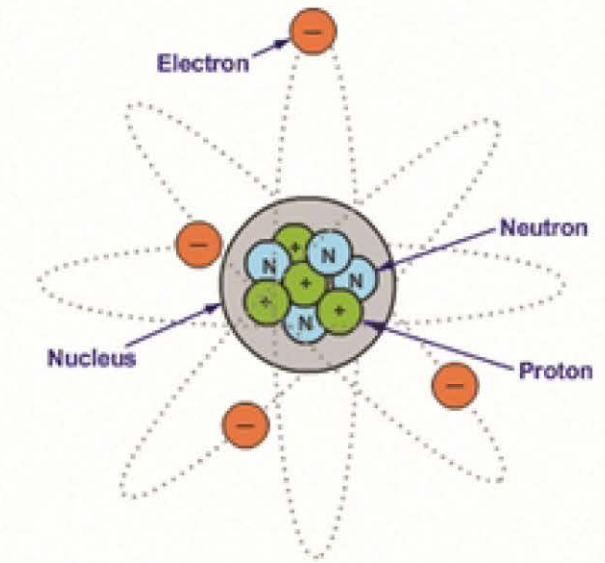
Imagine trying to measure (or model) the motion of any 1 quantum scale blade while the carousel rotates



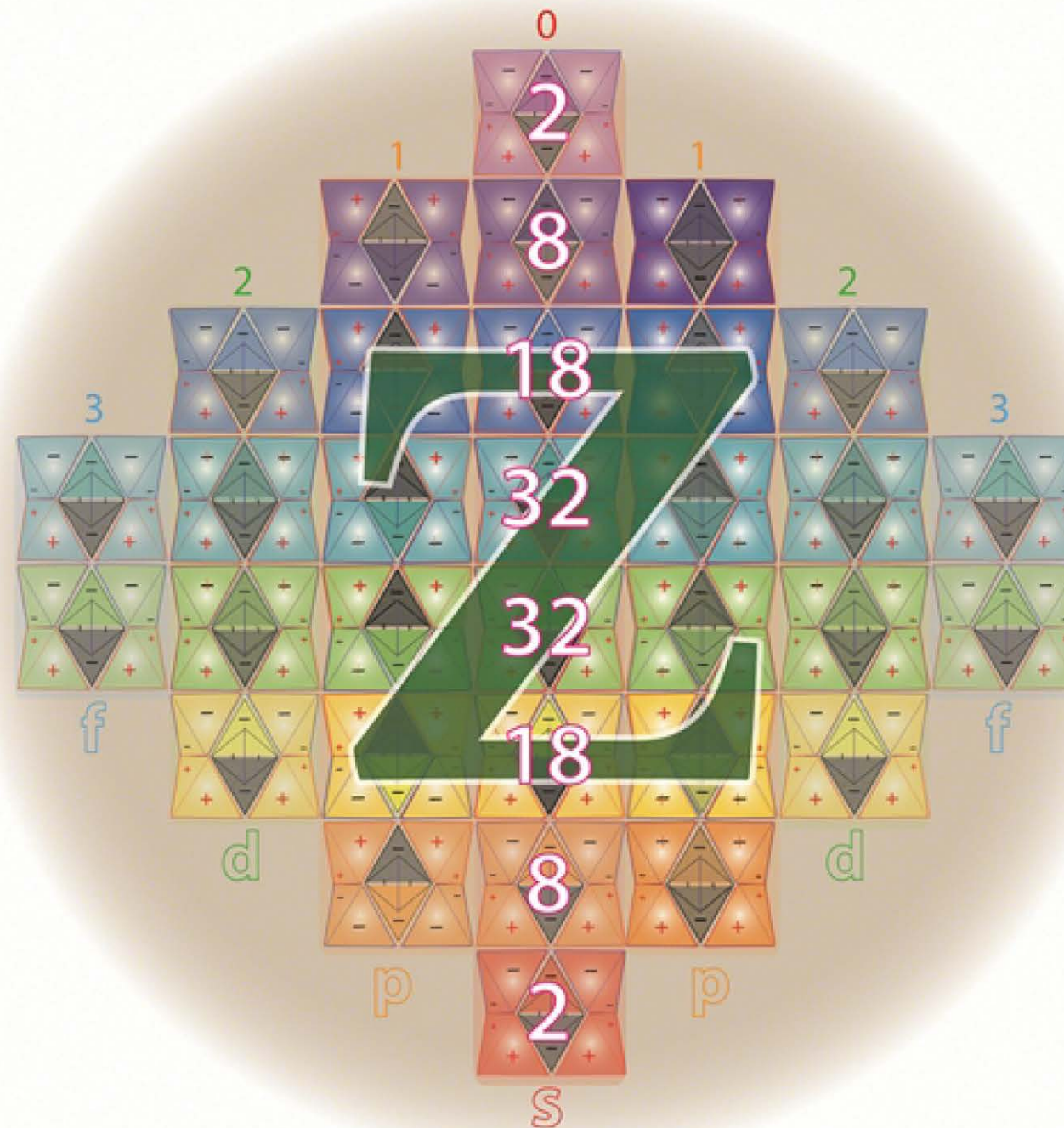
Quantum Topologies



Dalton Model

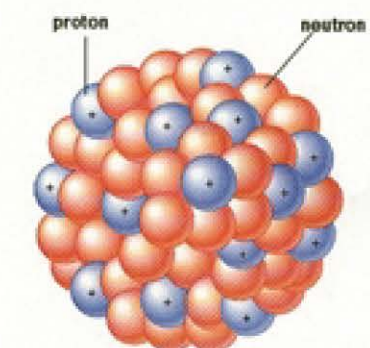
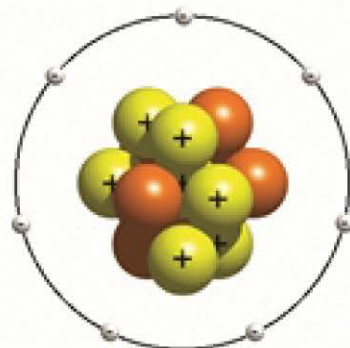


Quantum Model



Thomson Model

Rutherford Model



**Historically viewed as a spherical object
Tetryonic charge geometry has finally revealed the
true quantum topology of all atoms**

Element numbers

The rule dictating how many nuclei form each Atomic shell is known as the Aufbau principle.

The physical and chemical properties of elements is determined by the atomic structure.
The atomic structure is, in turn, determined by the electrons and which shells, subshells and orbitals they reside in.

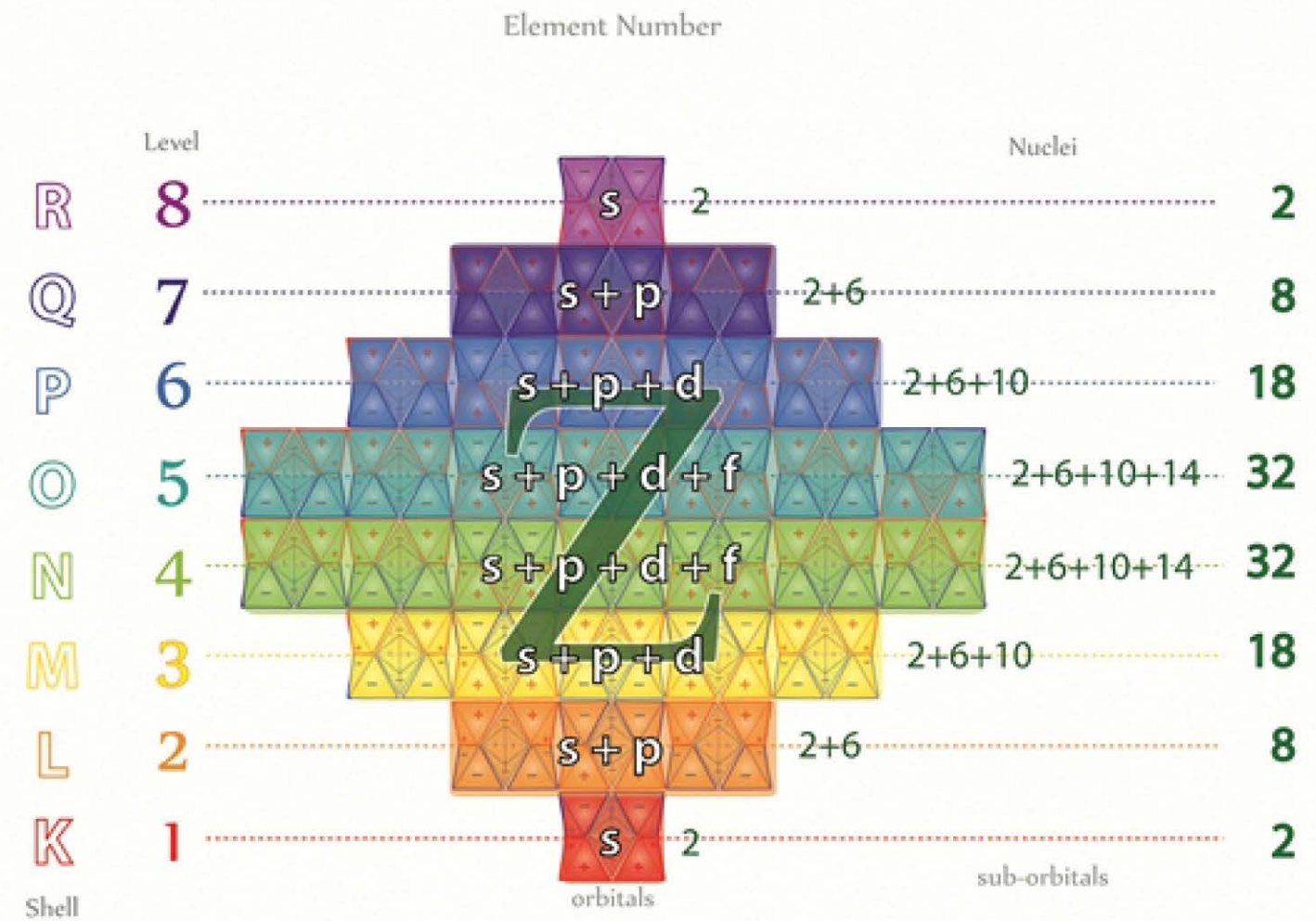
The maximum periodic elemental number is 120

		Element #
	2	120
	+	119
	8	118
	+	111
	18	110
	+	93
	32	92
	+	61
	32	60
	+	29
	18	28
	+	11
	8	10
	+	3
	2	2
		1
		Number of nuclei per level

$$Z = \sum_{n=1}^8 2(n^2) =$$

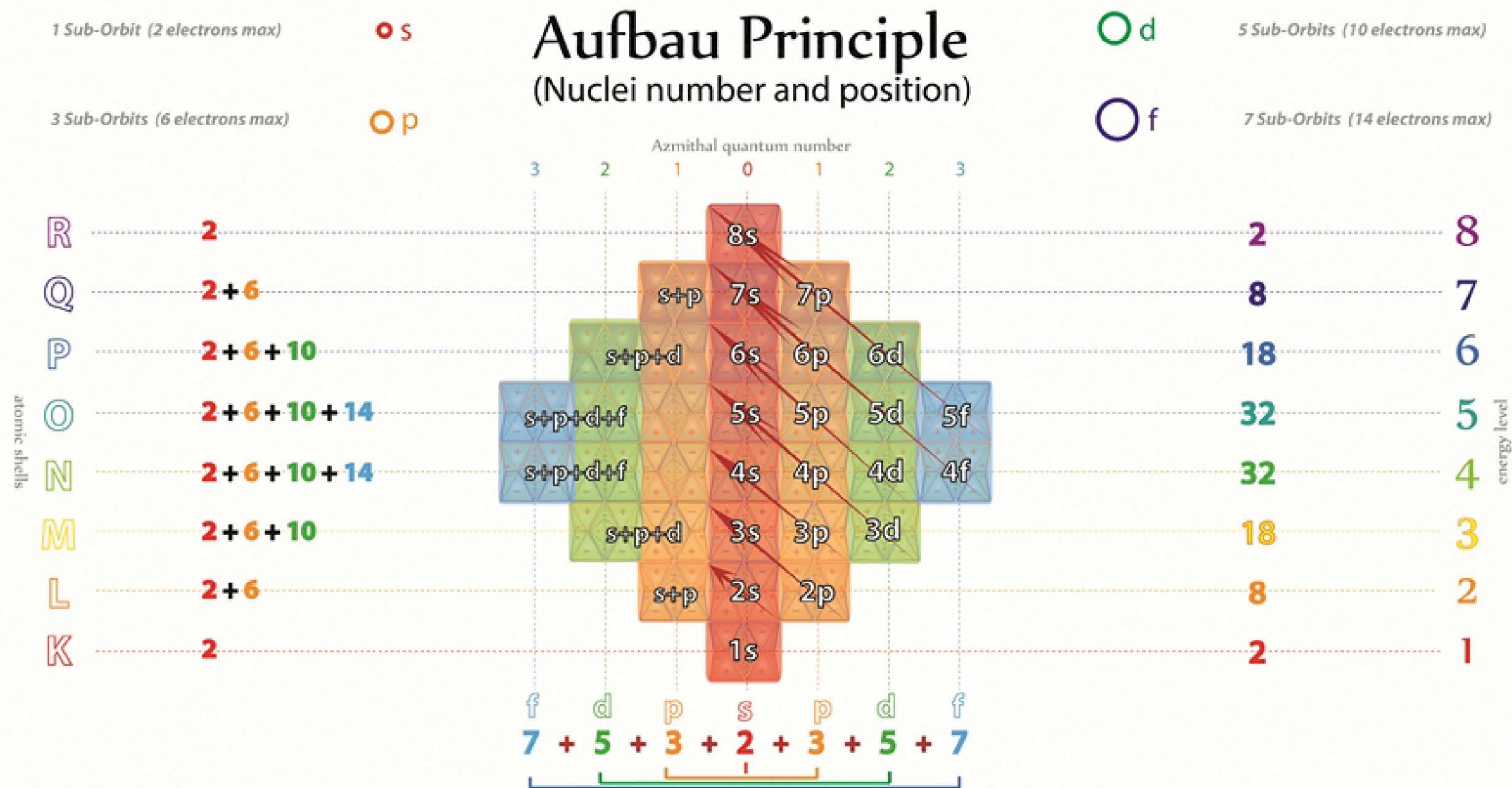
The number of nuclei per quantum level is reflective of photonic energy levels and provides the foundational geometry for all of the periodic elements

The number of possible nuclei in each Quantum level follows aufbau principle 'numbers' which can be determined using the following summation formula



Deuterium is the building block of all elements

Each element has equal numbers of Protons, electron & Neutrons with their stored mass-energies making up the molar masses of elements not excess neutron as currently modelled



Nuclei	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	per level	
R	119	120																									8	2						
Q	87	88	113	114	115	116	117	118																					7	8				
P	55	56	81	82	83	84	85	86	103	104	105	106	107	108	109	110	111	112											6	18				
O	37	38	49	50	51	52	53	54	71	72	73	74	75	76	77	78	79	80	89	90	91	92	93	94	95	96	97	98	99	100	101	102	5	32
N	19	20	31	32	33	34	35	36	39	40	41	42	43	44	45	46	47	48	57	58	59	60	61	62	63	64	65	66	67	68	69	70	4	32
M	11	12	13	14	15	16	17	18	21	22	23	24	25	26	27	28	29	30											3	18				
L	3	4	5	6	7	8	9	10																					2	8				
K	1	2																															1	2
Shells	s1	s2	p1	p2	p3	p4	p5	p6	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	f1	f2	f3	f4	f5	f6	f7	f8	f9	f10	f11	f12	f13	f14	Quantum number	

2 6 10 14

A specific nuclear energy is associated with each electron configuration and, upon certain conditions, bound electrons are able to move from one orbital to another by emission or absorption of a quantum of energy, in the form of a photon.

The Aufbau principle can also be used to model the binding configuration of Protons and Neutrons in an atomic nucleus, according to their specific Baryonic Energy levels, in turn revealing the quantum geometry of all periodic Elements

Wolfgang Pauli



(25 April 1900 – 15 December 1958)

The orbitals of lower energy are filled in first with the electrons and only then are the higher energy orbitals filled.

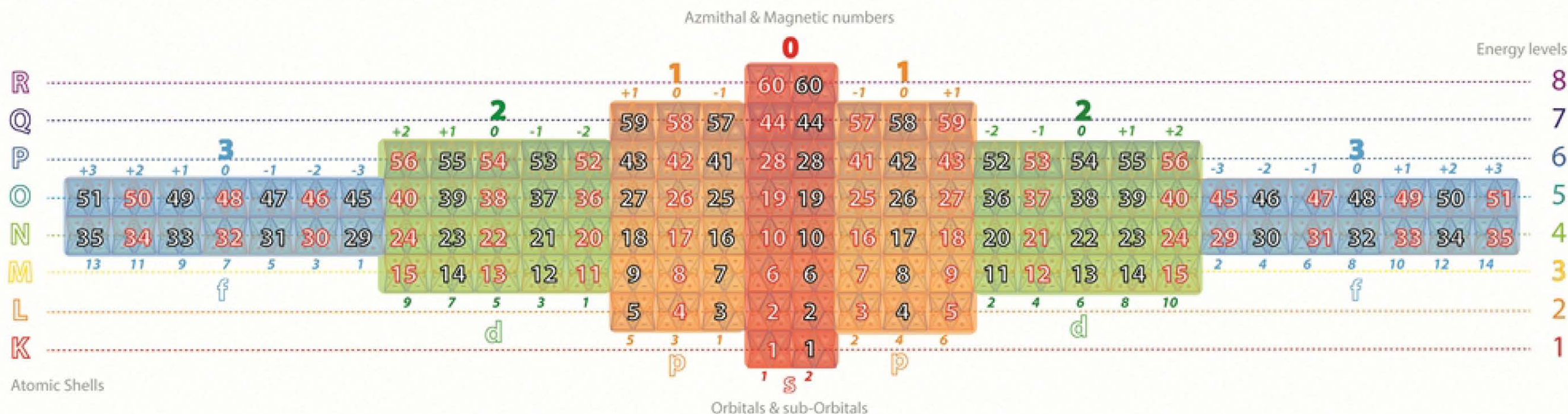
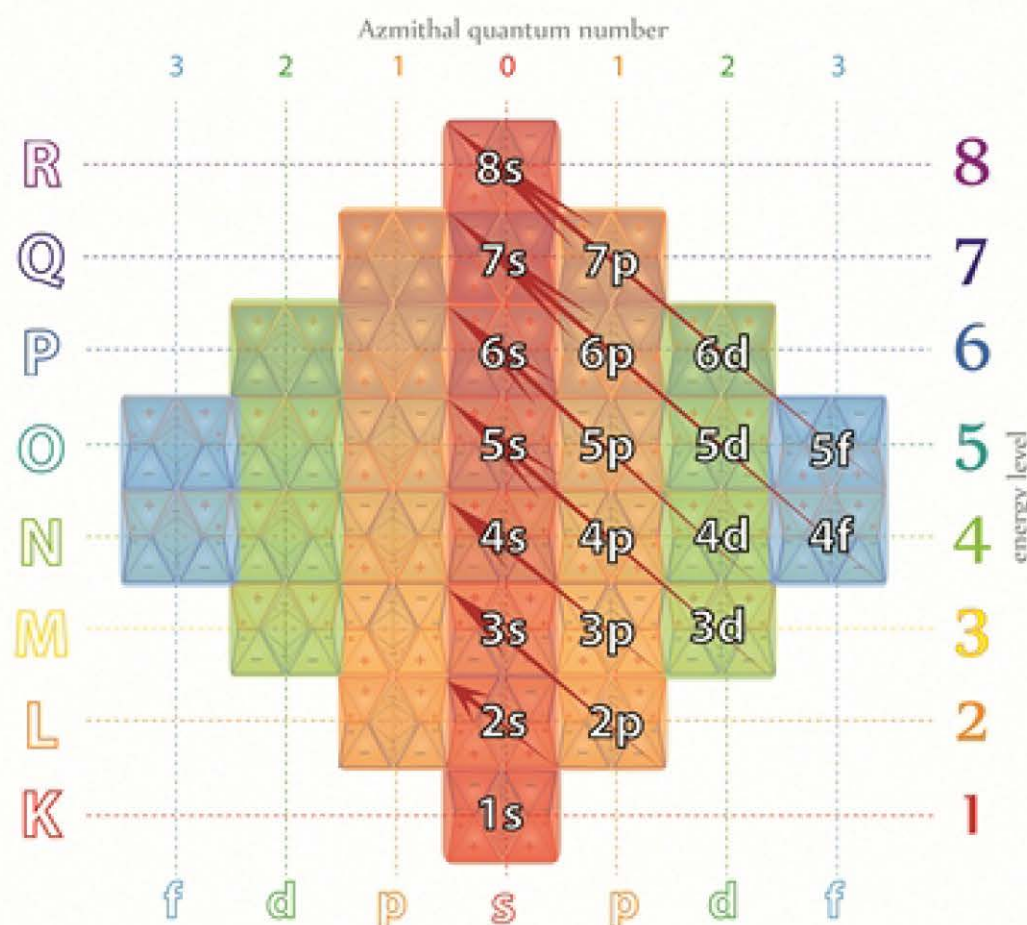
Friedrich Hermann Hund



(4 February 1896 - 31 March 1997)

Orbitals of equal energy are each occupied by one electron before any orbital is occupied by a second electron, and all electrons in singly occupied orbitals must have the same spin state

aufbau electron orbital filling

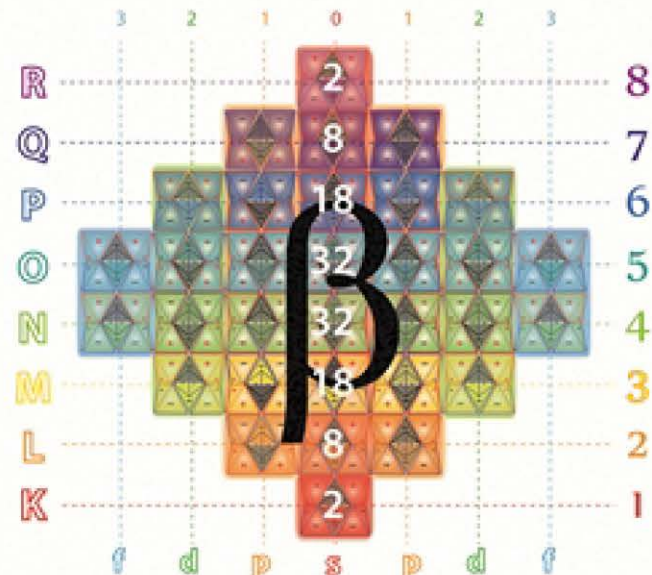
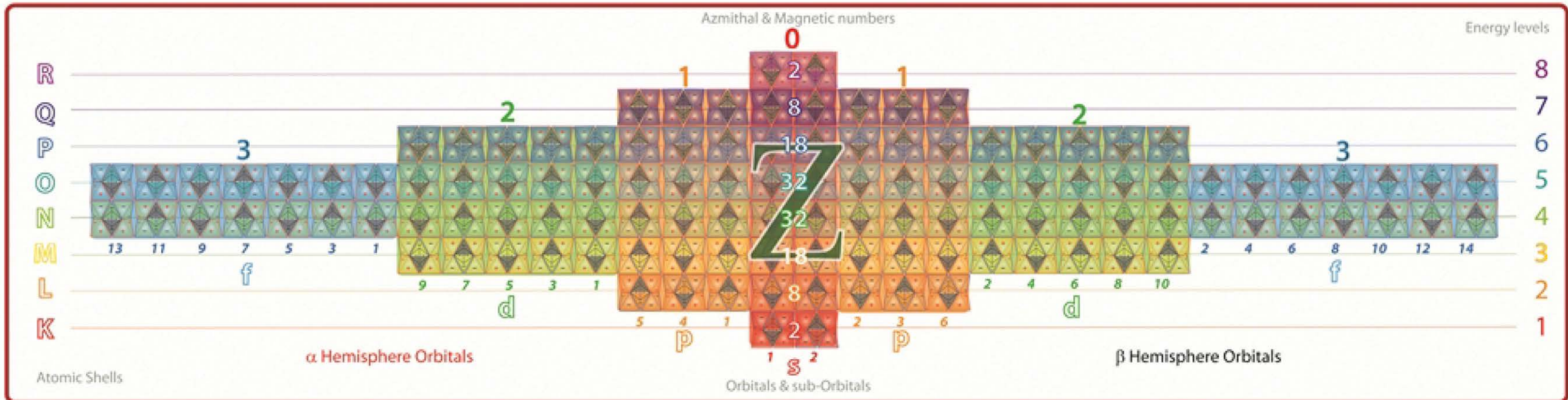


Aufbau construction

60



Proton
base
Hemisphere



Neutron
base
Hemisphere



60

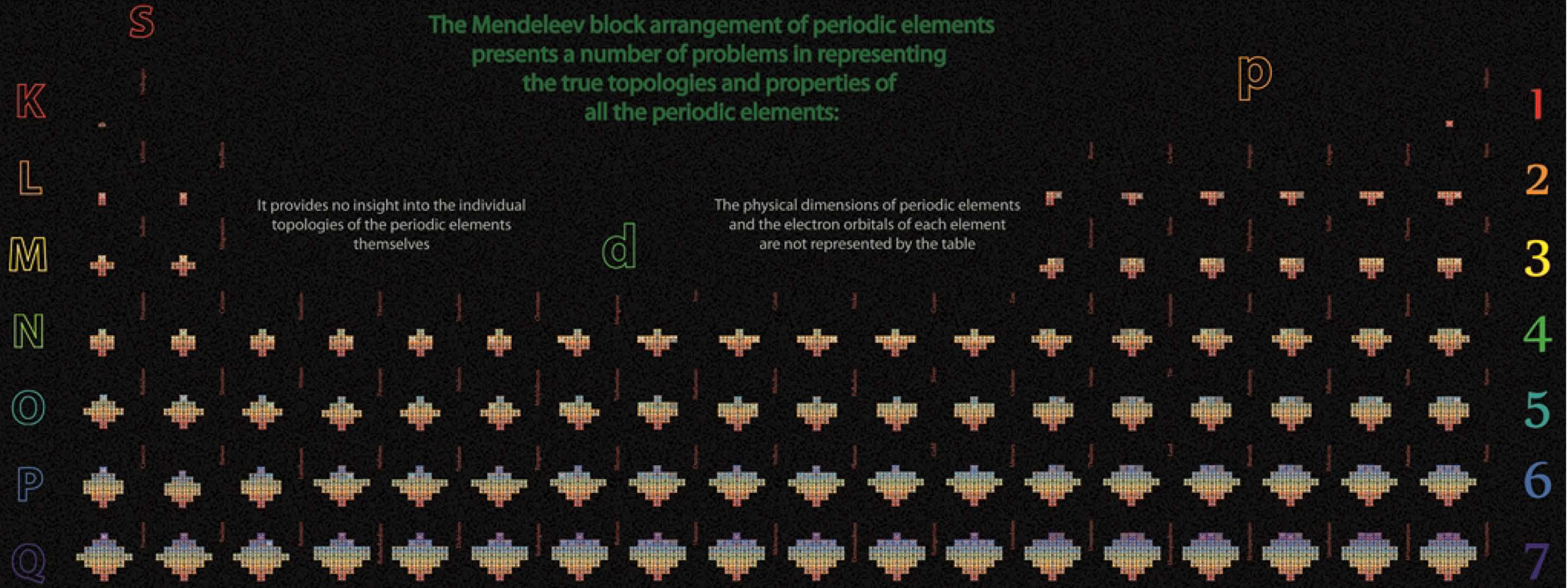
Atomic Weights

[Molar mass-energies]

The table does not illustrate the quark compositions of the baryonic nuclei in elements

The Mendeleev table incorrectly positions Hydrogen as Element 1 in the table and does not show Deuterium [the building block of all Elements]

The Mendeleev block arrangement of periodic elements presents a number of problems in representing the true topologies and properties of all the periodic elements:



It provides no insight into the individual topologies of the periodic elements themselves

The physical dimensions of periodic elements and the electron orbitals of each element are not represented by the table

The table does not reflect elemental quantum numbers as defined by Schrodinger's wave equation

The table provides no additional insights or information on nuclei packing, aufbau element building processes or how nuclei energies contribute to total molar mass



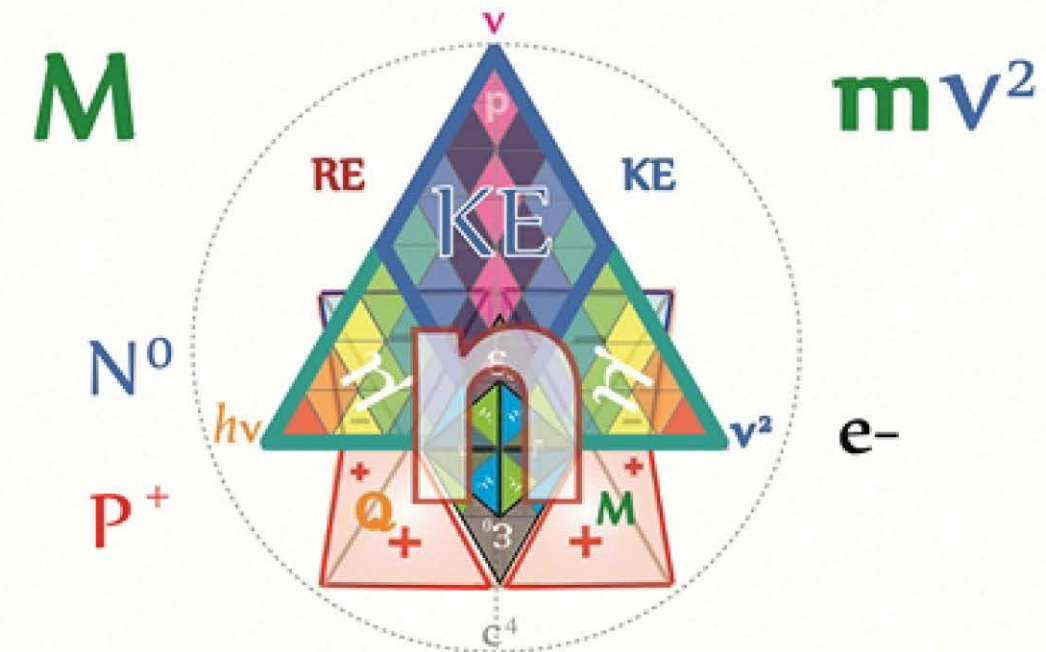
f

Tetryonic charge geometry can rectify all of these deficiencies



Atomic nuclei mass-energies

Each element's weight [mass-Matter in a gravitational field] is the result of the total quanta comprising that element



The nuclei forming each atomic shell have specific mass-energy quanta

$$\sum_{n=1}^8 \left[\text{Baryon rest masses } [72(n)^2] + \text{lepton rest mass } [12e19] + \text{KEM } [m_e v^2] \right]$$

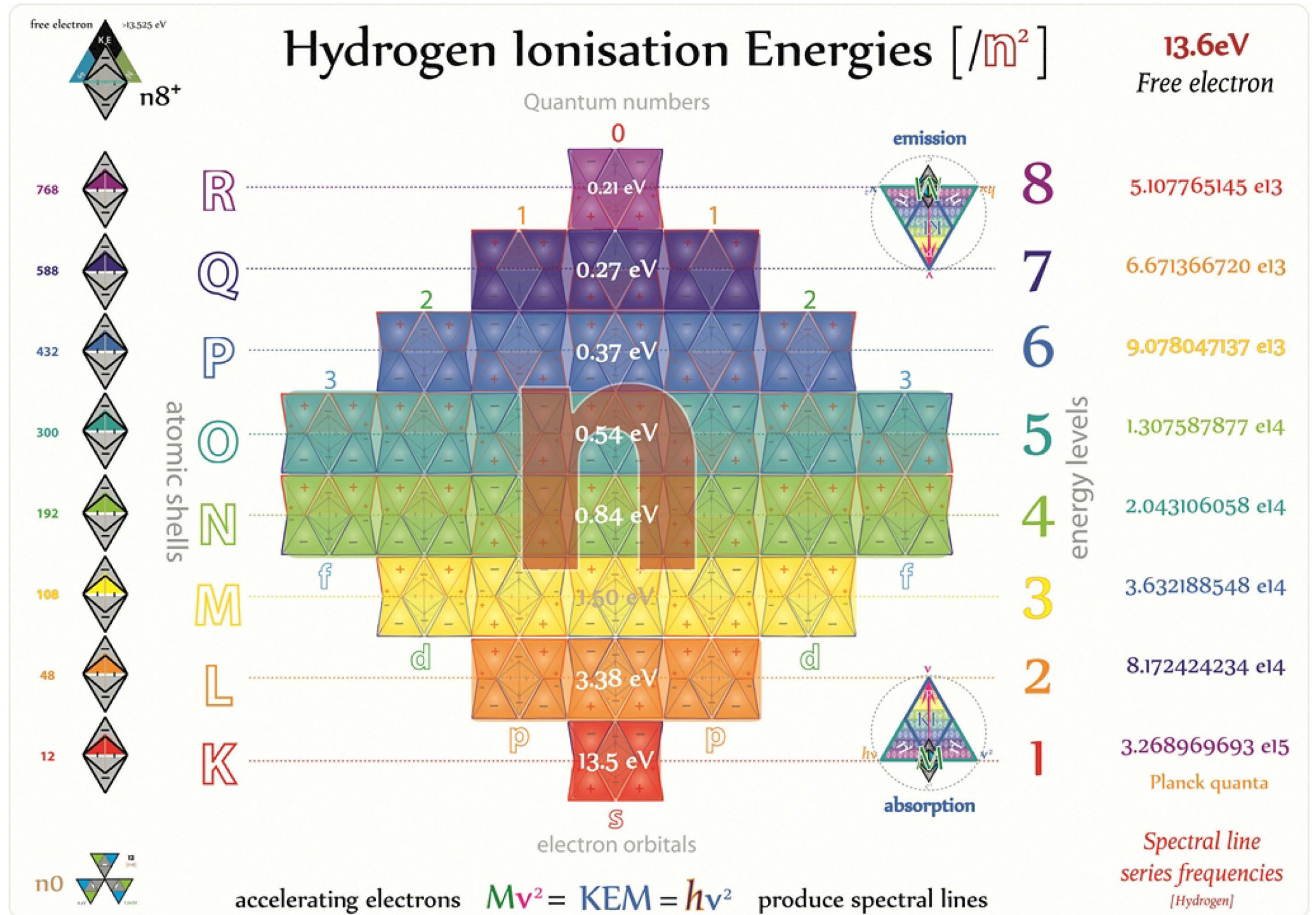
Deuterium mass-energy per shell

Despite having differing mass-energies each Deuterium nuclei has the same velocity invariant Matter geometry [84π]

spin orbital coupling in synchronous quantum convertors

Electrons act as quantum scale rotating armatures in atomic nuclei and can only have specific energies reflective of the electron orbital energy level of the Baryons in which they are found

They achieve these energy levels by absorbing or emitting photons to achieve the specific angular momentum required



Redefining Atomic weights

Atomic weight (symbol: A_r) is a dimensionless physical quantity, the ratio of the average mass of atoms of an element (from a given source) to 1/12 of the mass of an atom of carbon-12 (known as the unified atomic mass unit)

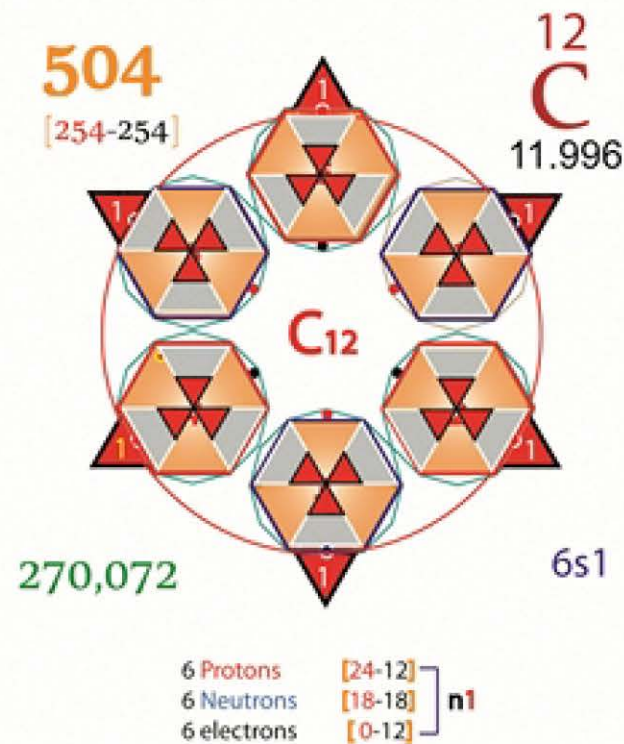
The 'unified atomic mass unit' currently in use is known to be inaccurate and must be corrected in order to bring clarity & increased accuracy to the atomic weights of all elements

$$A_r = 22,512$$

Hydrogen

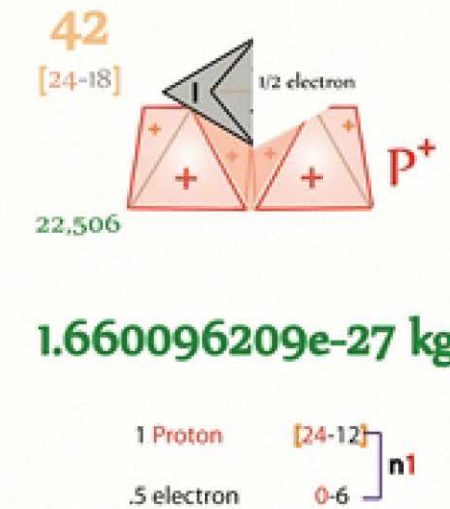
Defining Hydrogen as having an exact atomic Planck mass of $22512n$ quanta provides uniformity with Tetryonics

Carbon 12

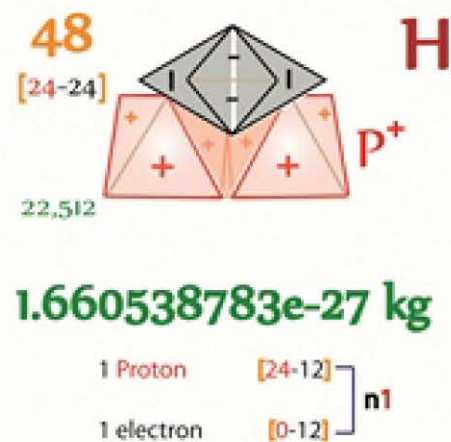


$$1/12 C_{12}$$

$$A_r = 22,506$$



Unified atomic Matter unit



Deuterium is the building block of all elements in the period table

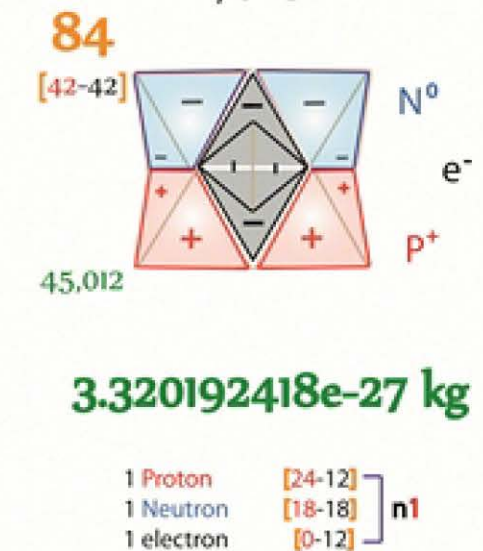
$$A_r = 45,012$$

Deuterium

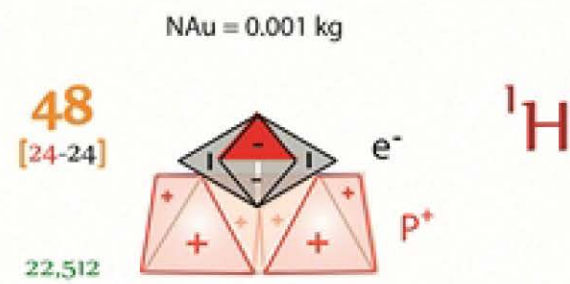
Defining Deuterium as having an exact atomic Planck mass of $45012n$ quanta reflects the true charged geometries of all Elements & their topologies

D

$$1/6 C$$



Planck mass-energy units

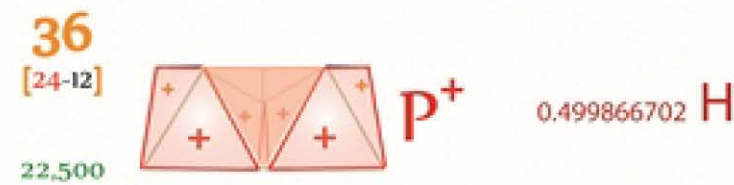


1.660538841 e-27 kg

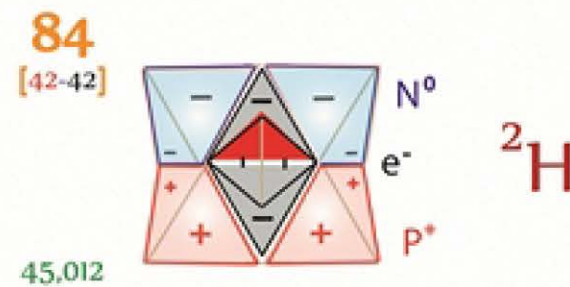
One Da is approximately equal to the mass of one proton or one neutron



1.659653693 e-27 kg



Deuterium is the building block of all elements



3.320192534 e-27 kg

The unified atomic mass unit (symbol: u) or Dalton (symbol: Da) is a unit that is used for indicating mass on an atomic or molecular scale

270,072

1/12 the mass of a C12 graphene atom at rest in its electronic ground state

1.660538782(83) x 10⁻²⁷ kg

22,506

is an inaccurate means of determining the exact rest mass of a Hydrogen atom

22,512

Carbon 12 has 270,072n planck quanta
(270,072 / 12 = 22,506)

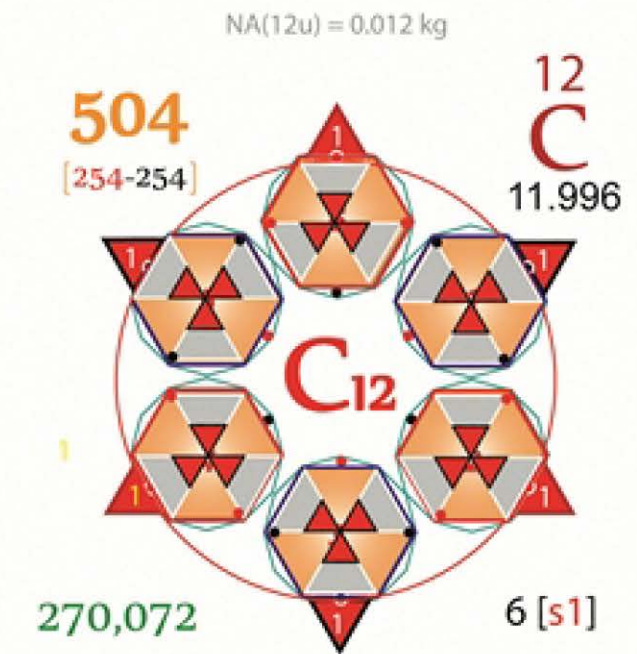
Hydrogen has a mass of 22,512n (22,500+12) requiring all mass to be calculated directly using the Planck mass-energy quantum (.001kg / N_A / 22,512) & Tetryonic charge geometries

Using Tetryonic theory to define
n Planck mass = 7.376238634 x 10⁻³² Kg
(see Tetryonics QM 15.04)

exact atomic rest masses for all particles, elements and compounds can be determined directly from atomic theory

N_A = 6.02214179 e23

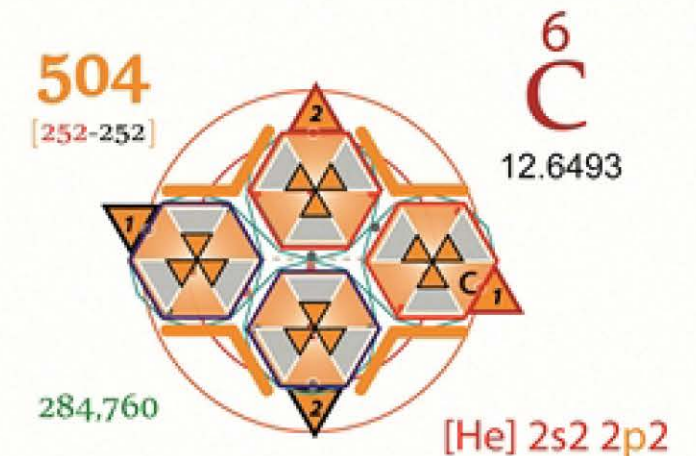
The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12; its symbol is "mol".



6 Protons [24-12]
6 Neutrons [18-18]
6 electrons [0-12] } n1

Carbon has a number of differing atomic configurations (allotropes)

6 Protons [24-12]
6 Neutrons [18-18]
6 electrons [0-12] } n1-2



Planck mass-energy contributions to the measured weights of periodic, elementary mass-Matter topologies

Baryons have 2,25e23 Planck quanta comprising their rest Matter topologies

[930.974 MeV]
 Δ **1875 x**
 [496.5 keV]

Leptons have 1.2 e20 Planck quanta comprising their rest Matter topologies

[496.5 keV]
 Δ **36,711 x**
 [13.6 eV]

Photons are planar geometries [Matter-less] (purely Kinetic mass-Energy and momenta)

The Lyman alpha spectral line mass-energy contribution to the mass of a Deuterium nucleus is negligible

Electron quantum level energies are determined by the energy of the Nuclei they bind to in elements

D⁺
 [1.862 GeV]

84
 [42-42]

N⁰
 e⁻
 p⁺

90,012n+

Photons contribute spectral mass-energies to the nuclei mass but are themselves Matterless [2D zero rest mass-energies]

Photons are 2π charge mass-energy geometries

36
 [18-18]

N⁰

45,000n

1.659653693 e-27 kg

36
 [24-12]

p⁺

45,000n

12
 [0-12]

e⁻

12n

8.851486361 e-31 kg

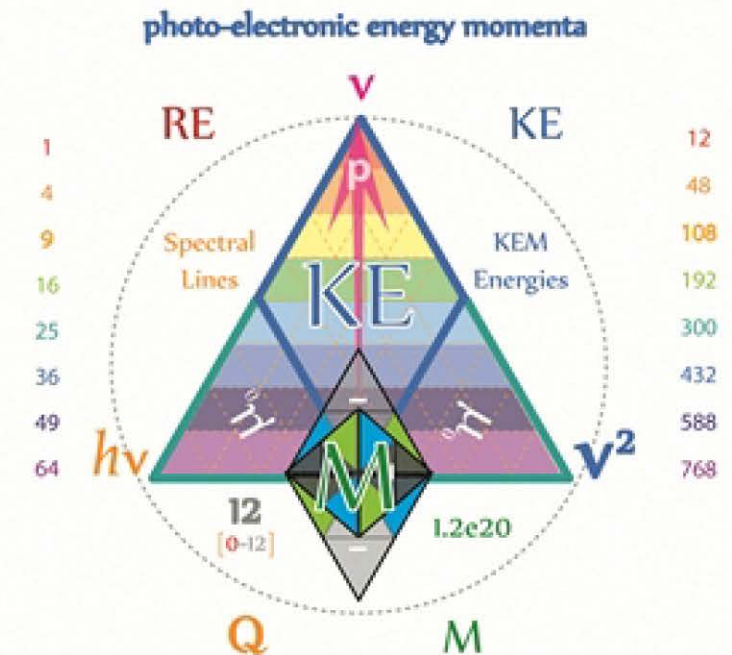
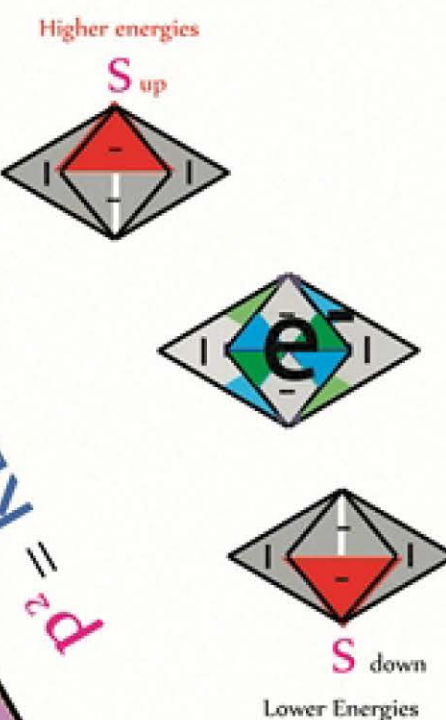
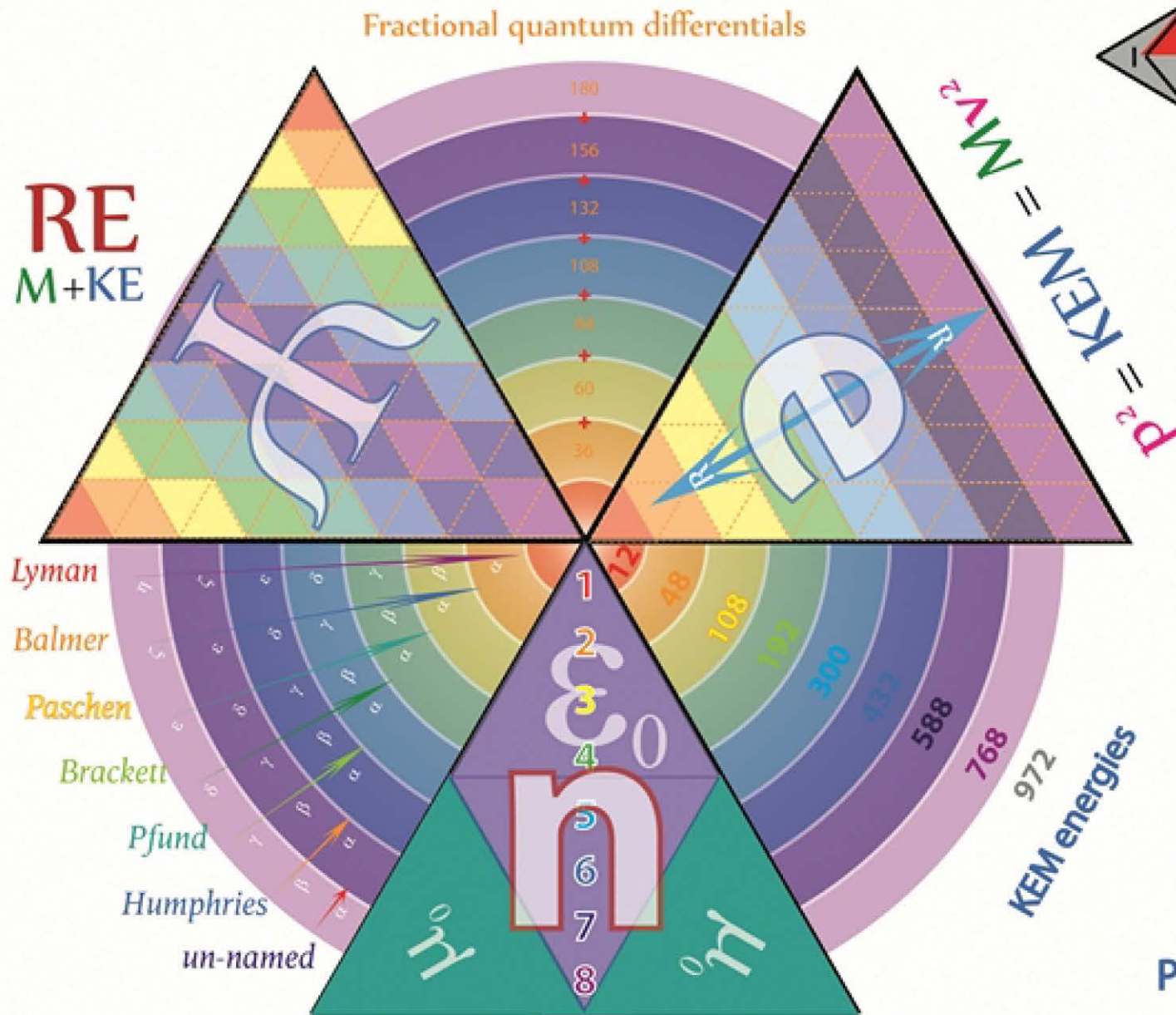
n
 [v-v]

0

KEM

2.411109611 e-35 kg

Ionisation energies

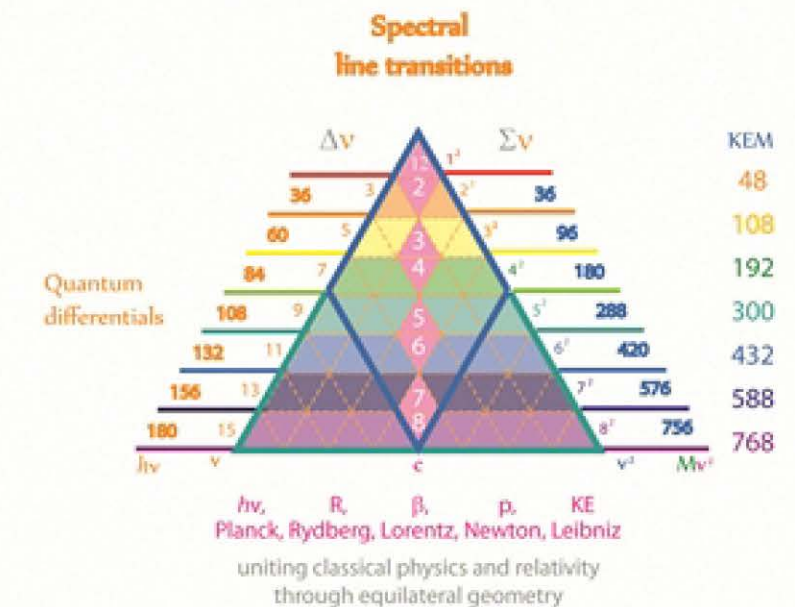


Mapping photo-electron transition energies to Tetryonic energy momenta geometries reveals many key facts about the ionisation energies of nuclei

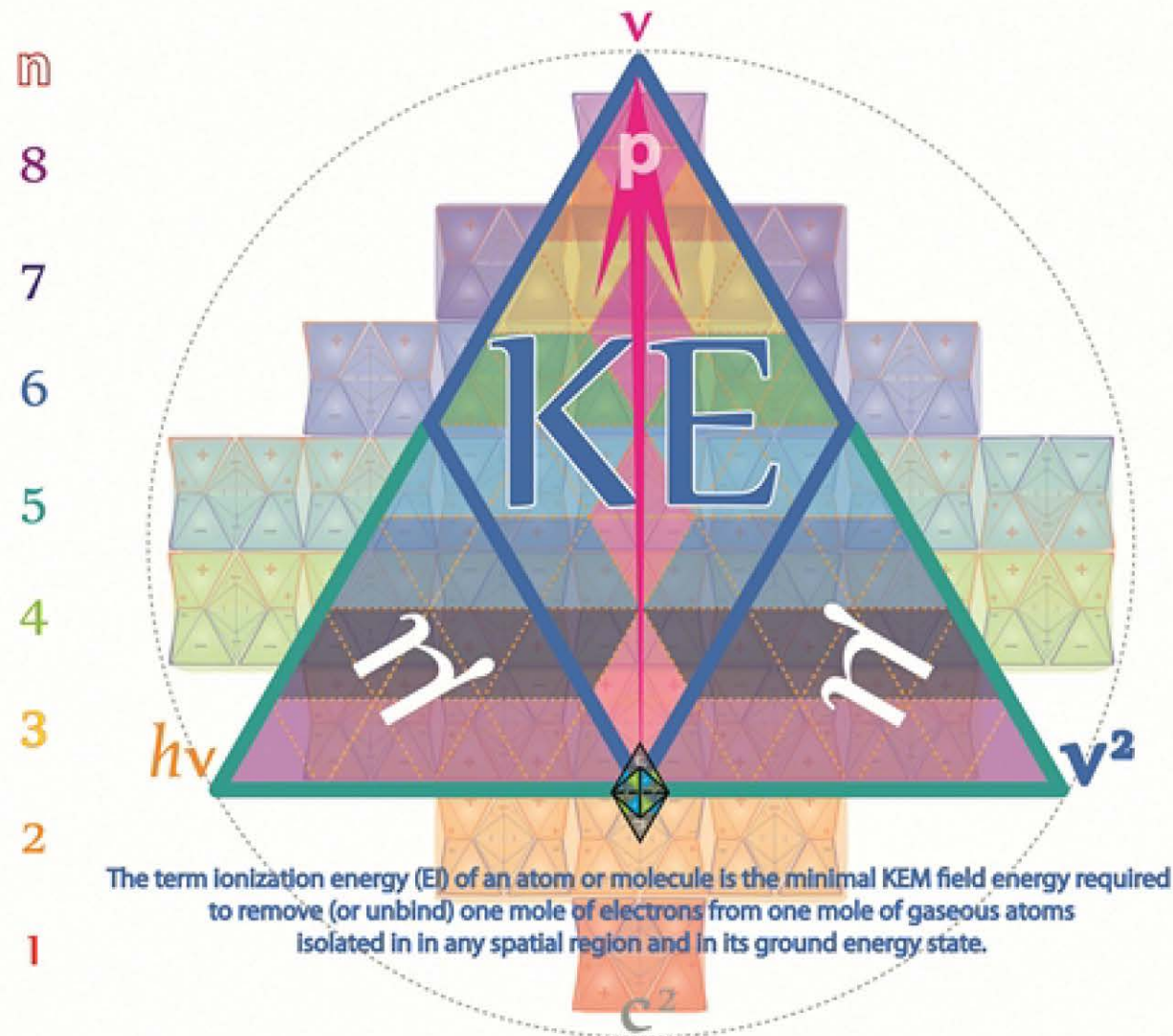
$$E = -\frac{Z^2 ke^2}{n^2 2a_0} = -\frac{13.6Z^2}{n^2} eV$$

The differing fractional KEM field energy momenta of electrons that results from their transitions to specific energy nuclei in elements results in differing QAM quanta and produces spectral lines and fine line splitting

Photo-electrons absorb/emit spectral energies



Elementary ionisation energies



The term "ionization energy" is sometimes used as a name for the work needed to remove (or un-bind) the highest energy photoelectron from an atom or molecule.

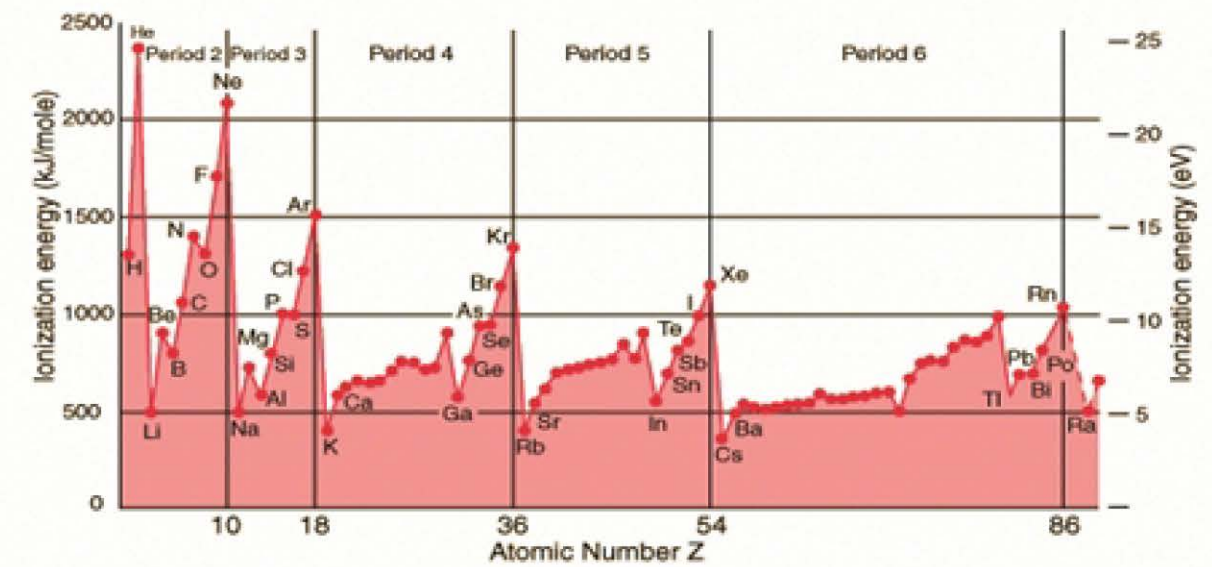
However, due to interactions with surfaces, this value differs from the ionization energy of the atom or molecule in question when it is located by itself in free space.

So, in the case of surface-adsorbed atoms and molecules, it may be better to use the more general term "electron binding energy", in order to avoid confusion.

Both these names are also sometimes used to describe the work needed to remove an electron from a "lower" orbital (i.e., not the topmost orbital) for both free and adsorbed atoms; in such cases it is necessary to specify the orbital from which the electron has been removed

$$E = -\frac{Z^2 ke^2}{n^2 2a_0} = -\frac{13.6Z^2}{n^2} eV$$

Every electron in each elementary orbit has a unique ionisation energy



Nuclei	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	per shell
--------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----------

Shells	Element number																																			
R	119	120																																		
Q	87	88	113	114	115	116	117	118																												
P	55	56	81	82	83	84	85	86	103	104	105	106	107	108	109	110	111	112																		
O	37	38	49	50	51	52	53	54	71	72	73	74	75	76	77	78	79	80	89	90	91	92	93	94	95	96	97	98	99	100	101	102				
N	19	20	31	32	33	34	35	36	39	40	41	42	43	44	45	46	47	48	57	58	59	60	61	62	63	64	65	66	67	68	69	70				
M	11	12	13	14	15	16	17	18	21	22	23	24	25	26	27	28	29	30																		
L	3	4	5	6	7	8	9	10																												
K	1	2																																		
Shells	s	s	p	p	p	p	p	p	d	d	d	d	d	d	d	d	d	d	f	f	f	f	f	f	f	f	f	f	f	f	f	f				
	s1	s2	p1	p2	p3	p4	p5	p6	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	f1	f2	f3	f4	f5	f6	f7	f8	f9	f10	f11	f12	f13	f14				
																			Orbitals																	
																			sub-orbitals																	

8	2
7	8
6	18
5	32
4	32
3	18
2	8
1	2
Energy level	

Hyperfine splitting and Lamb Shifts

When the spectral lines of the hydrogen spectrum are examined at very high resolution, they are found to be closely-spaced doublets. This splitting is called fine structure and was one of the first experimental evidences for electron spin.

The fine structure describes the splitting of the spectral lines of atoms due to first order relativistic corrections [principal quantum energies]

n

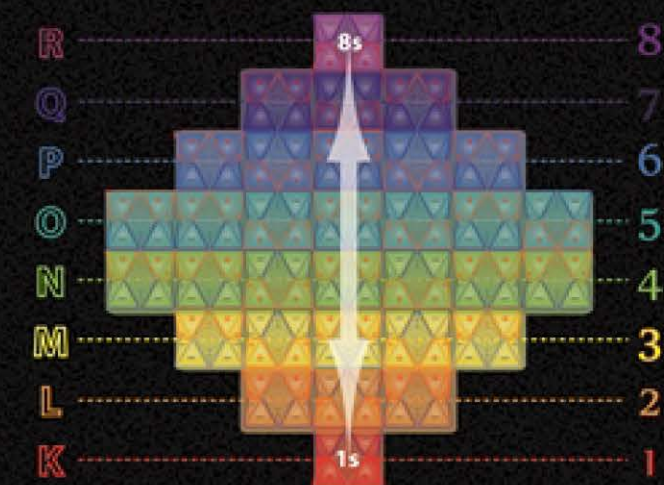
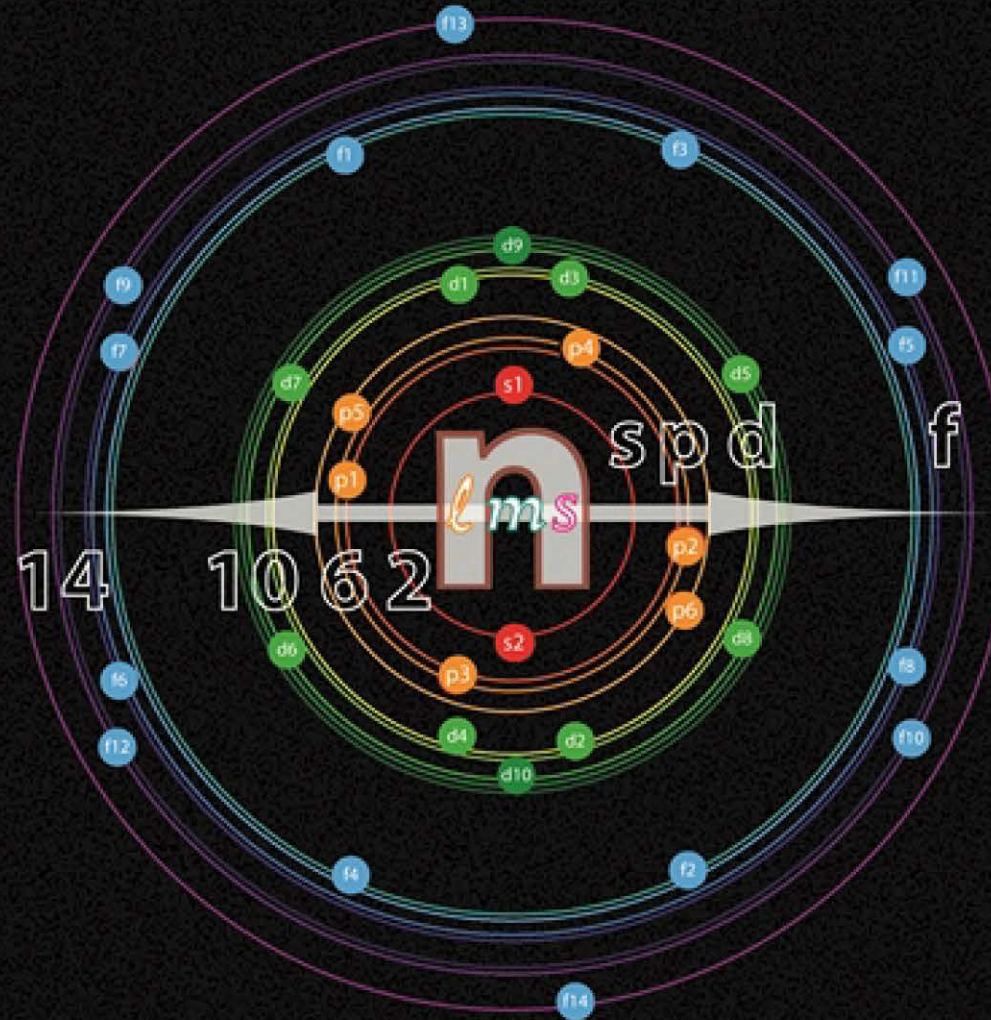
Differing electron spins within shells & quantum levels produces Hyperfine splitting

The electron energy levels of Hydrogen should depend only on the principal quantum number n.

In 1951 it was discovered that this was not so, the $2p_{1/2}$ state is slightly less than the $2s_{1/2}$ state resulting in the Lamb shift

lms

Differing electron sub-Orbital energies create Lamb Shifts

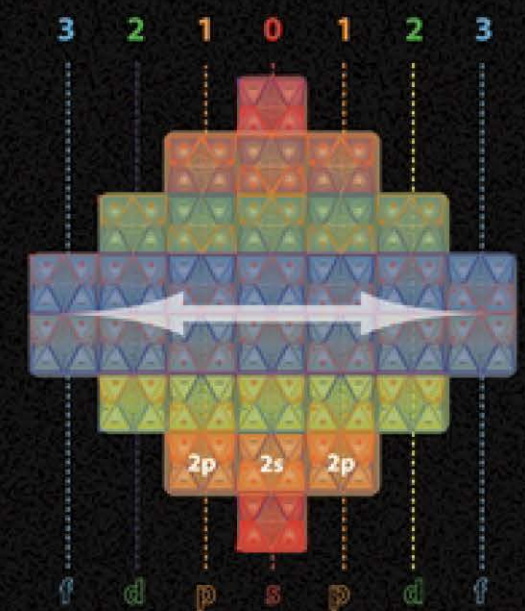


atomic shell energies result from Series addition of baryonic energies

If you measure the atomic energy levels of photo-electrons at an extremely high resolution, you'll find small deviations of individual KEM field energies of electrons in sub-orbitals which are primarily the result of parallel and anti-parallel electron spins



All electron spins are referenced to the Nuclear magneton



electron sub-orbital energies are Parallel energy configurations

M_0

3D Matter topologies are comprised of charged 2D mass-energies

Energy per second²



$$\frac{T\pi}{c^4} \left[\left[\begin{matrix} \text{Matter} & \text{Planck quanta} \\ m\Omega v^2 \end{matrix} \right] \right]$$

mass velocity

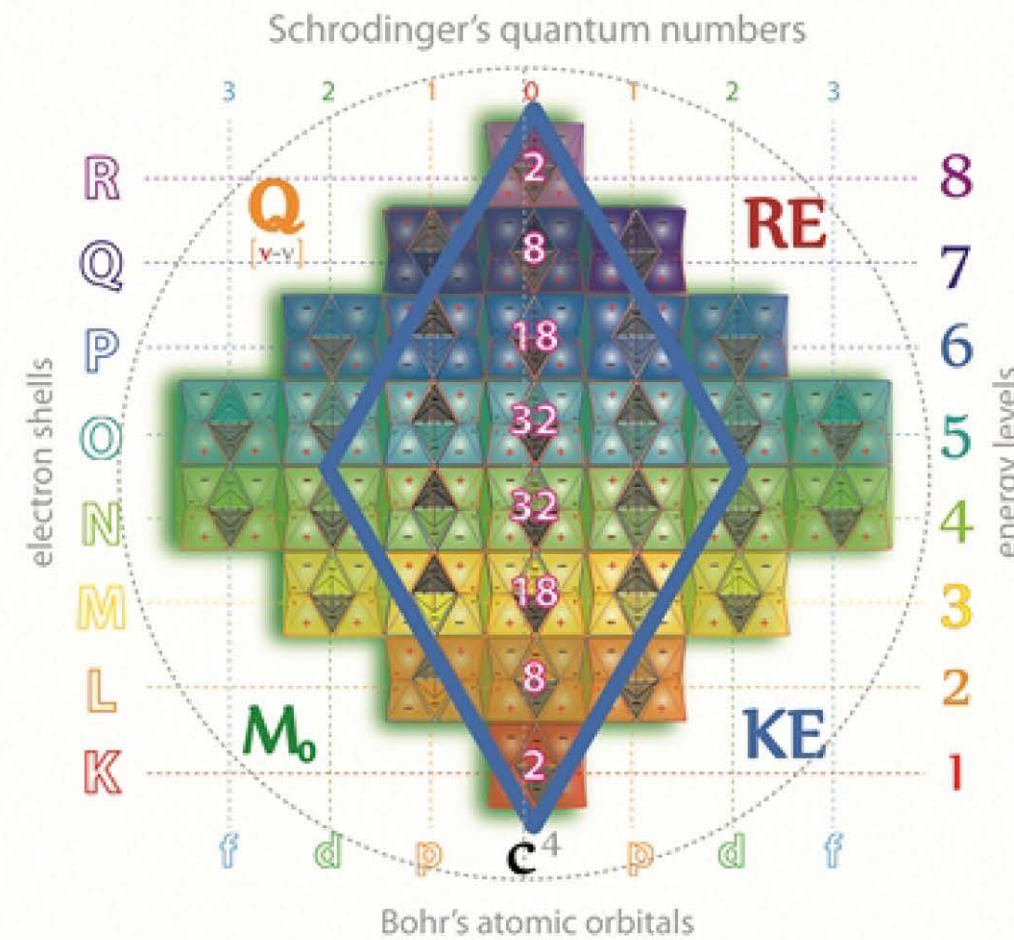
mass-Matter

standing wave mass-energies create the material substance of all chemical elements

RE

Relativistic mass-ENERGY-Matter

Relativity fails at the foundational level to explain and differentiate between mass-ENERGY and Matter in physical systems



Einstein's relativistic [Lorentz corrected] stress energy tensor aggregates all forms of energy into a single energy density gradient

$$\text{atomic energies } \frac{Tm\hbar}{c^4} + \frac{mv^2}{c^2} \text{ electron spins}$$

3D rest Matter + Lorentz corrected 2D Kinetic Energies = total Relativistic Energies

KE

2D equilateral mass-energies are euclidean geometries

Energy per second



$$\frac{n\pi}{c^2} \left[\left[\begin{matrix} \text{mass} & \text{Planck quanta} \\ m\Omega v^2 \end{matrix} \right] \right]$$

mass velocity

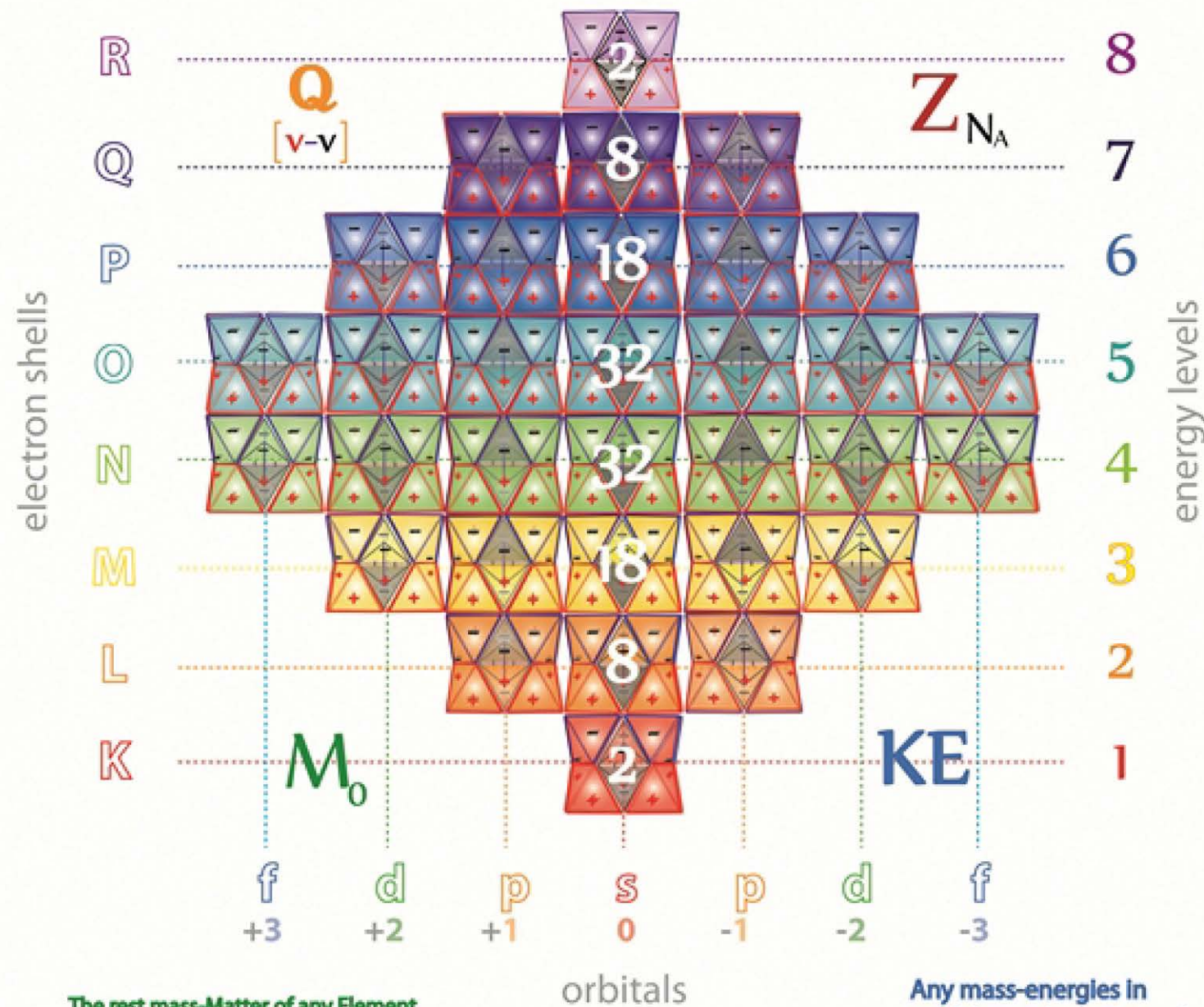
mass-energies

radiant planar mass-energies create EM fields, spectral lines & chemical interactions

Deuterium is the building block of all Elements (save Hydrogen)

The geometry of any Element
is determined by its Charge

The Molar Weight of any Element
is a measure of its standing wave
mass-energies



The rest mass-Matter of any Element
is determined by the total number of quanta
making up the Protons, Neutrons and electrons
that comprise them (in their respective energy levels)

Any mass-energies in
excess of the molar [n1] weight
is a measurement of a element's
CHEMICAL energies

Important point to note:

The Kinetic Energy difference between any Element's total [n1] Deuteron mass-energies and its Molar mass has historically been incorrectly explained as resulting from an excess number of Neutrons in the atom it is not, $Z\# = (\text{number of Protons} = \text{number of electrons} = \text{number of Neutrons})$

Elementary mass-Matter

	n per nuclei $1e19v = n$	
2	2 nuclei [74,496 ea]	120 Unbinilium
8	8 nuclei [69,780 ea]	119 Ununennium
18	18 nuclei [65,232 ea]	118 Ununoctium
32	32 nuclei [60,852 ea]	87 Francium
32	32 nuclei [56,640 ea]	112 Copernicium
18	18 nuclei [52,596 ea]	55 Caesium
8	8 nuclei [48,720 ea]	102 Nobelium
2	2 nuclei [45,012 ea]	37 Rubidium
		70 Ytterbium
		19 Potassium
		30 Zinc
		11 Sodium
		10 Neon
		3 Lithium
		2 Helium
		1 Deuterium

The rest mass-Matter of any Element
is the sum total of its constituent
 $Z[n^2]$ energy level Deuterium nuclei

Aufbau

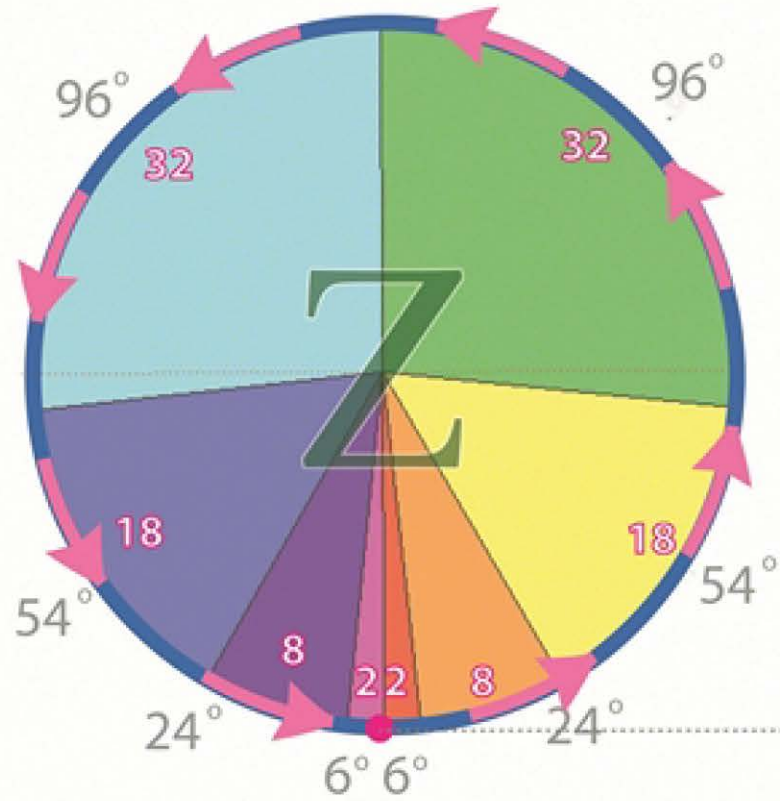
$$Z\# \left[\begin{array}{l} z \text{ Protons} \\ z \text{ Neutrons} \\ z \text{ electrons} \end{array} \begin{array}{l} [24-12] \\ [18-18] \\ [0-12] \end{array} \right] n1-8$$

(ie Calcium [20] = 2+8+10 n level Deuterium nuclei)

Periodic Harmonic motions

$$x = A \cos(\omega t + \phi)$$

Circular motion



Much of the math in of modern physics is predicated on the assumption that π [where it appears] is related to the properties of a circle

$$F = -kx$$

Linear motion



1
2
3
4
4
3
2

$$P \Sigma 2(n^2)$$

Simple harmonic motion can be visualized as the projection of uniform circular motion onto one axis

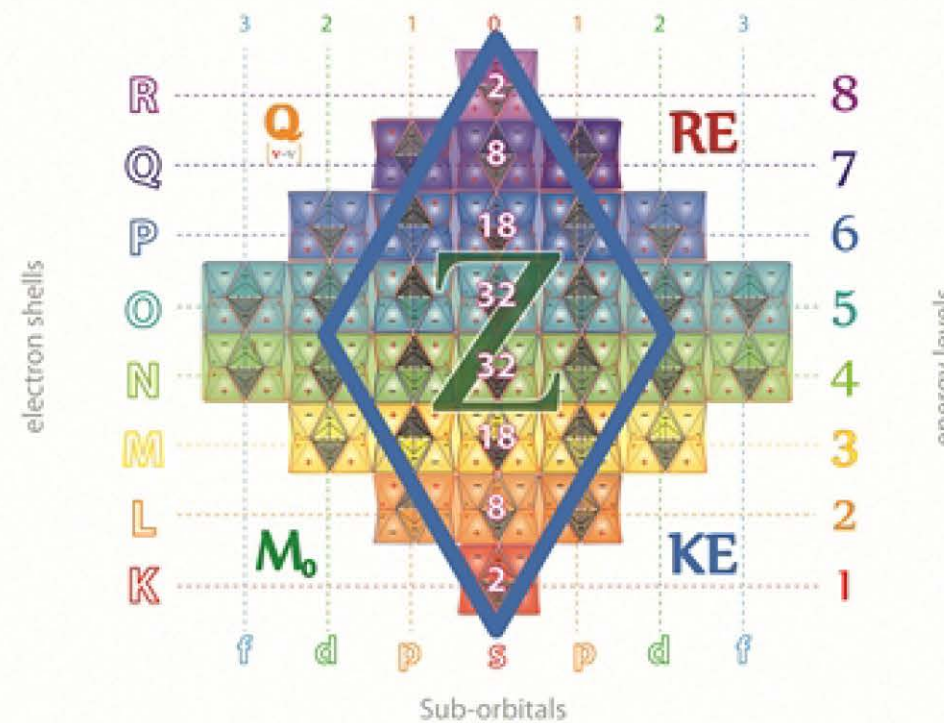
Principal Quantum Numbers

circular harmonic motion

Circular motions describe the motion of a body with a changing velocity vector [the result of an acceleration force].

simple harmonic motion

Nuclei per shell in elements follows a 'periodic summation rule' that is reflective of photonic energies





STEP ONE

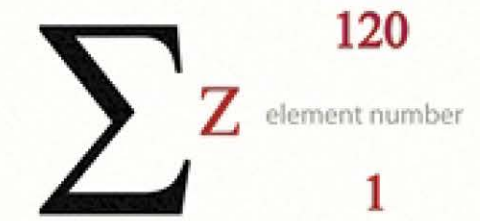
Periodic summation follows the atomic shell electron config

$$\begin{matrix}
 1 & R \\
 2 & \\
 3 & \\
 4 & \\
 4 & \\
 3 & \\
 2 & \\
 1 & K
 \end{matrix}
 \Sigma 2(x^2) =$$

Each atomic shell can hold only a fixed number of deuterium nuclei

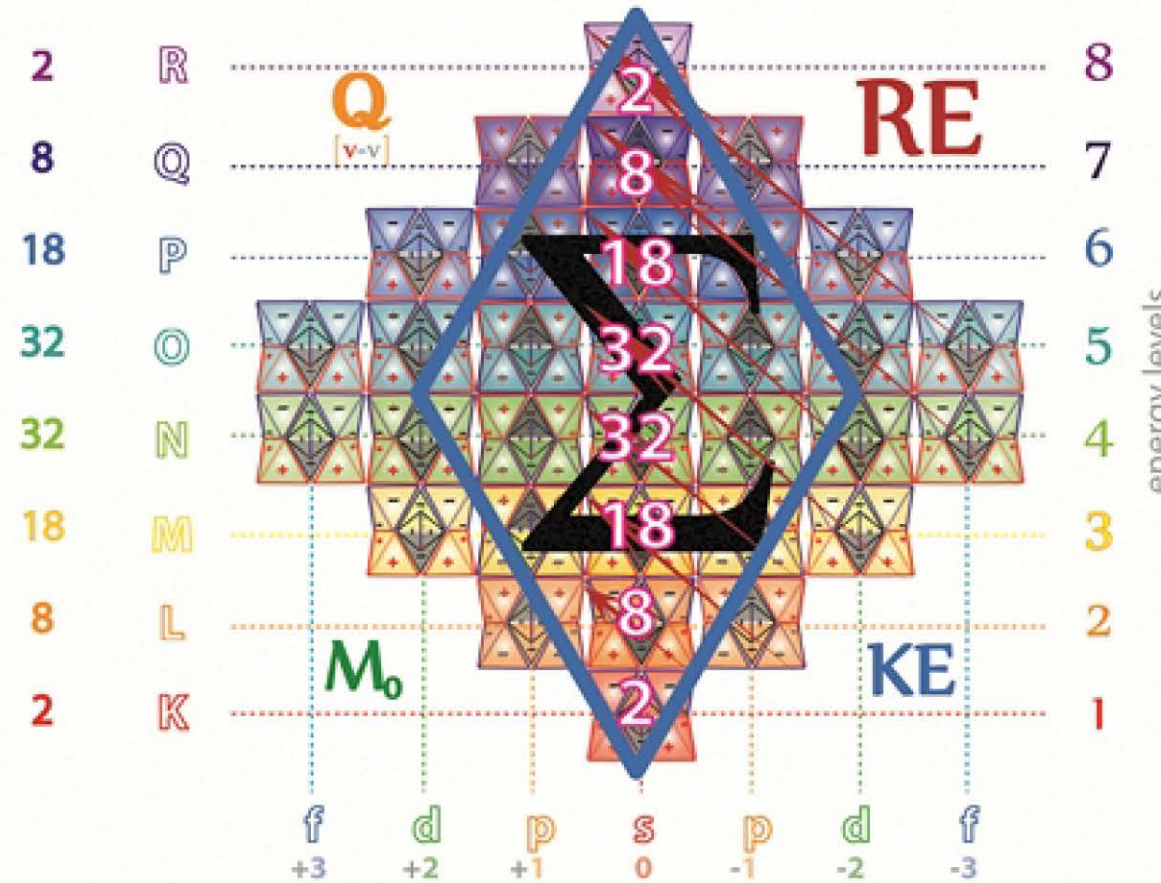
Periodic Summation

Periodic summation is a notation developed for Tetryonic theory to model the geometric series addition of $Z[n^2]$ energy level Deuterium nuclei that form the periodic elements



STEP TWO

Periodic elements build up following the aufbau sequence



$\Sigma R = 2$	2 nuclei [74,496 ea]	120	Unbinilium
$\Sigma Q = 8$	8 nuclei [69,780 ea]	118	Ununoctium
$\Sigma P = 18$	18 nuclei [65,232 ea]	110	Darmstadtium
$\Sigma O = 32$	32 nuclei [60,852 ea]	92	Uranium
$\Sigma N = 32$	32 nuclei [56,640 ea]	60	Neodymuim
$\Sigma M = 18$	18 nuclei [52,596 ea]	28	Argon
$\Sigma L = 8$	8 nuclei [48,720 ea]	10	Neon
$\Sigma K = 2$	2 nuclei [45,012 ea]	2	Helium
		0	Hydrogen

The LHS of the notation determine the number of nuclei in each atomic shell, from the periodic mass-energy levels for atoms, and the RHS follows the aufbau building principle to determine the rest mass-Matter of any specific element

Aufbau

Each periodic element is made of $Z [n^2 \text{energy}]$ deuterium nuclei

$$Z\# \left[\begin{matrix} z \text{ Protons} & [24-12] \\ z \text{ Neutrons} & [18-18] \\ z \text{ electrons} & [0-12] \end{matrix} \right] n^{1-8}$$

Planck mass-energies form the surface integral of rest Matter topologies for each periodic element

Element numbers

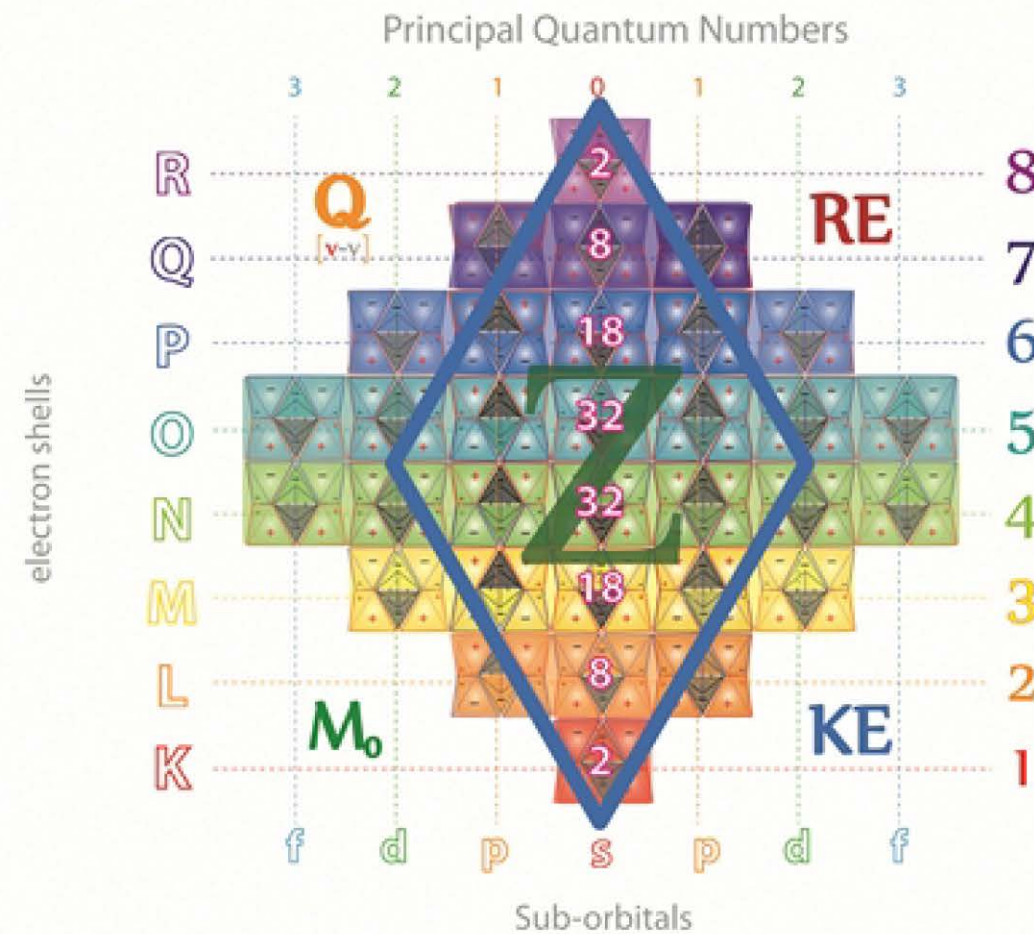
Nuclei per shell in elements follow a 'periodic summation rule' that is reflective of photonic energies

$$\sum_{K=1}^R 2(x^2) = 2 + 8 + 18 + 32 + 32 + 18 + 8 + 2$$

Z

- 120 Unbinilium n8
- 119 Ununennium n7
- 118 Ununoctium n6
- 87 Francium n5
- 112 Copernicium n4
- 55 Caesium n3
- 102 Nobelium n2
- 37 Rubidium n1
- 70 Ytterbium n1
- 19 Potassium n1
- 30 Zinc n1
- 11 Sodium n1
- 10 Neon n1
- 3 Lithium n1
- 2 Helium n1
- 1 Deuterium n1

Hydrogen 0



Periodic mass-ENERGY-Matter

Following periodic summation rules for shell filling n[1-8] quantum energy deuterium nuclei combine to form elementary Matter

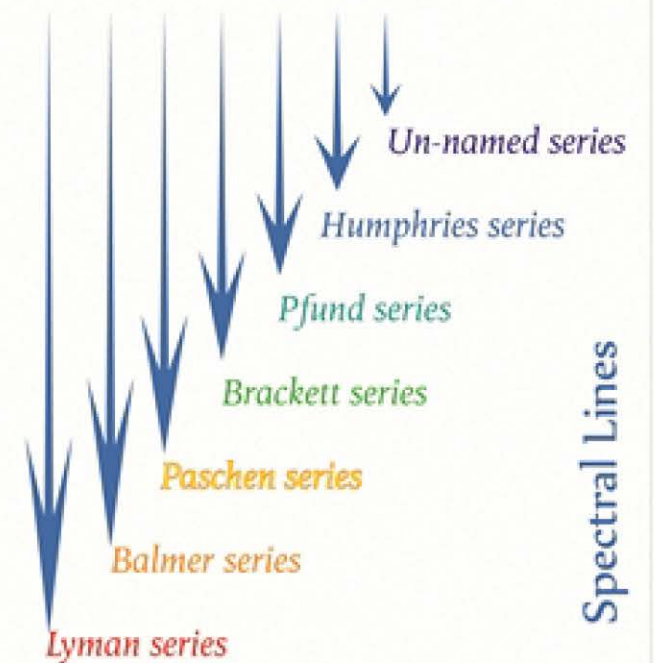
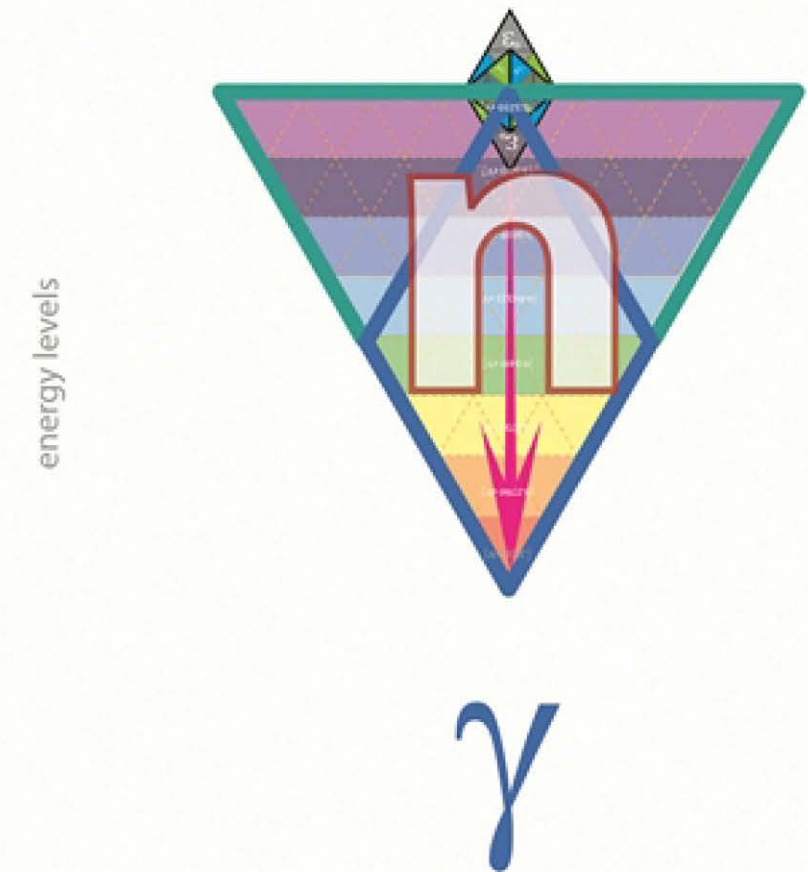
$$\sum_{K=1}^R \sum_{P=1}^{32} \left[\frac{72(n)^2}{25} + [12e19] + [m_e v^2] \right]_1^8$$

Deuterium mass-energy per shell

The measured weight of Matter in gravitational fields is the result of planar mass-energies in tetryonic standing-wave geometries

The periodicity of all the elements, along with their exact molar rest mass-energies and quantum wavefunctions can be described with Tetryonic geometries

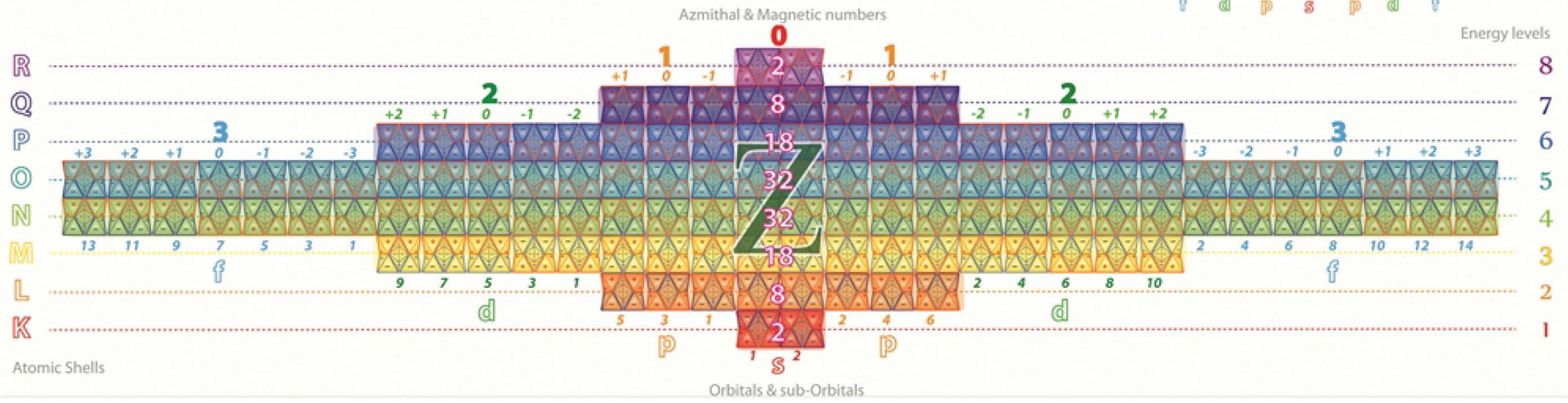
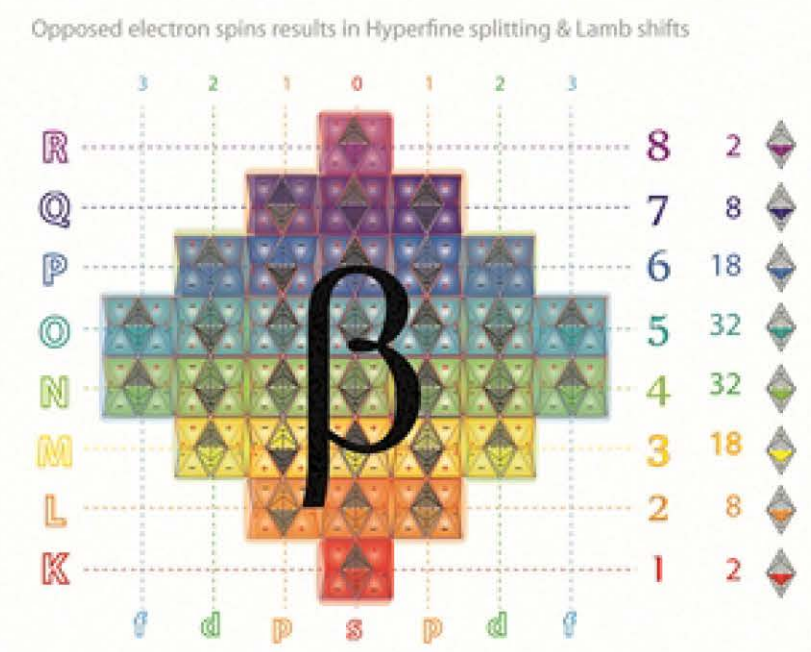
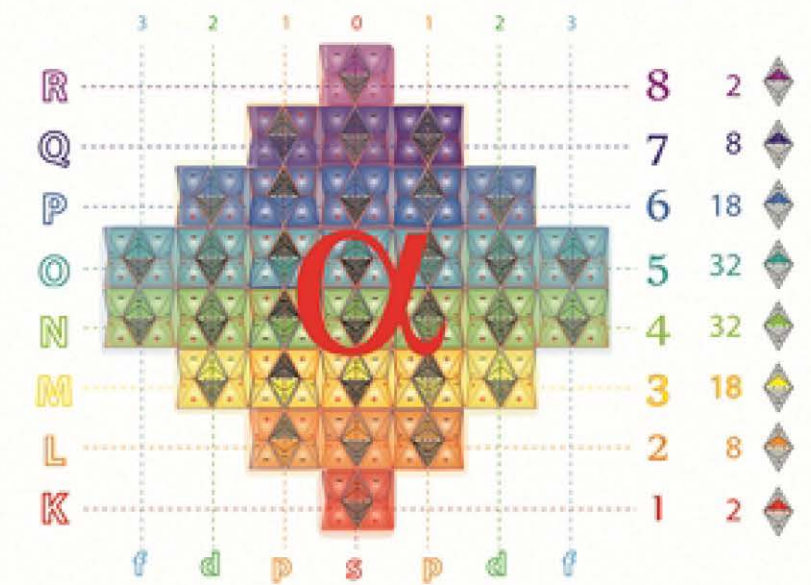
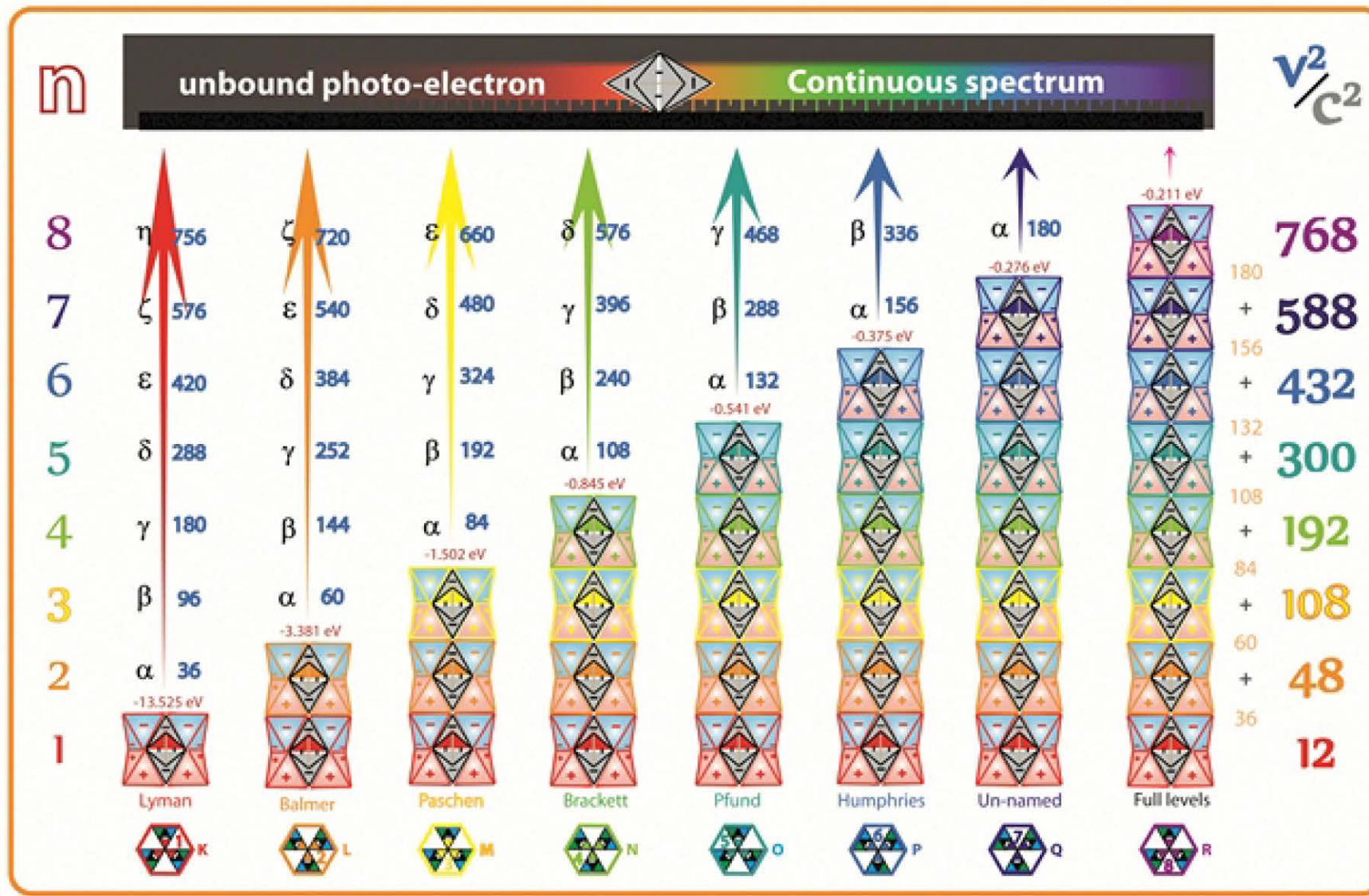
Ionisation energies



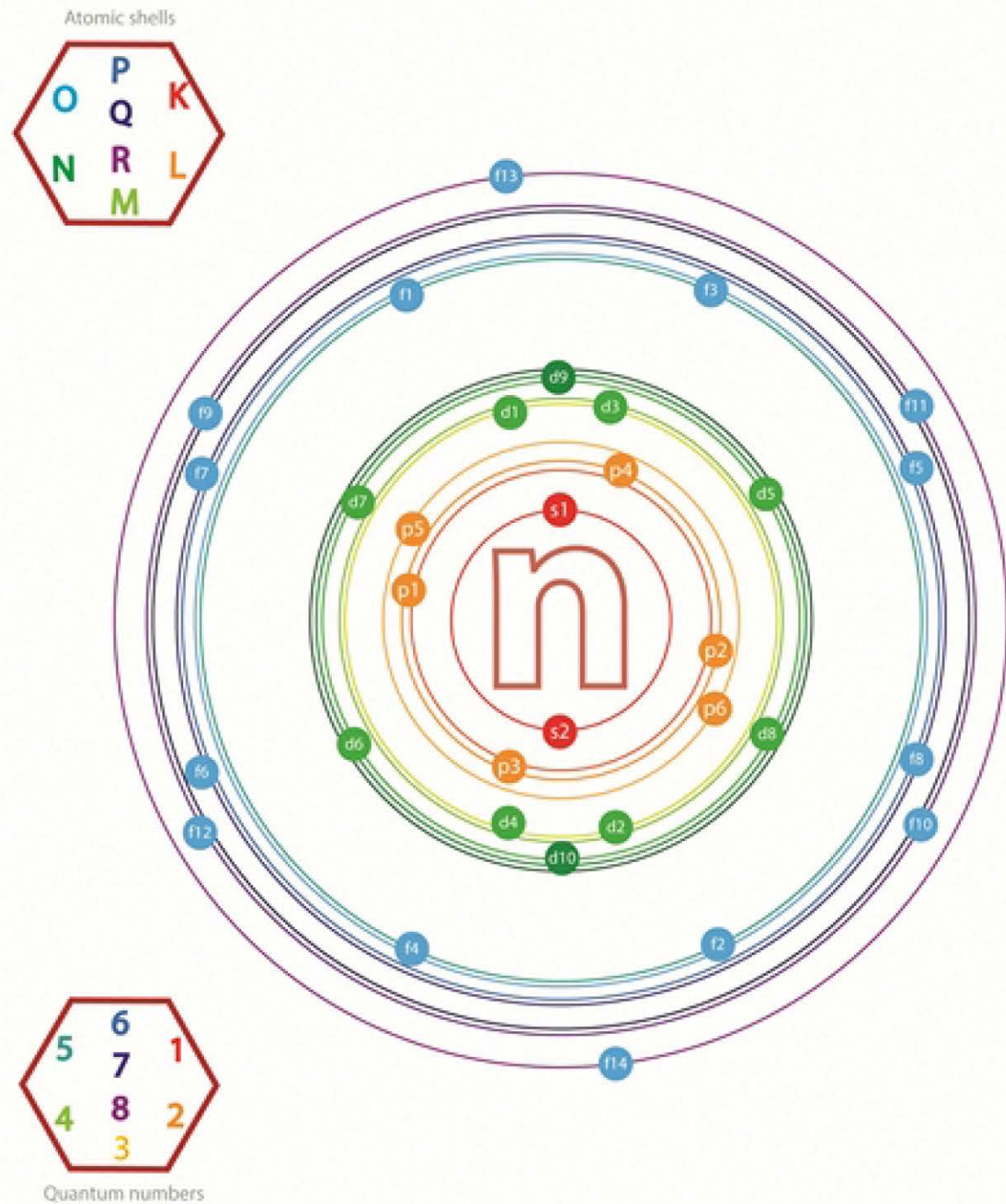
$$Mv^2 = KEM = hcR_H$$

Photon emission/absorption

Photo-electron ionisation energies

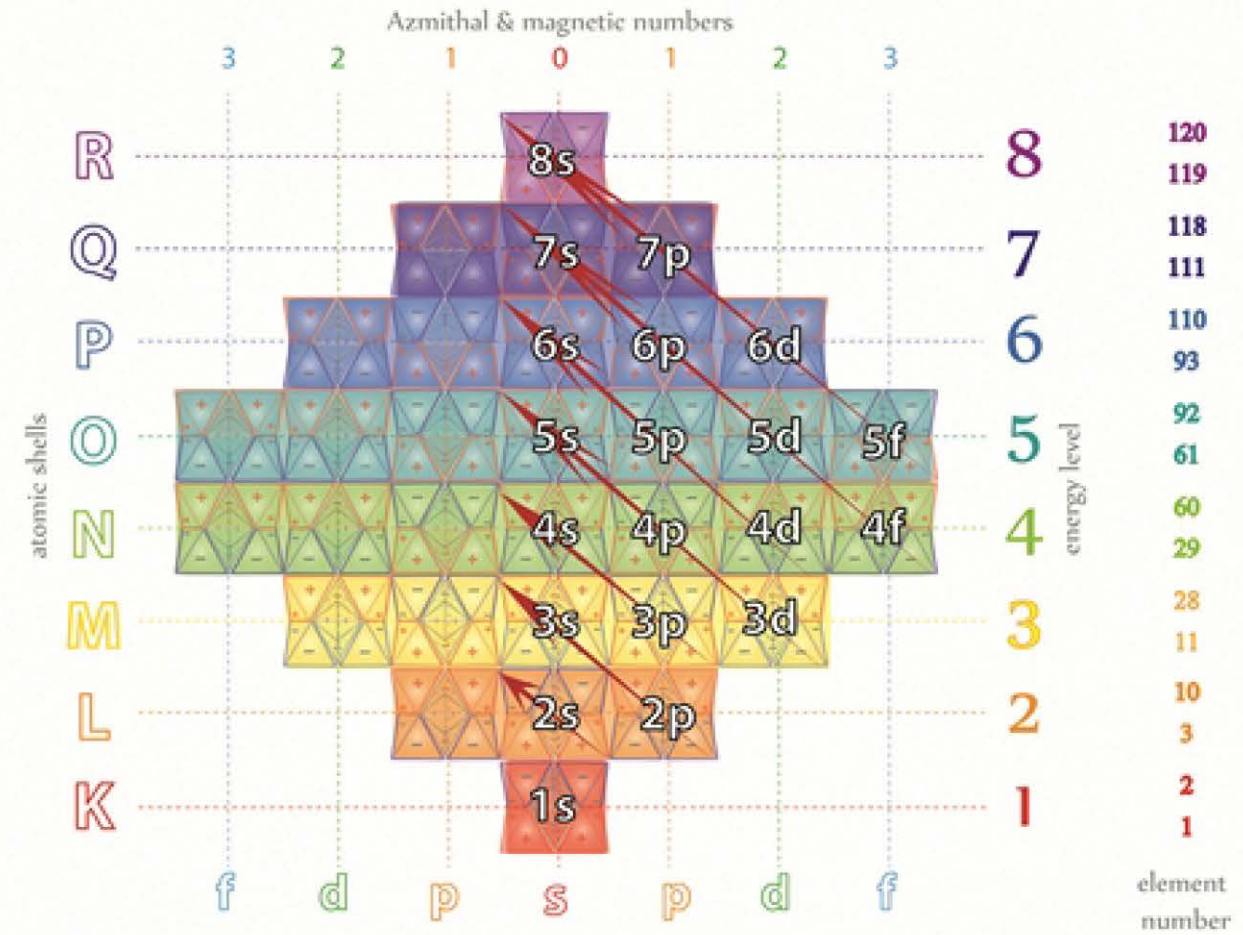


Eigenstate - Ionisation energies



2
+
8
+
18
+
32
+
32
+
18
+
8
+
2

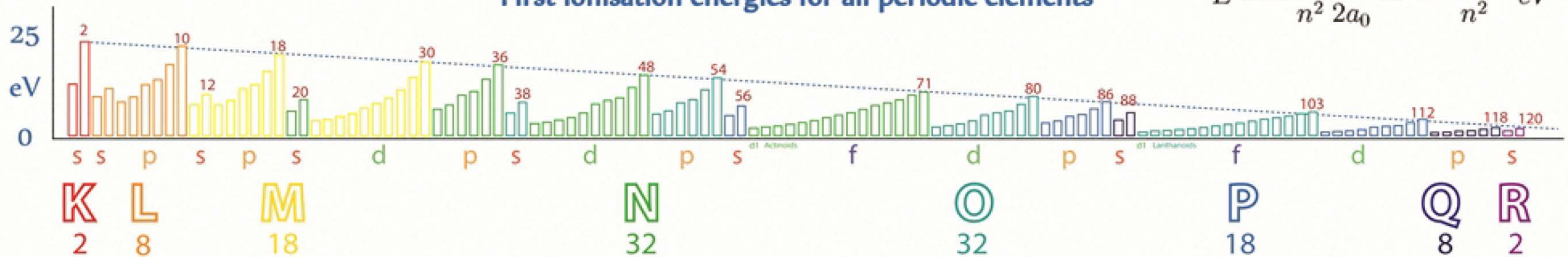
nuclei per shell



The ionisation energies of individual atoms varies due to many factors, namely:
electron spin-orbital coupling with Baryons of specific energies,
the relativistic energies of photo-electrons bound in nuclei
and Zitterbewegung effects on bound electrons

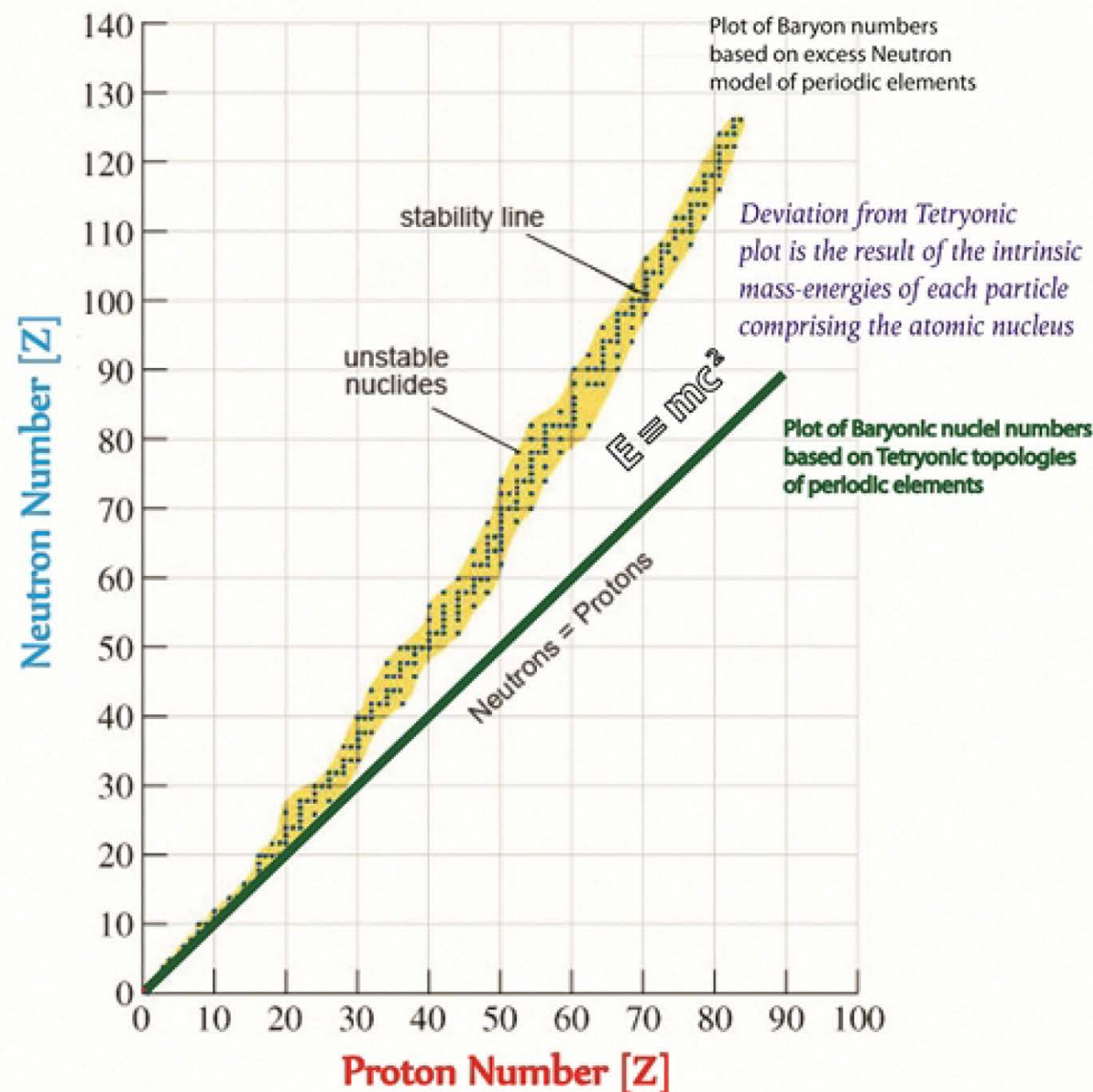
First ionisation energies for all periodic elements

$$E = -\frac{Z^2 ke^2}{n^2 2a_0} = -\frac{13.6Z^2}{n^2} eV$$



Proton - Neutron Curve

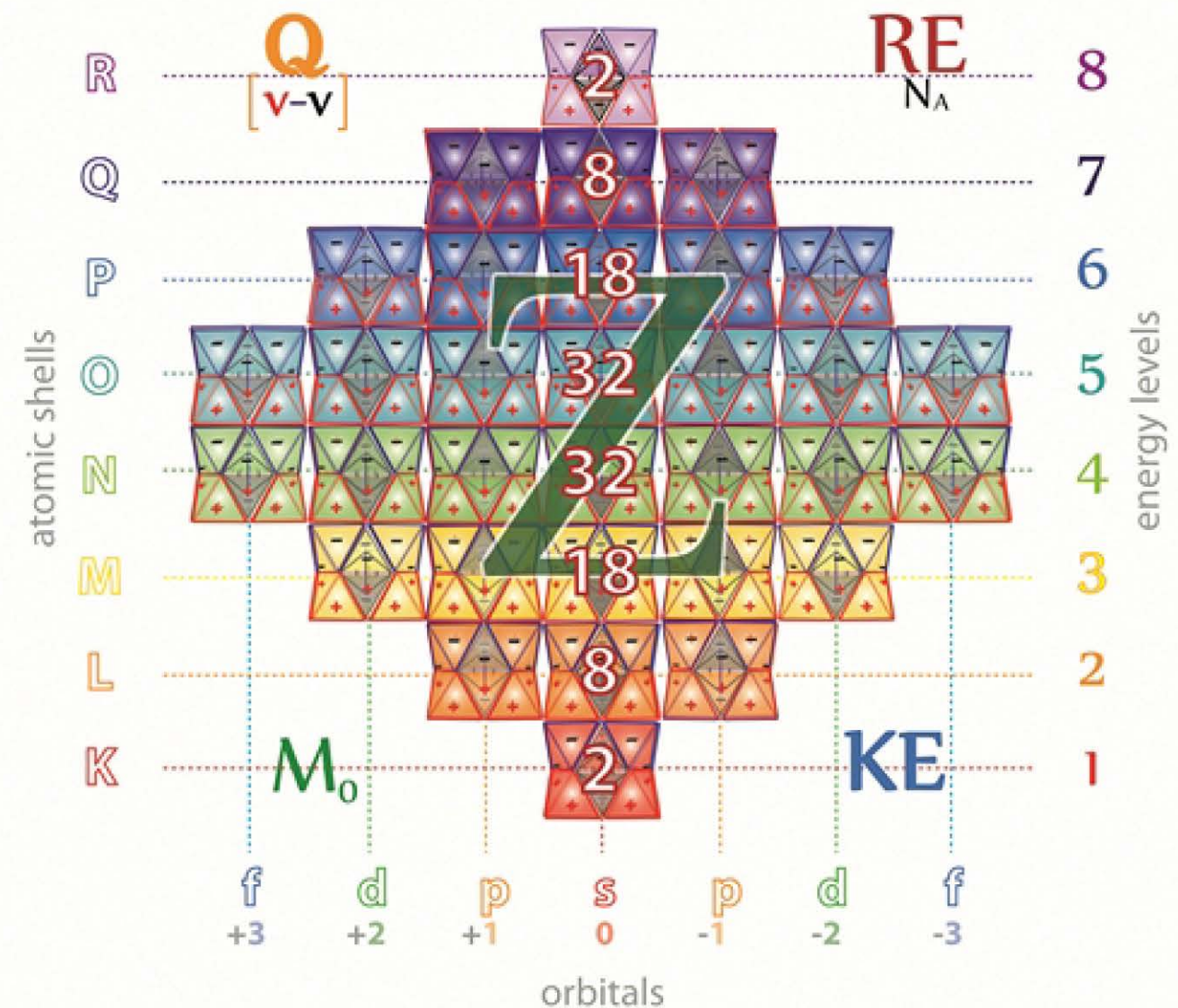
The graph below is a plot of neutron number against proton number. It is used as rule to determine which nuclei are stable or unstable.



Historically, Proton-electron numbers are viewed as being equivalent in neutral elementary matter with the excess molar mass measured being the result of 'excess or extra' Neutrons in the atom

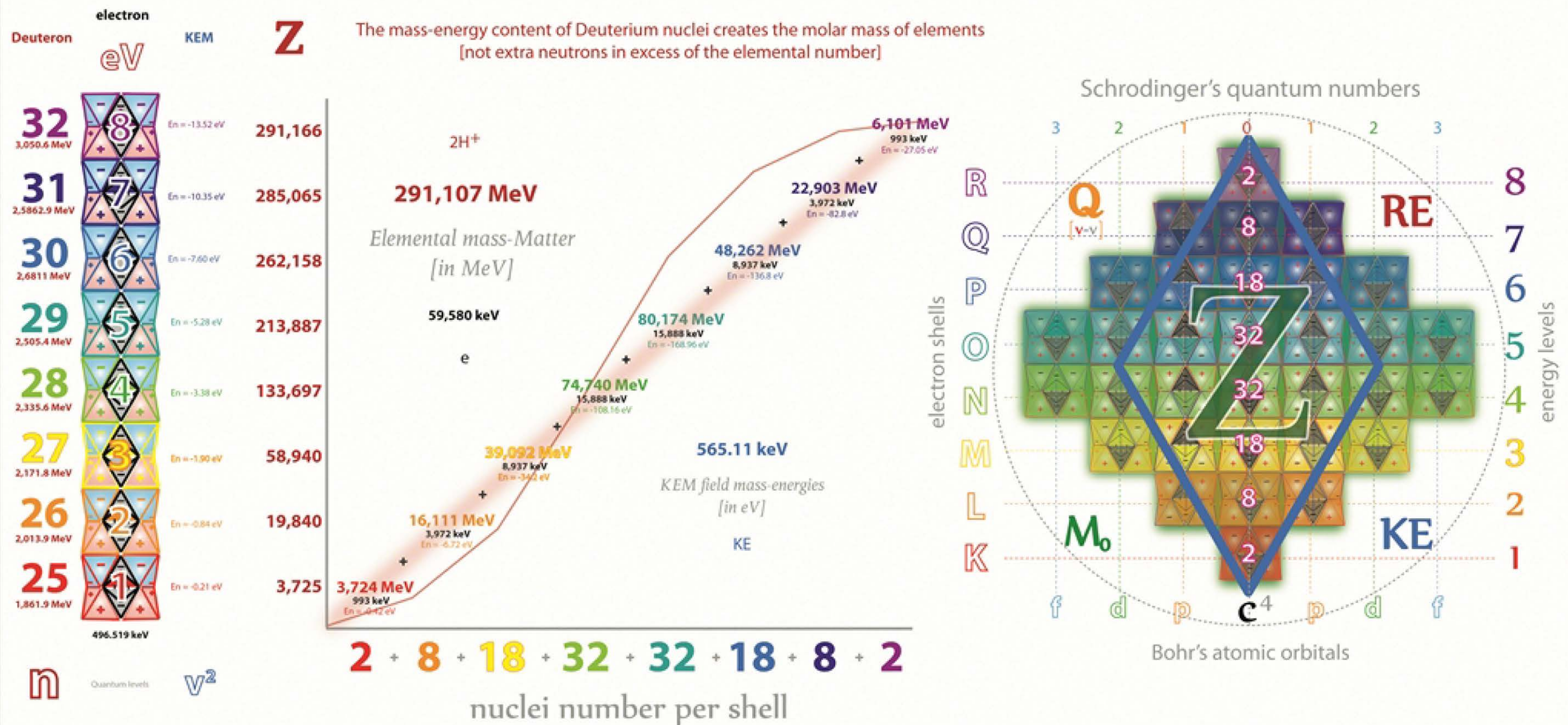
Atomic Nuclei Numbers

All periodic elements have an EQUAL number of Protons, Neutrons & Electrons with their molar mass-Matter being determined by their quantum level mass-energies



Tetryonic modelling of the charged mass-ENERGY-Matter topologies of elementary atoms and the nuclei that comprise them, reveals a DIRECT LINEAR relationship for the number of Protons-electrons-Neutrons in all periodic elements and nuclear isotopes

Planck mass-energy contributions to elementary Matter and isotopes



n¹
Elementary nuclei

are comprised of equal numbers of Protons, Neutrons & electrons with varying energy levels

Baryons **electrons** **KEM fields**

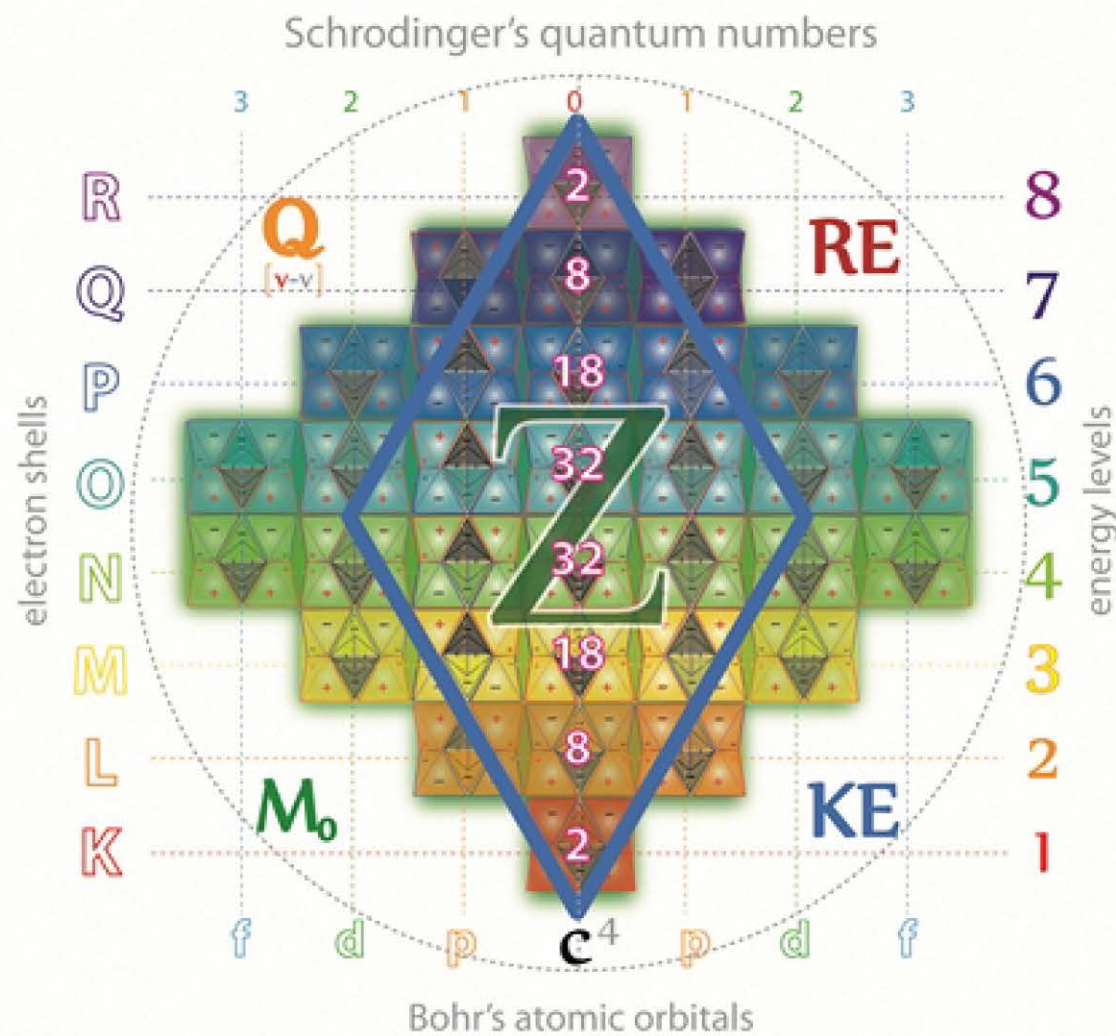
930.947 MeV + **496.519 keV** + **13.525 eV**

The mass-energy content of Matter topologies is velocity invariant

The mass-energy content of Baryons determines the KEM field of electrons

$$\text{Baryons } 930.947 \text{ MeV} + \text{KEM fields } 13.525 \text{ ev} + \text{electrons } 496.519 \text{ keV}$$

Mapping Planck mass-energy contributions to elementary Matter and isotopes



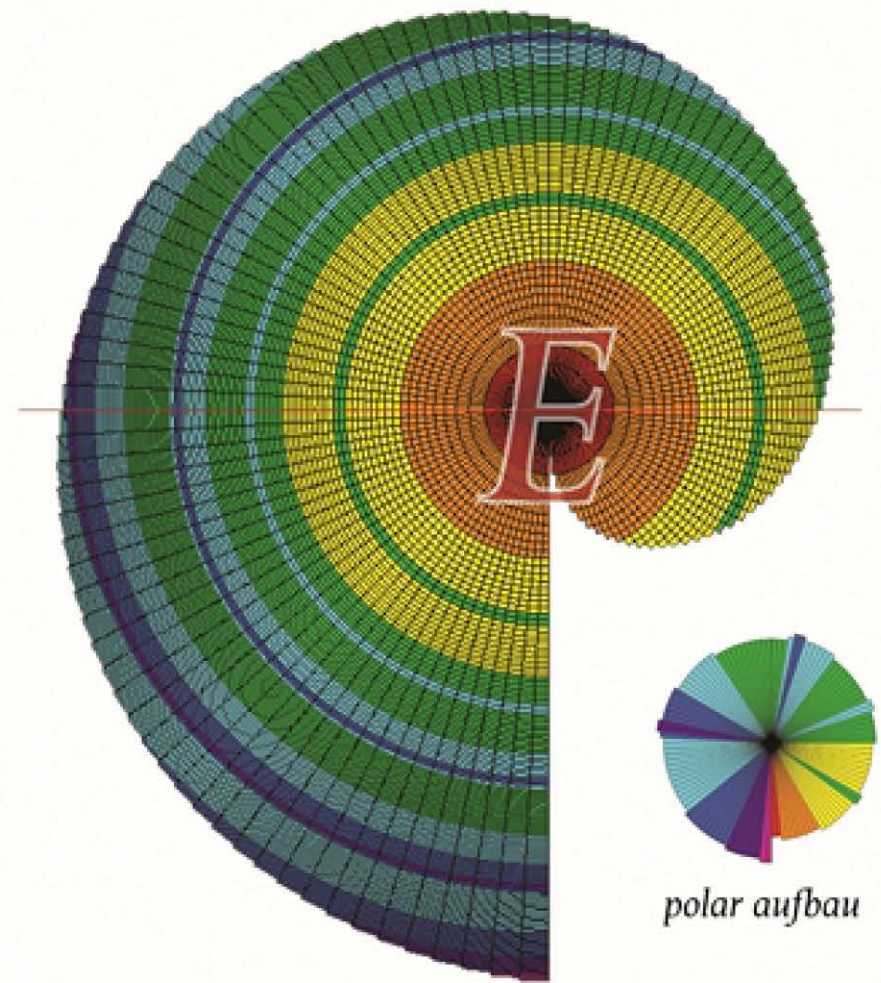
$$E = hv^2$$

$$n^2 + v^2 + e = Z$$

general form quadratic equation

$$ax^2 + bx + c = Z$$

$$E = nhv$$



polar energy spirals courtesy of Rene Cormier

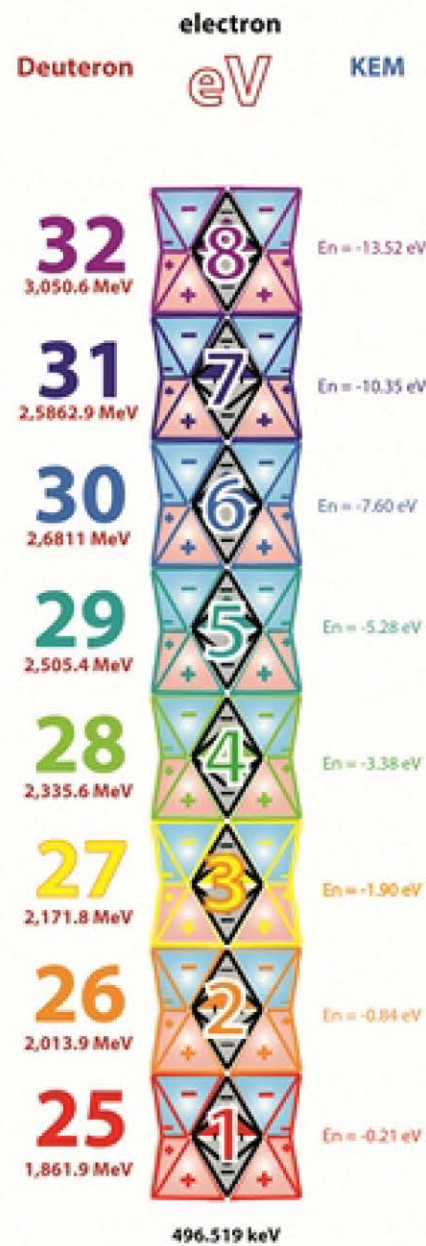
Identifying electron rest Matter topologies as velocity invariant we can re-arrange the component Planck mass-energy geometry formulation of periodic elements to

$$h \left[\begin{matrix} 72[v^2] \\ \text{Deuteron rest mass} \end{matrix} + \begin{matrix} v \\ \text{Spectral lines} \end{matrix} + \begin{matrix} 1.20 \text{ e}20 \text{ v} \\ \text{electron rest mass} \end{matrix} \right]$$

reveal a quadratic formulation for all Z numbers

All elements are comprised of n level Dueterium nuclei

The atomic shell energy levels of Deuterium nuclei in elements



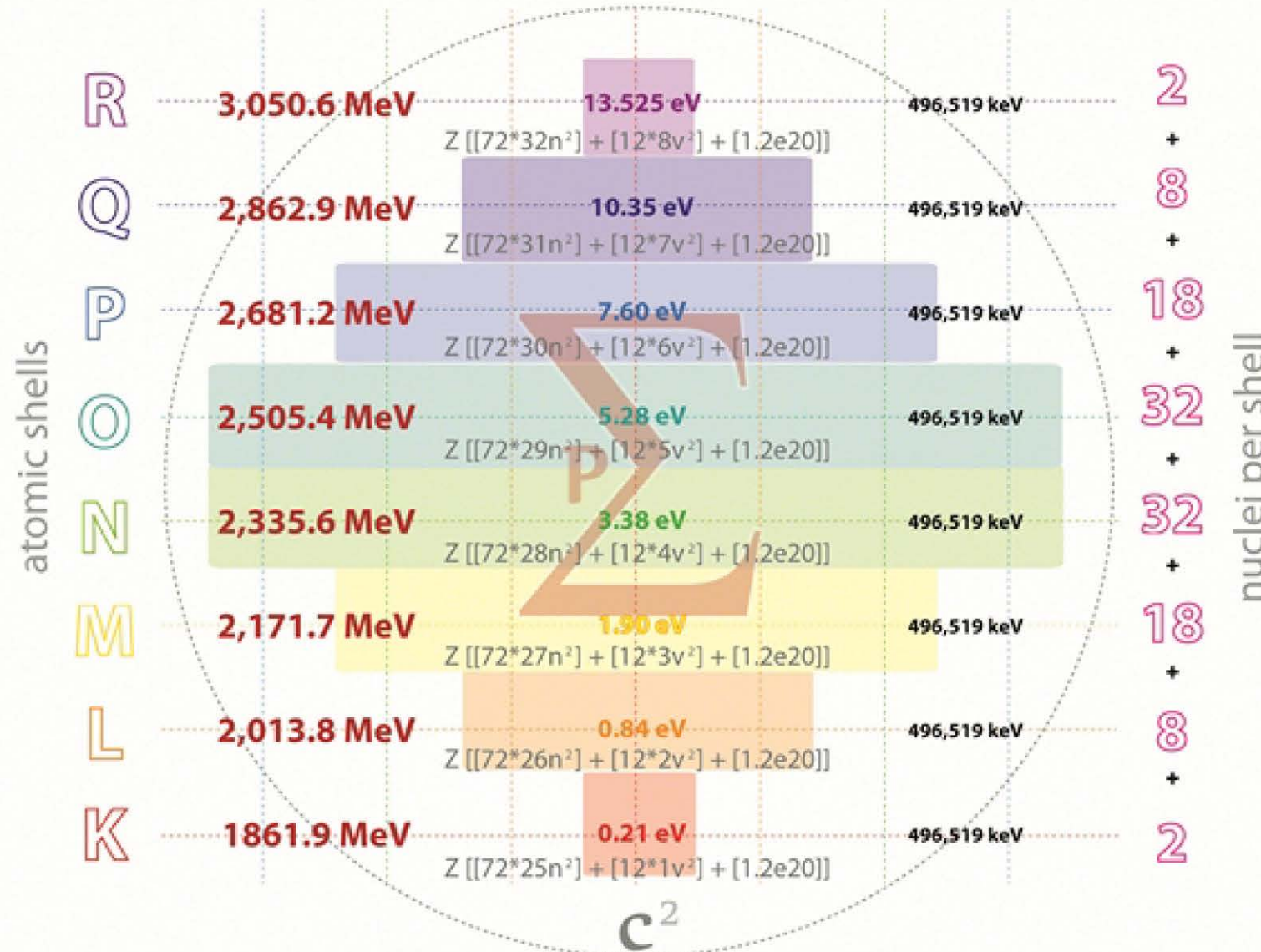
$$Z \left[[72n^2] + [12v^2] + [1.2e20] \right]$$

Baryons: 1,861,949 MeV
 KEM fields: 13.525 eV
 electrons: 496,519 keV

$$2H^+ \quad Z \quad \gamma$$

[72n²] [MeV²]

Elemental mass-Matter [in MeV]

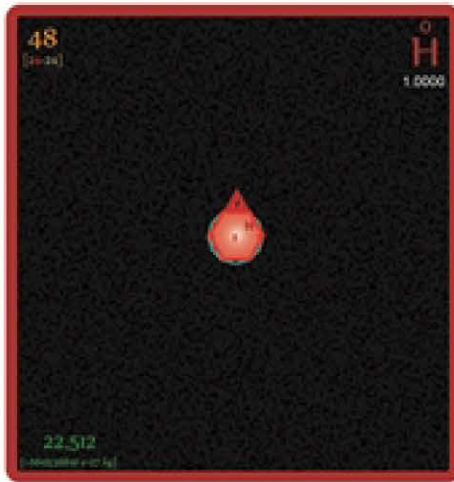


[1.2e20]]

Determines the spectral line [KEM field energies] of electrons bound to them

The relativistic rest mass-energy-Matter of all periodic elements is the sum of the mass-energies of all atomic nuclei and spectral lines that comprise its mass-Matter topology as measured in any spatial co-ordinate system per unit of time


e the rest mass-Matter of bound photo-electrons is velocity invariant



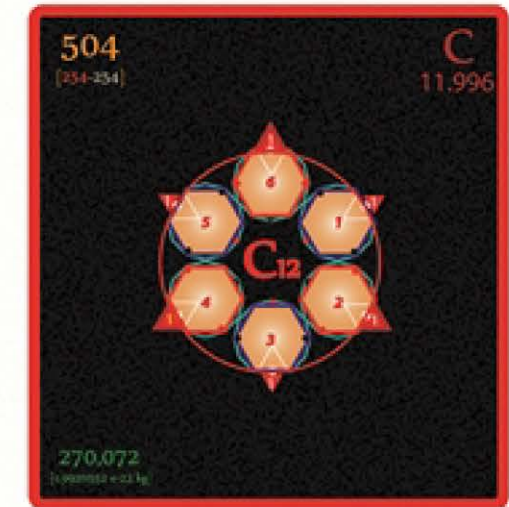
6.022141579 e26
atoms in 1KG of Matter

Avagadro's number
1 KG mass
[of Matter]

1.660538841 e-27 kg
atomic rest mass-Matter

Hydrogen

01

using SI units Avagadro's number can be expressed exactly as the inverse rest mass of Hydrogen



Carbon



12

5.019789213 e25
atoms in 1KG of Matter

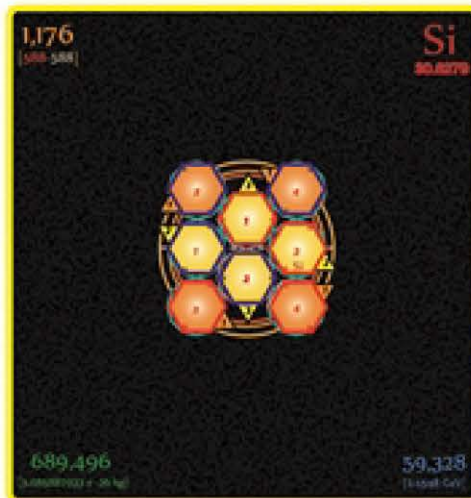
Weighted atomic mass

6.02214078 e 23

1.99211552 e-26 kg
atomic rest mass-Matter

Tetryonic charge geometries make weighted atomic mass measurements and calculations obsolete

22,506 1/12 of Carbon 12 [Graphene] is not equal to 1 Hydrogen atom 22,512
(Deuterium is the building block of all atomic elements)



Platinum



191

1.966225348 e25
atoms in 1KG of Matter

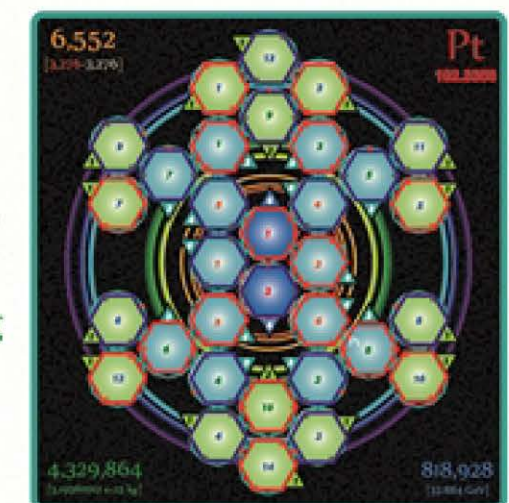
International Avagadro project

5.085887033 e-26 kg
atomic rest mass-Matter

The gram was originally defined in 1795 as the mass of one cubic centimeter of water at 4°C, making the kilogram equal to the mass of one liter of water.

The prototype kilogram, manufactured in 1799 and from which the current kilogram is based has a mass equal to the mass of 1.000025 liters of water

In recent years two major experiments, namely the Watt balance & Avagadro projects, have been attempting to measure and define 1KG of mass-Matter in terms of electrical force and the number of atoms respectively in order to better define 1KG of mass-Matter precisely for all future physical references



2.817950081 e24
atoms in 1KG of Matter
3.181804449 e23

90%

La Grande K

Pt

3.1893811012 e-25 kg
atomic rest mass-Matter

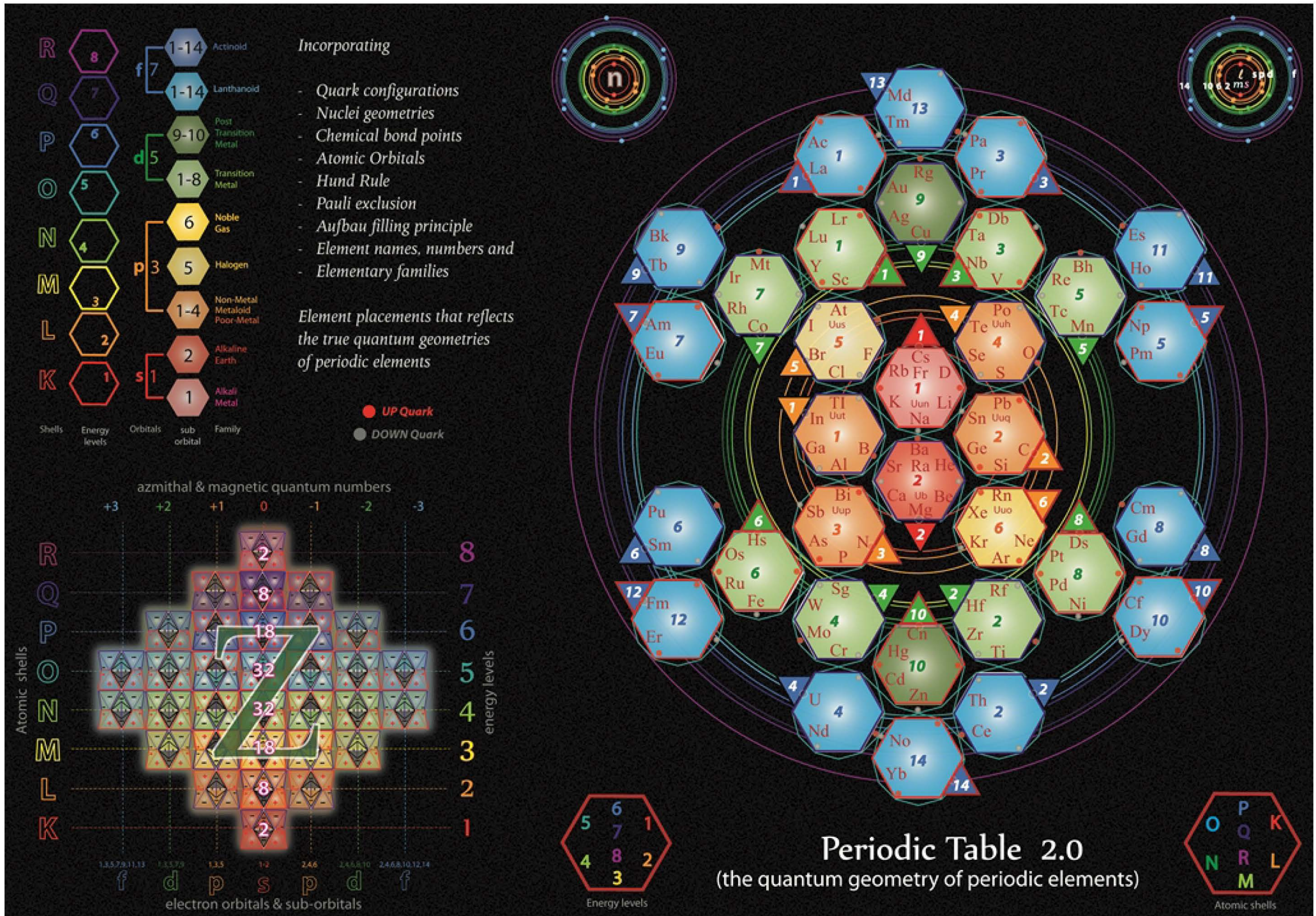
10%

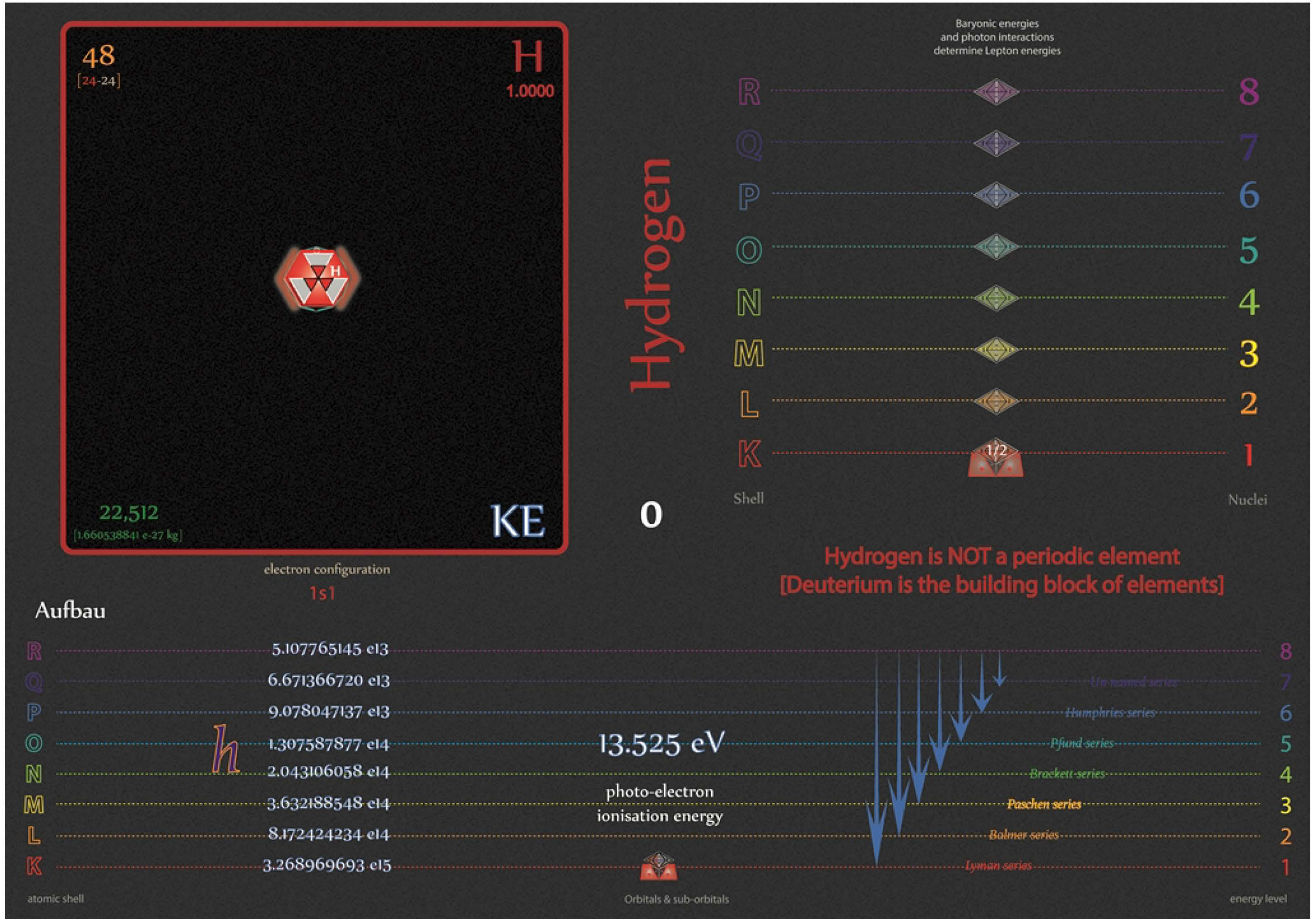
The La grande K is an alloy of 90% Platinum & 10% Iridium that has been slowly losing mass since its manufacture

Ir

3.142870708 e-25 kg

All atomic rest masses are for atoms at absolute zero and any deviation is a measure of the topological Matter's Kinetic energy content [chemical energy, KEM fields and/or spectral lines]





84
[42-42]
D
1.9995

45,012
[3.320192534 e-27 kg]

electron configuration
1s1

Aufbau

R		8
Q		7
P		6
O		5
N		4
M		3
L		2
K		1

atomic shell

Deuterium

01

Azimuthal & Magnetic numbers

	3	2	1	0	1	2	3	
R								8
Q	Q					RE		7
P								6
O								5
N								4
M								3
L								2
K	M					KE		1
	f	d	p	s	p	d	f	

Orbital & sub-orbitals

01 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n**1**

Alkali Metal

energy level

Tetryonics 51.01 - Deuterium atom

168
[84-84]
He
3.9989

90,024
[6.640385068 e-27 kg]

electron configuration **1s²**

Helium

R							8
Q	Q						7
P							6
O							5
N							4
M							3
L							2
K	M				KE		1
	f	d	p	s	p	d	f

02

Azimuthal & Magnetic numbers

02 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n**1**

Alkaline Earth

Aufbau

R							8
Q							7
P							6
O							5
N							4
M							3
L							2
K							1
			0				
			1	s	2		

Orbital & sub-orbitals

energy level

252
[126-126]

Li
6.1615

138,708
[1.023143308 e-26 kg]

3,672
[0.1519 GeV]

electron configuration

[He] 2s¹

Aufbau

R		8
Q		7
P		6
O		5
N		4
M		3
L		2
K		1

atomic shell

03

Azimuthal & Magnetic numbers

	3	2	1	0	1	2	3	
R		Q				RE		8
Q								7
P								6
O								5
N								4
M								3
L		M		3		KE		2
K				f	d	p	s	1

03

Protons [24-12]
Neutrons [18-18]
electrons [0-12]

m¹⁻²

Alkali
Metal

Orbitals & sub-orbitals

energy level

336
[168-168]

Be
8.3241

187,392
[1.3822481e-26 kg]

7,344
[0.303 GeV]

electron configuration

[He] 2s²

Aufbau

R
Q
P
O
N
M
L
K

atomic shell

04

Azimuthal & Magnetic numbers

Orbital & sub-orbitals

04 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻²

Alkaline Earth

R
Q
P
O
N
M
L
K

3 2 1 0 1 2 3

Q

M

f d p s p d f

8
7
6
5
4
3
2
1

energy level

420
[210-210]

B
10.4867

236,076
[1.741352851 e-26 kg]

11,016
[0.455 GeV]

electron configuration
[He] 2s² 2p¹

Aufbau

R
Q
P
O
N
M
L
K

atomic shell

Boron

05

Azimuthal & Magnetic numbers

Orbitals & sub-orbitals

3	2	1	0	1	2	3	
R	Q				RE	8	
Q						7	
P						6	
O						5	
N						4	
M						3	
L	M			5		2	
K					KE	1	
	f	d	p	s	p	d	f

05 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] **n1-2** Metalloid

R
Q
P
O
N
M
L
K

energy level

8
7
6
5
4
3
2
1

504
[252-252]

C
12.6493

284,760
[2.100457713 e-26 kg]

14,688
[0.6077 GeV]

electron configuration
[He]₂ 2s² 2p²

Aufbau

R
Q
P
O
N
M
L
K

atomic shell

06

Azimuthal & Magnetic numbers

Orbitals & sub-orbitals

06 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻²

Metalloid

energy level

Carbon

R
Q
P
O
N
M
L
K

3 2 1 0 1 2 3

Q

M

f d p s p d f

8
7
6
5
4
3
2
1

RE

KE

Tetryonics 51.06 - Carbon atom

588
[294-294]

N
14.8118

333,444
[2.4659562515 e-26 kg]

18,360
[0.759 GeV]

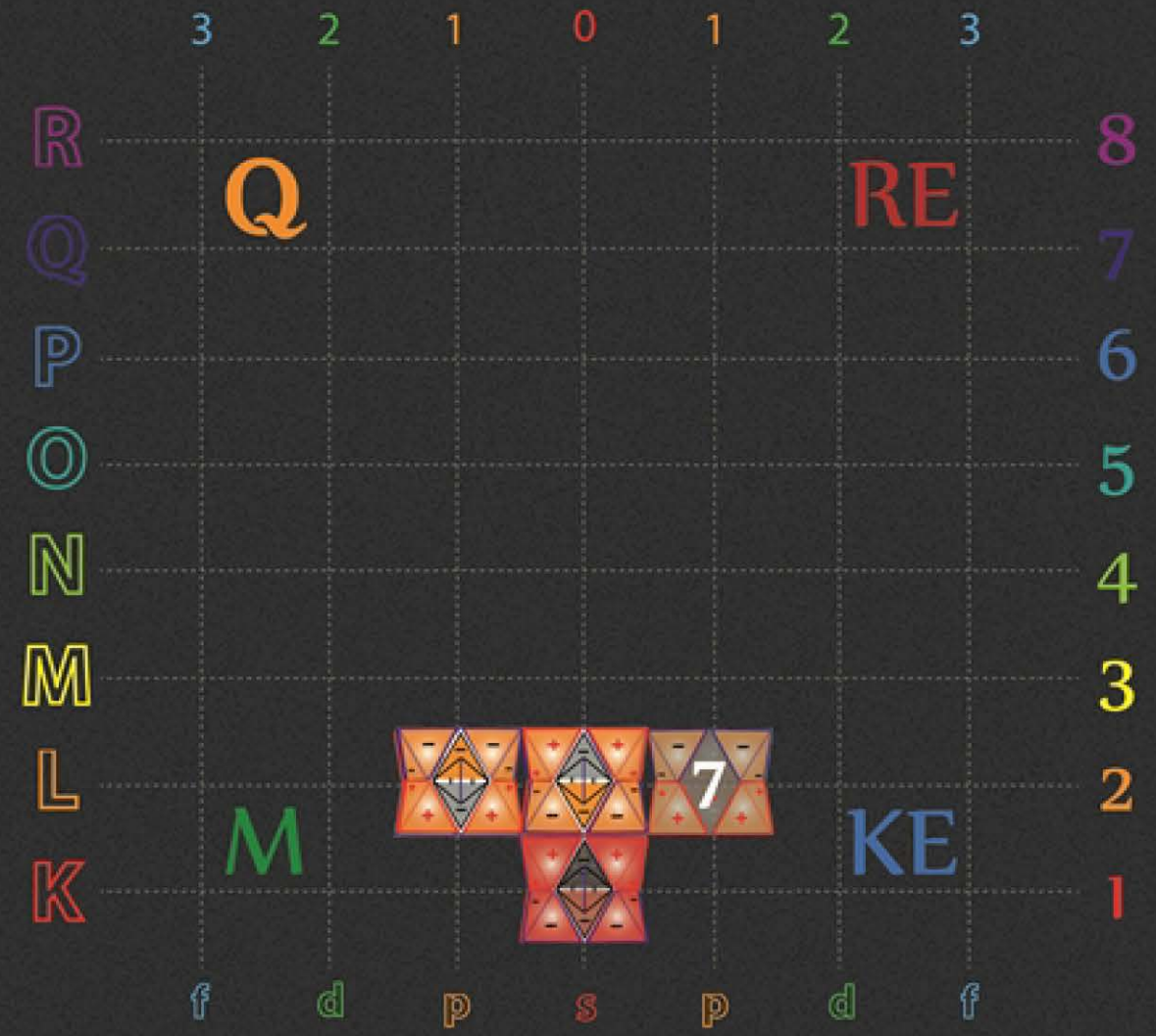
electron configuration



Aufbau

Nitrogen

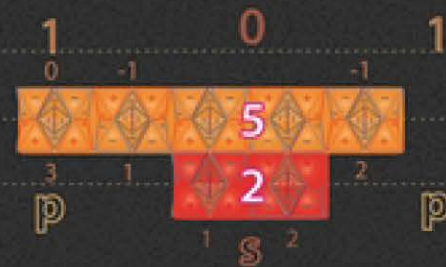
07



07 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-2

Metalloid

Azimuthal & Magnetic numbers



Orbitals & sub-orbitals

672
[336-336]

O
16.9744

382,128
[2.818667317 e-26 kg]

22,032
[0.9116 GeV]

electron configuration

[He] 2s² 2p⁴

Aufbau

08

08 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻² Metalloid

Azimuthal & Magnetic numbers

	3	2	1	0	1	2	3	
R								8
Q								7
P								6
O								5
N								4
M								3
L								2
K								1

atomic shell

energy level

Orbitals & sub-orbitals

756
[378-378]

F
19.1370

430,812
[3.177772119 e-26 kg]

25,704
[1.063 GeV]

electron configuration

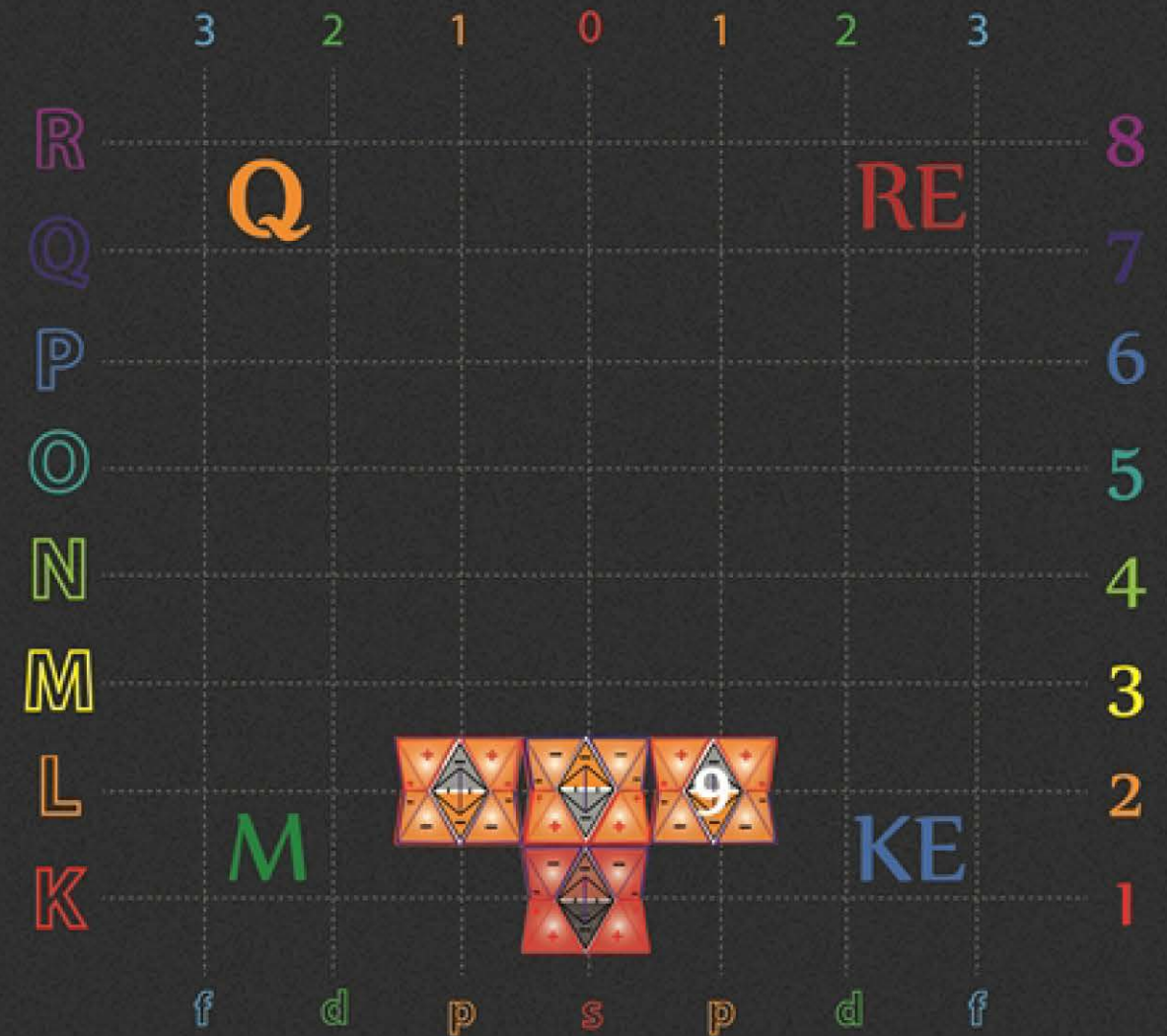


Aufbau

Fluorine

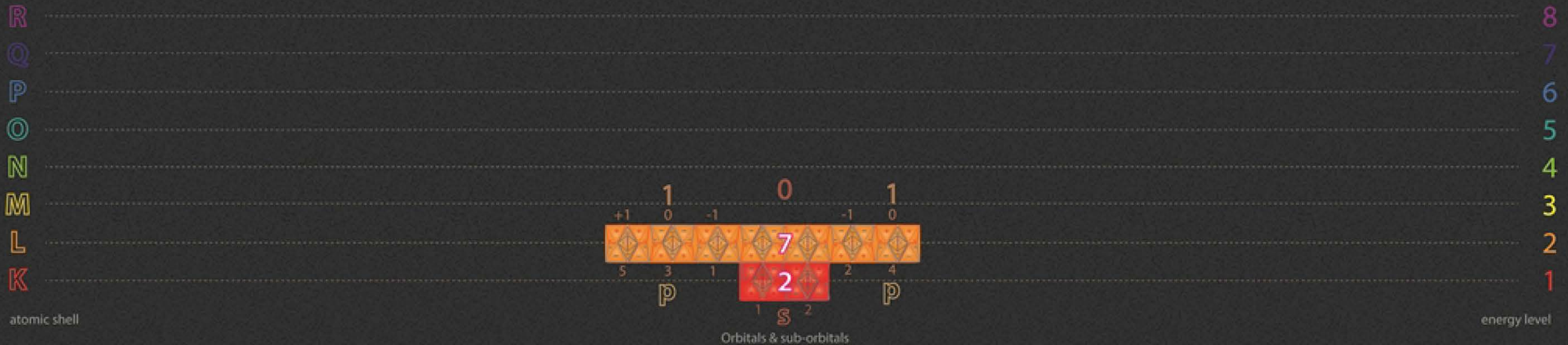
09

Azimuthal & Magnetic numbers



09 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-2

Halogen



840
[420-420]

Ne
21.2996

479,496
[3.53687692 e-26 kg]

29,376
[1.2155 GeV]

electron configuration
[He] 2s² 2p⁶

Aufbau

R
Q
P
O
N
M
L
K

atomic shell

10

Azimuthal & Magnetic numbers

Orbitals & sub-orbitals

10 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻²

Noble Gas

R
Q
P
O
N
M
L
K

atomic shell

3 2 1 0 1 2 3

R
Q
P
O
N
M
L
K

f d p s p d f

8
7
6
5
4
3
2
1

energy level

Tetryonics 51.10 - Neon atom

924
[462-462]

Na
23.6317

531,996
[3.924129448 e-26 kg]

36,864
[1.5253 GeV]

electron configuration

Aufbau

[Ne] 3s¹
₁₀

Sodium

11



11 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n₁₋₃

Alkali
Metal

Azimuthal & Magnetic numbers



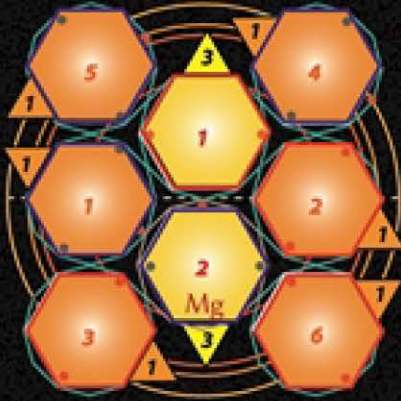
atomic shell

energy level

Orbitals & sub-orbitals

1,008
[504-504]

Mg
25.9638



Mg

584,496
[4.311381977 e-26 kg]

44,352
[1.835 GeV]

electron configuration



Aufbau

Magnesium

12



12 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-3

Alkaline Earth

Azimuthal & Magnetic numbers



atomic shell

energy level

Orbitals & sub-orbitals

1,092
[546-546]

Al
28.2958

636,996
[4.698634505 e-26 kg]

51,840
[2.1450 GeV]

Aluminium

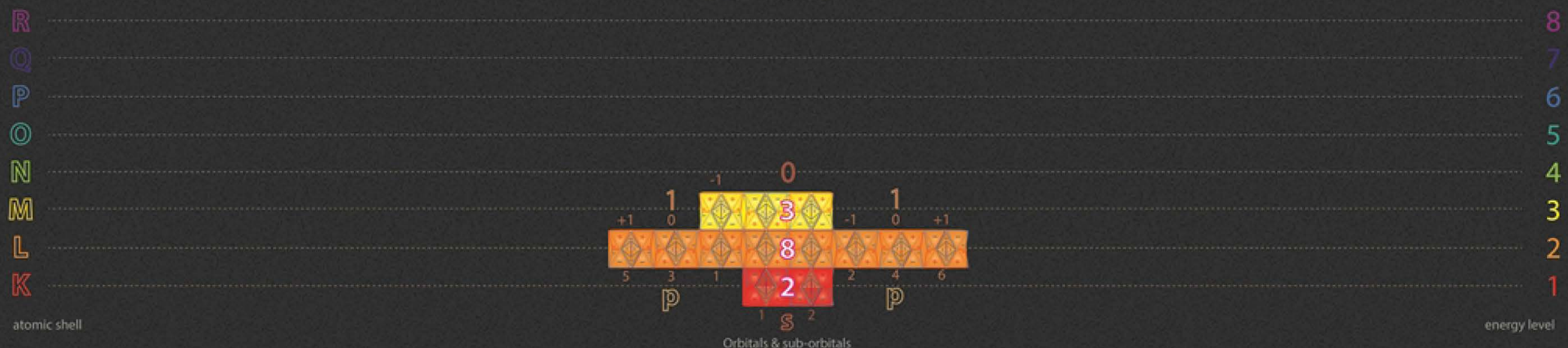
13



electron configuration
 $[Ne]_{10} 3s^2 3p^1$

13 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n_{1-3}$ Metalloid

Aufbau



Tetryonics 51.13 - Aluminium atom

1,176
[588-588]

Si
30.6279

689,496
[5.085887033 e -26 kg]

59,328
[2.4548 GeV]

electron configuration
[Ne] 3s² 3p²

Aufbau

R 8
Q 7
P 6
O 5
N 4
M 3
L 2
K 1

atomic shell

Orbitals & sub-orbitals

energy level

Silicon
14

3 2 1 0 1 2 3

R 8
Q 7
P 6
O 5
N 4
M 3
L 2
K 1

f d p s p d f

14 [Protons [24-12] Neutrons [18-18] electrons [0-12]] n1-3 Metalloid

1,260
[630-630]

P
32.9600

741,996
[5.473139562 e-26 kg]

66,816
[2.7646 GeV]

electron configuration
[Ne] 3s² 3p³
10

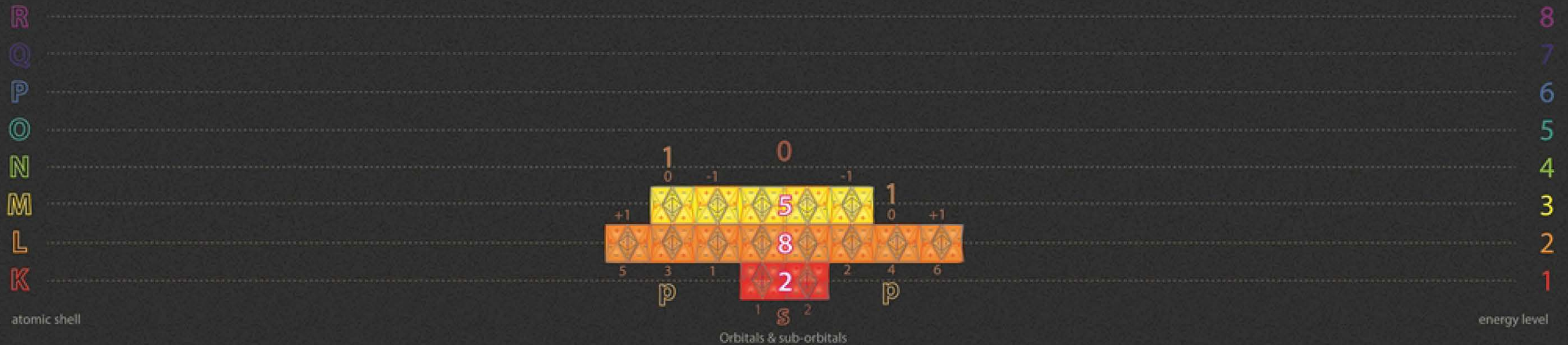
Aufbau

Phosphorus
15



15 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-3 Metalloid

Azimuthal & Magnetic numbers

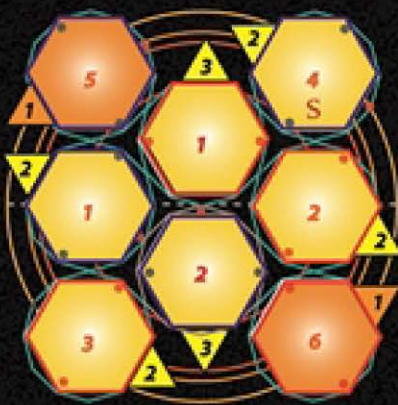


1,344

[672-672]

S

35.2921



794,496

[5.86039209 e-26 kg]

74,304

[3.074 GeV]

electron configuration



Aufbau

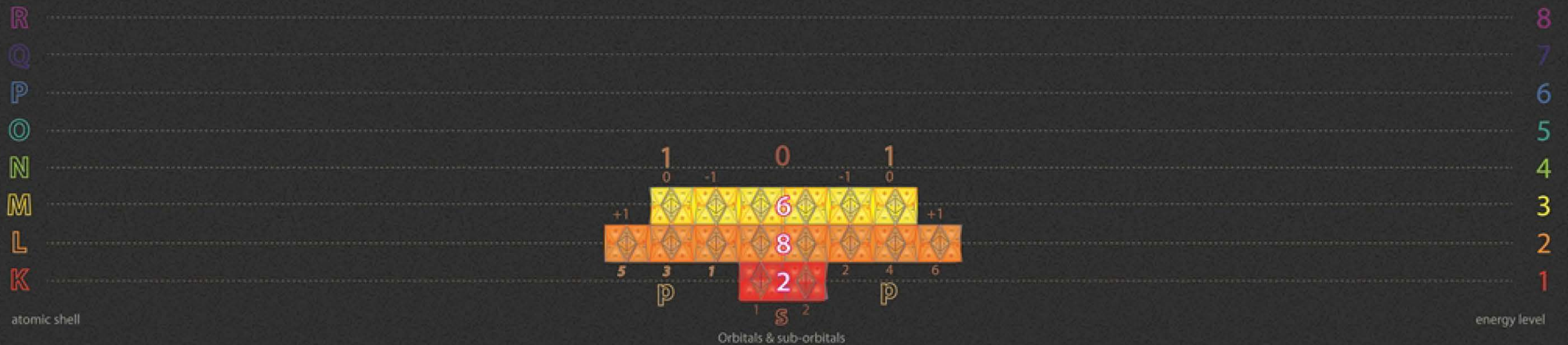
Sulfur

16



16 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n1-3$

Metalloid



Tetryonics 51.16 - Sulfur atom

1,428
[714-714]

Cl
37.6242

846,996
[6.247644618 e-26 kg]

81,792
[3.6384 GeV]

electron configuration
[Ne]₁₀ 3s² 3p⁵

Aufbau

R
Q
P
O
N
M
L
K

atomic shell

Chlorine

17

Azimuthal & Magnetic numbers

Orbitals & sub-orbitals

8
7
6
5
4
3
2
1

energy level

17 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n_{1-3}$ Halogen

R
Q
P
O
N
M
L
K

3 2 1 0 1 2 3

f d p s p d f

8
7
6
5
4
3
2
1

Tetryonics 51.17 - Chlorine atom

1,512
[756-756]

Ar
39.9563

Ar

899,496
[6.634897147 e-26 kg]

89,280
[3.694 GeV]

electron configuration
 $[Ne] 3s^2 3p^6$
₁₀

Aufbau

Argon

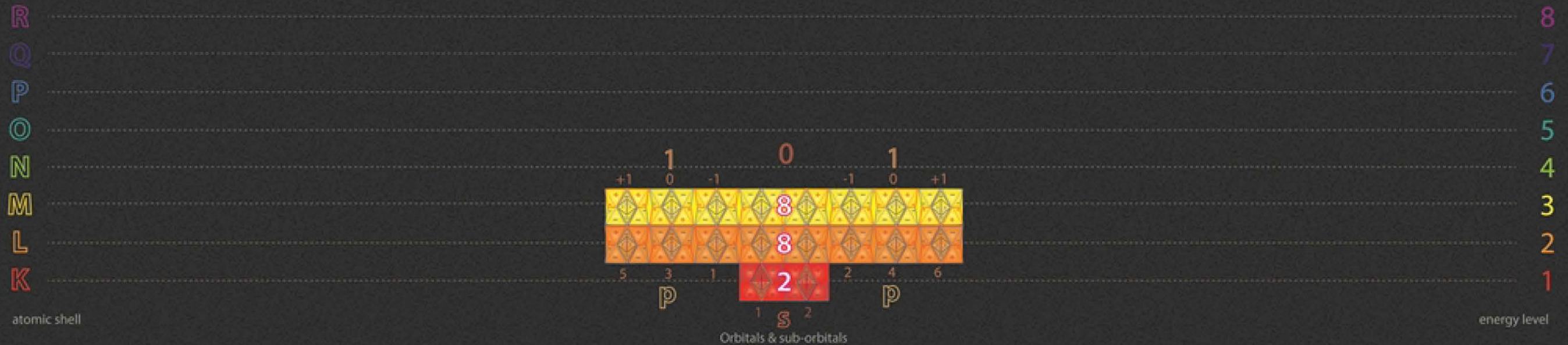
18



18 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-3

Noble Gas

Azimuthal & Magnetic numbers



1,596
[798-798]

K
42.4643

955,956
[7.05135958 e-26 kg]

100,728
[4.167 GeV]

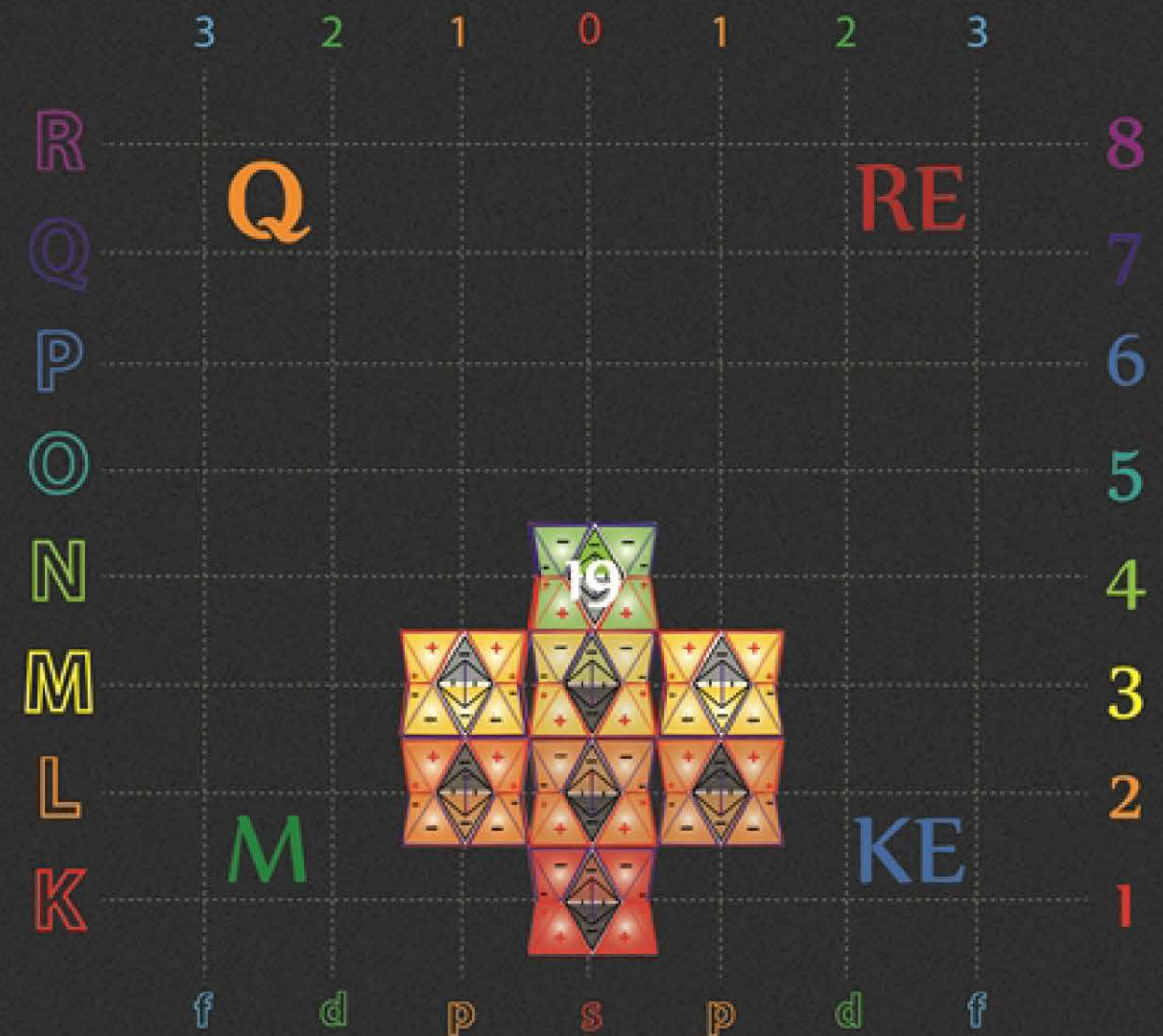
electron configuration



Aufbau

Potassium

19



19 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Alkali
Metal

Azimuthal & Magnetic numbers



atomic shell

Orbitals & sub-orbitals

energy level

Tetryonics 51.19 - Potassium atom

1,680
[840-840]

Ca
44.9723

1,012,416
[7.467822013 e-26 kg]

112,176
[4.641 GeV]

electron configuration



Calcium

20



20 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Alkaline Earth

Aufbau

Azimuthal & Magnetic numbers



atomic shell

Orbitals & sub-orbitals

energy level

1,764
[882-882]

Sc
47.3044

1,064,916
[7.855074541 e-26 kg]

119,664
[4.951 GeV]

electron configuration



Aufbau

Scandium

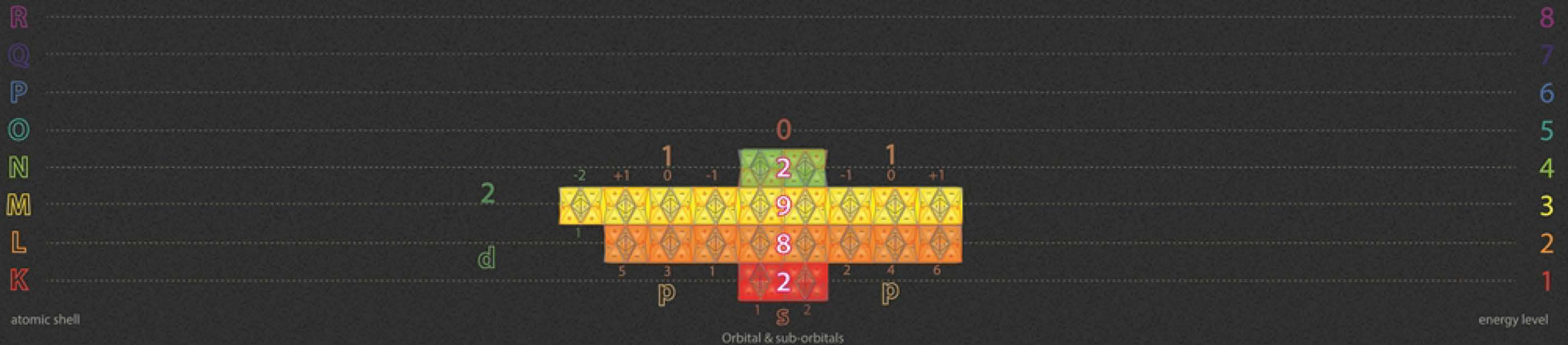
21



21 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Transition Metal

Azimuthal & Magnetic numbers



Tetryonics 51.21 - Scandium atom

1,848
[924-924]

Ti
49.6365

1,117,416
[8.242327069 e-26 kg]

127,152
[5.261 GeV]

electron configuration
[Ar] 3d² 4s²
18

Aufbau

Titanium

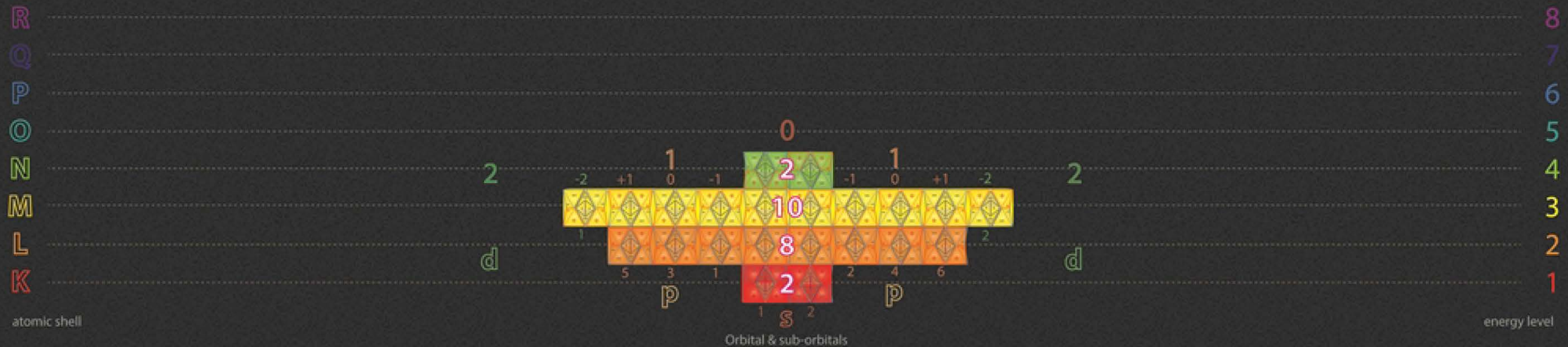
22



22 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Transition
Metal

Azimuthal & Magnetic numbers



Tetryonics 51.22 - Titanium atom

1,932
[966-966]

Va
51.9688

1,169,916
[8.629579598 e-26 kg]

134,640
[5.570 GeV]

electron configuration
[Ar] 3d³ 4s²
18

Aufbau

Vanadium

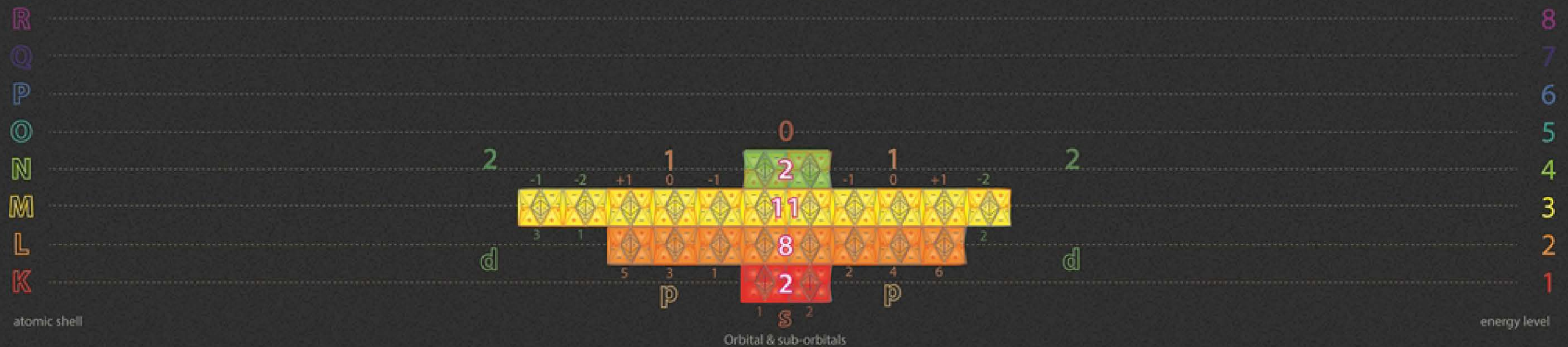
23



23 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Transition Metal

Azimuthal & Magnetic numbers



Tetryonics 51.23 - Vanadium atom

2,016
[1,008-1,008]

Cr
54.3008

1,222,416
[9.016832126 e-26 kg]

142,128
[5.880 GeV]

electron configuration
[Ar] 3d⁴ 4s²
18

Aufbau

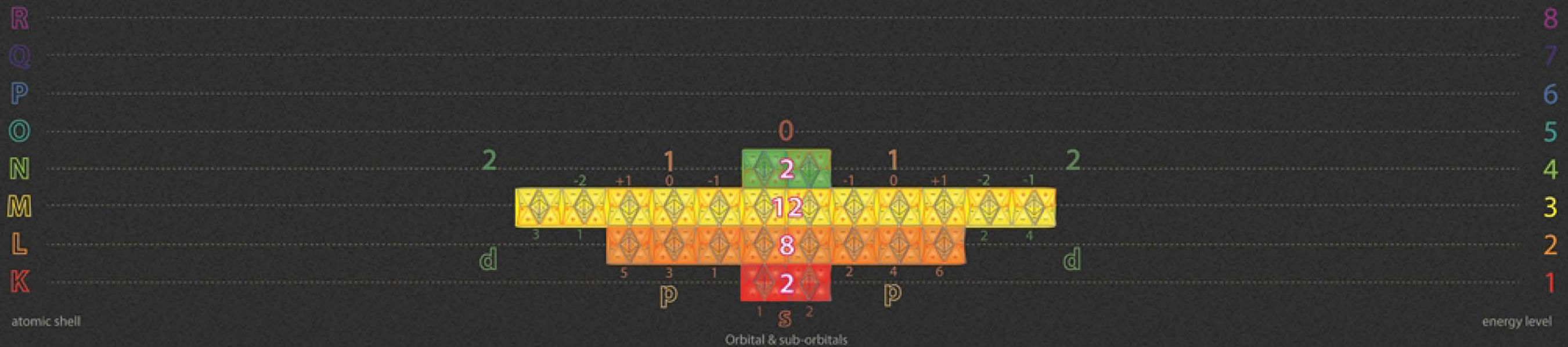
Chromium
24



24 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Transition
Metal

Azimuthal & Magnetic numbers



Orbital & sub-orbitals

Tetryonics 51.24 - Chromium atom

2,100
[1,050-1,050]

Mn
56.6327

1,274,916
[9.404084654 e-26 kg]

149,616
[6.190 GeV]

electron configuration



Aufbau

Manganese

25



Azimuthal & Magnetic numbers



atomic shell

Orbital & sub-orbitals

energy level

2,184
[1,092-1,092]

Fe
58.9648

1,327,416
[9.791337183 e-26 kg]

157,104
[6,500 GeV]

electron configuration



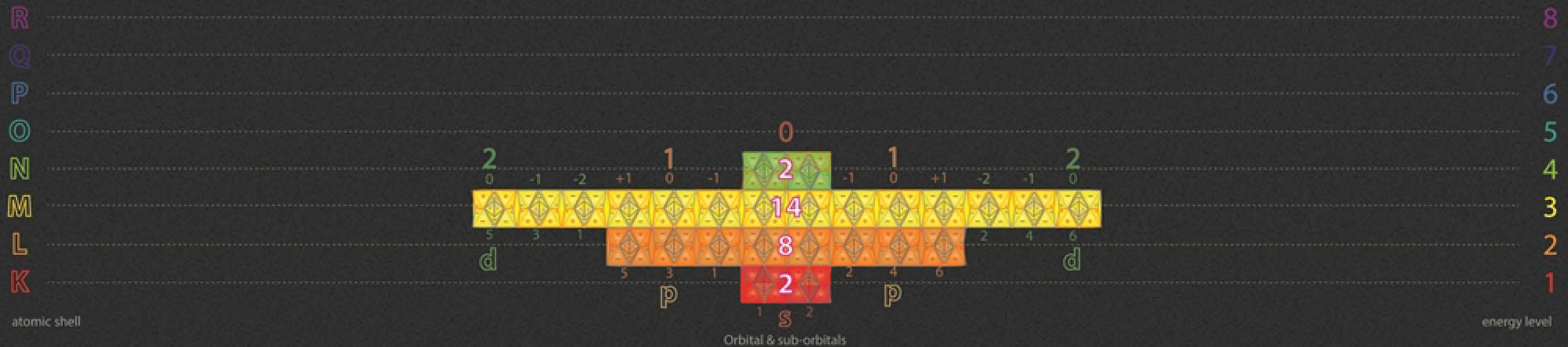
Aufbau

Iron

26



Azimuthal & Magnetic numbers



2,268
[1,134-1,134]

Co
61.2969

1,379,916
[1.017858971 e-25 kg]

164,592
[6.810 GeV]

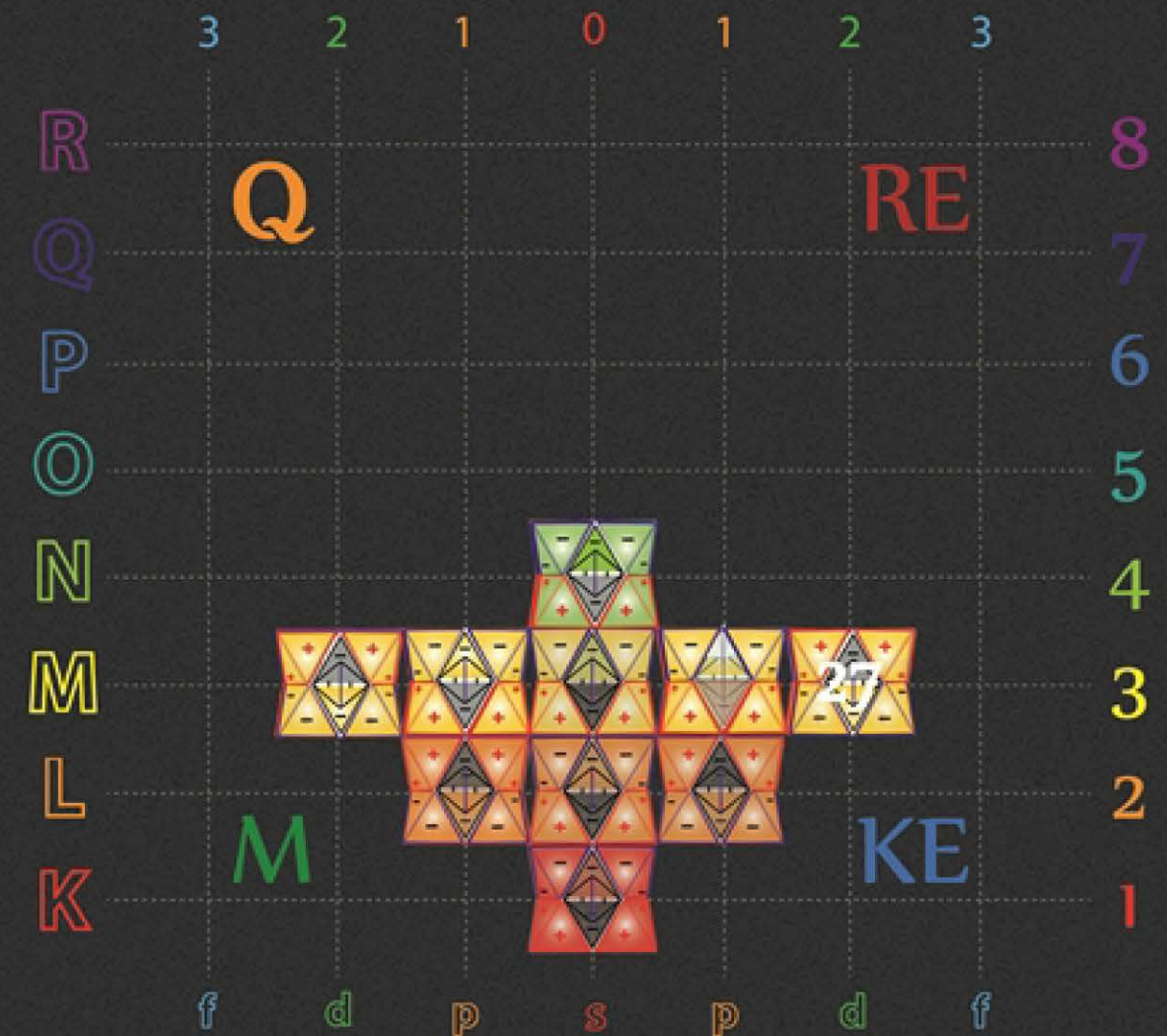
electron configuration



Aufbau

Cobalt

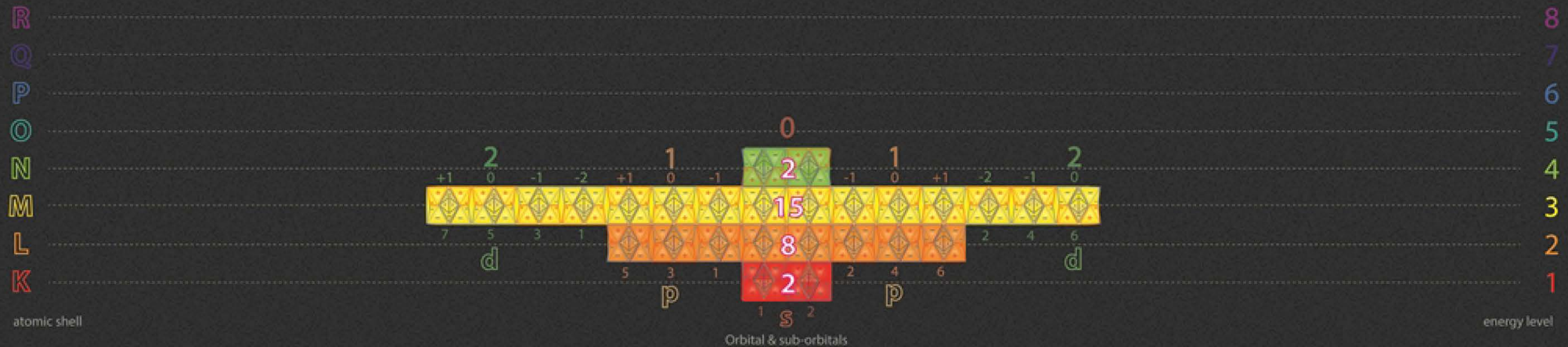
27



27 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4

Transition Metal

Azimuthal & Magnetic numbers



Tetryonics 51.27 - Cobalt atom

2,352
[1,176-1,176]

Ni
63.6290

1,432,416
[1.056584224 e-25 kg]

172,080
[7,120 GeV]

electron configuration
[Ar] 3d⁸ 4s²
18

Aufbau

Nickel

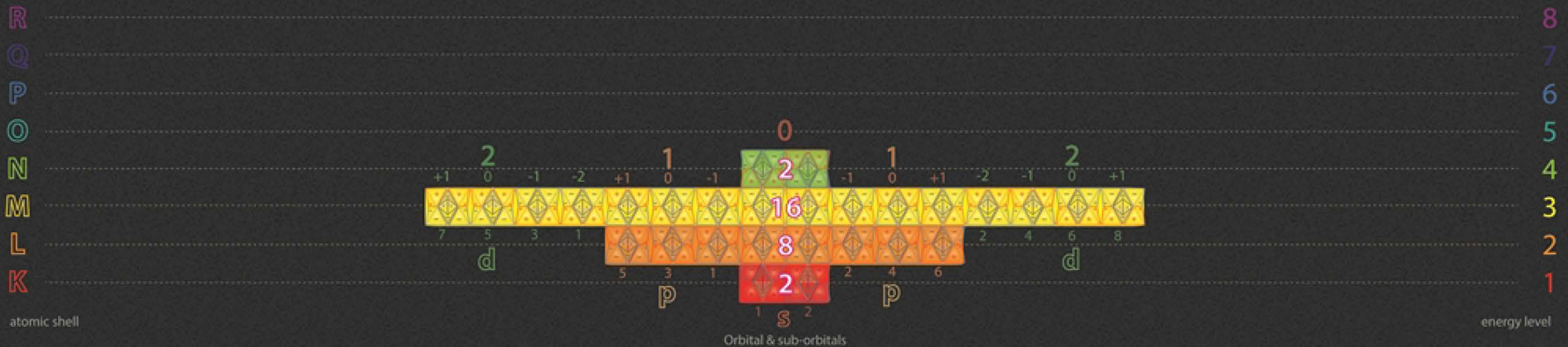
28



28 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] m1-4

Transition Metal

Azimuthal & Magnetic numbers



atomic shell

Orbital & sub-orbitals

energy level

2,436
[1,218-1,218]

Cu
65.9611

1,484,916
[1.095309477 e-25 kg]

179,568
[7.429 GeV]

electron configuration
[Ar] 3d⁹ 4s²
₁₈

Aufbau

29

Post
Transition
Metal

Azimuthal & Magnetic numbers

R
Q
P
O
N
M
L
K

8
7
6
5
4
3
2
1

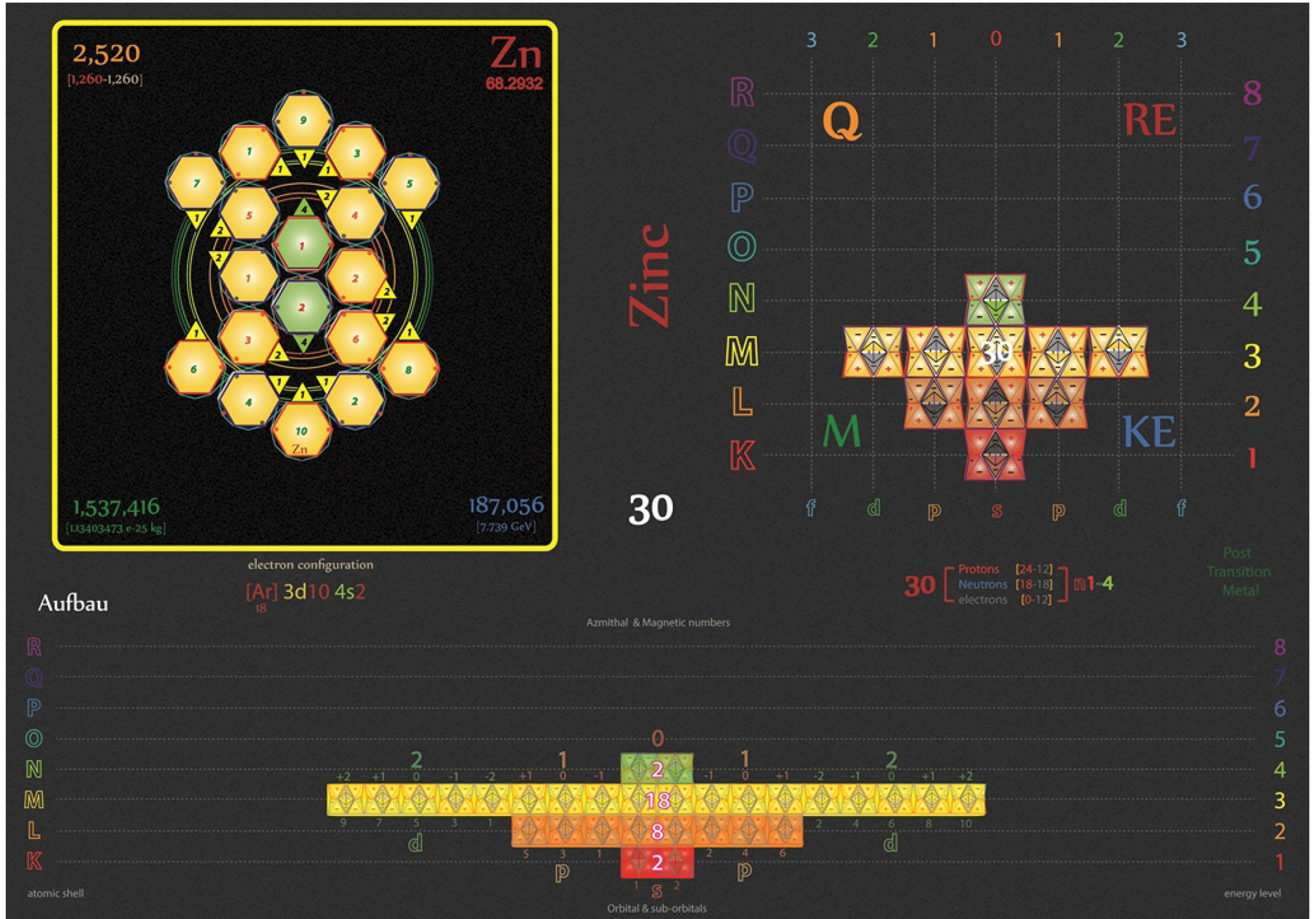
Orbital & sub-orbitals

atomic shell

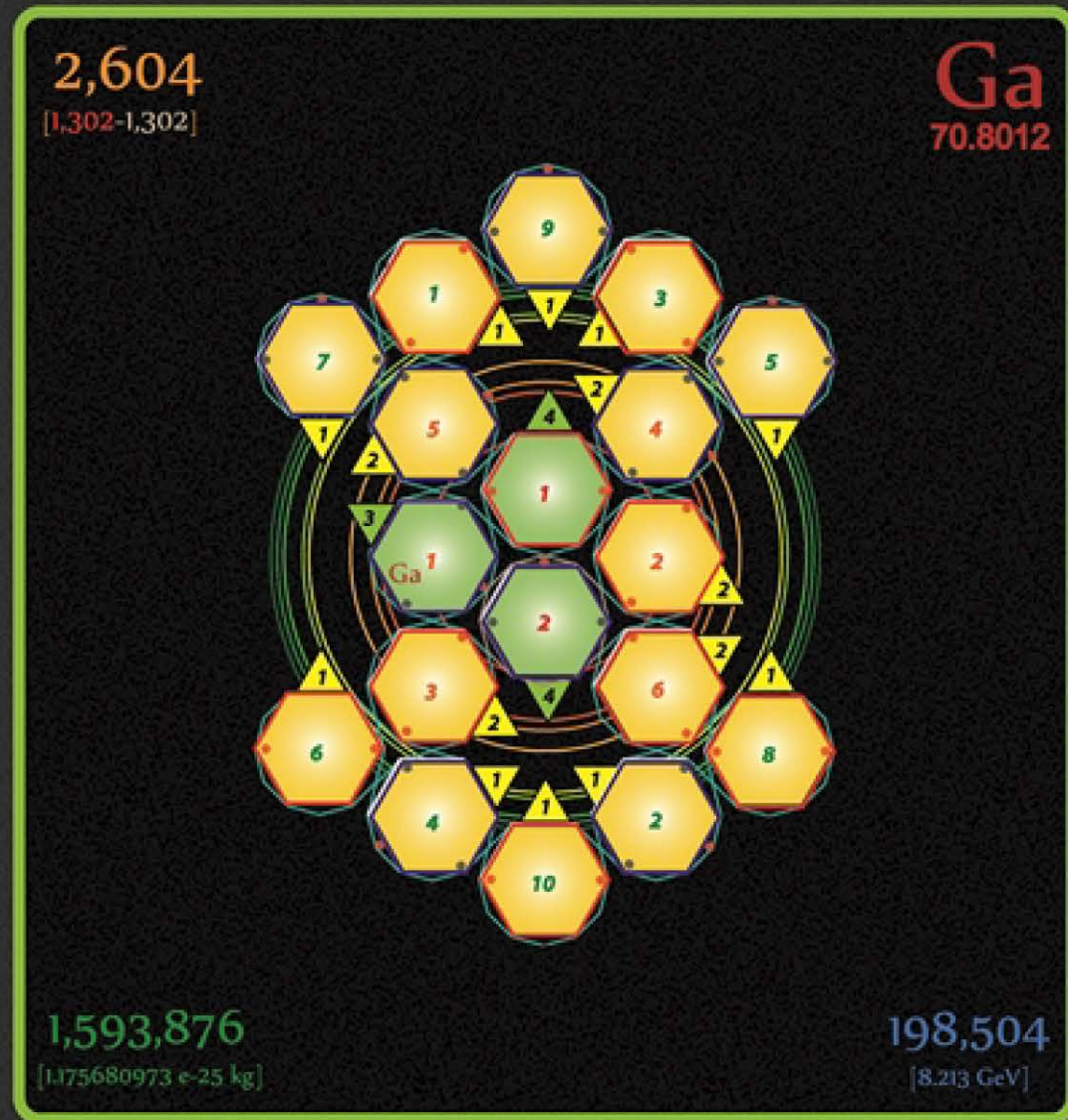
energy level

29 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻⁴

Tetryonics 51.29 - Copper atom



Tetryonics 51.30 - Zinc atom



electron configuration



Aufbau

Gallium
31



31 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n^{1-4}$

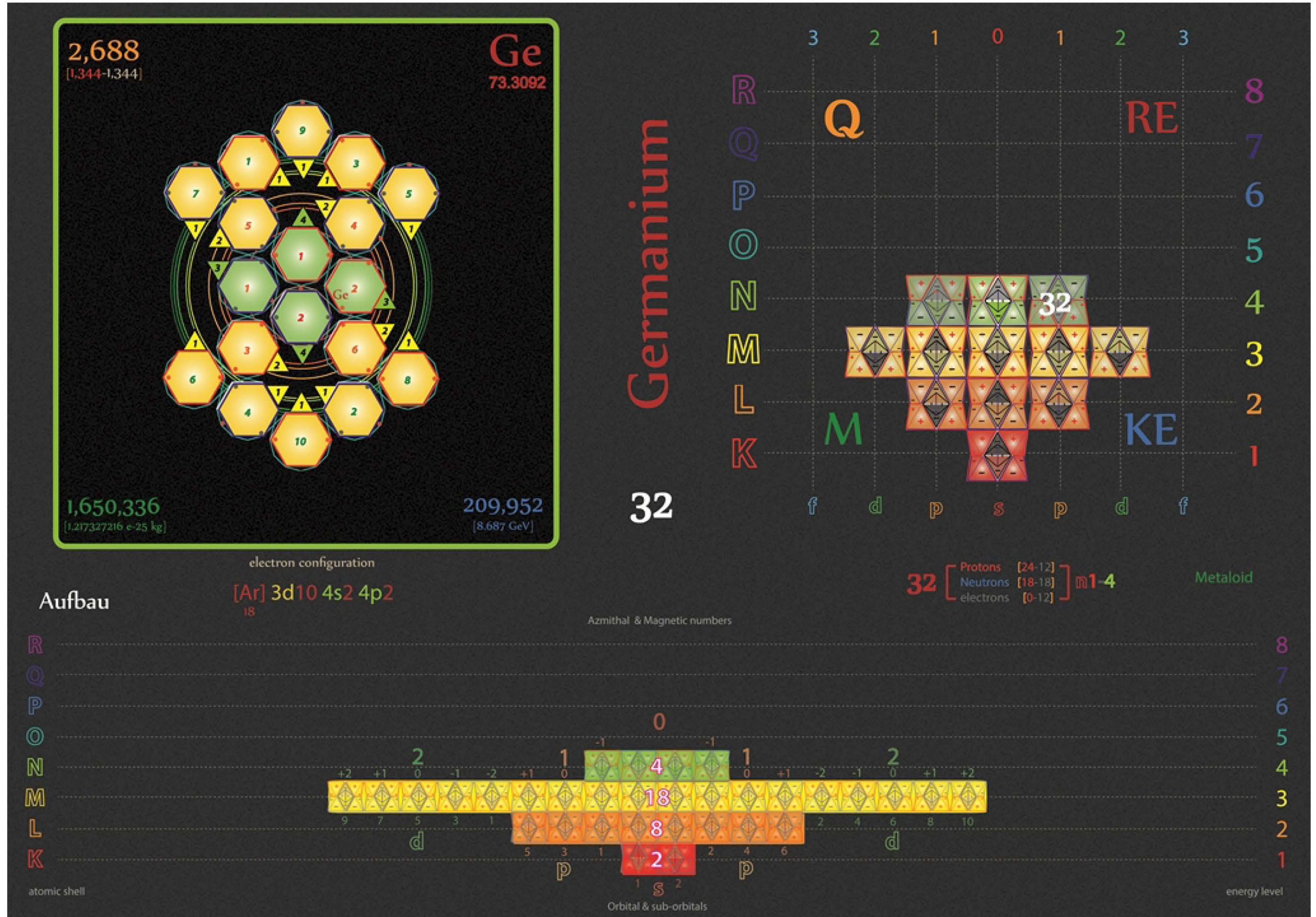
Metalloid

Azimuthal & Magnetic numbers

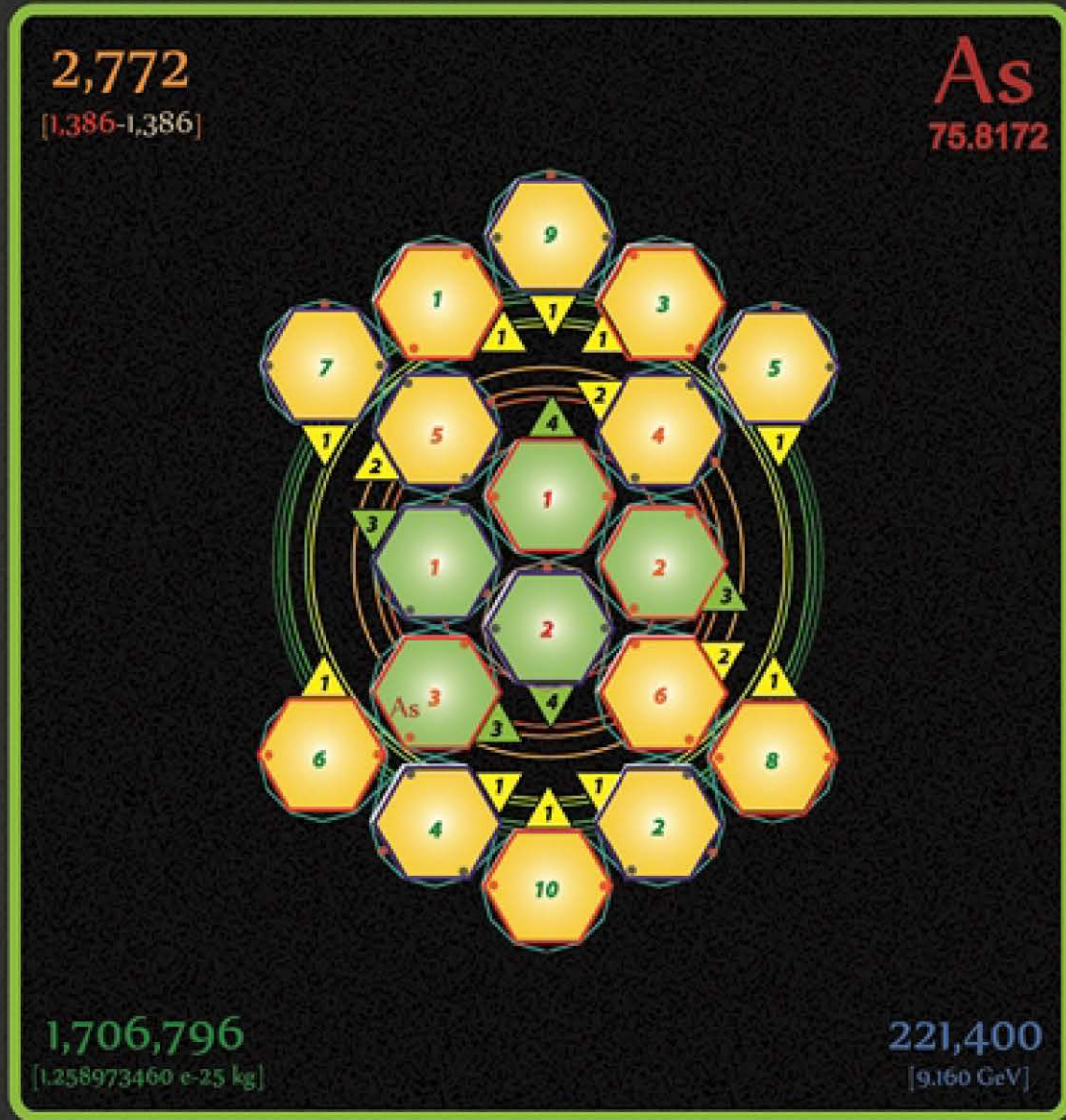


Orbital & sub-orbitals

energy level

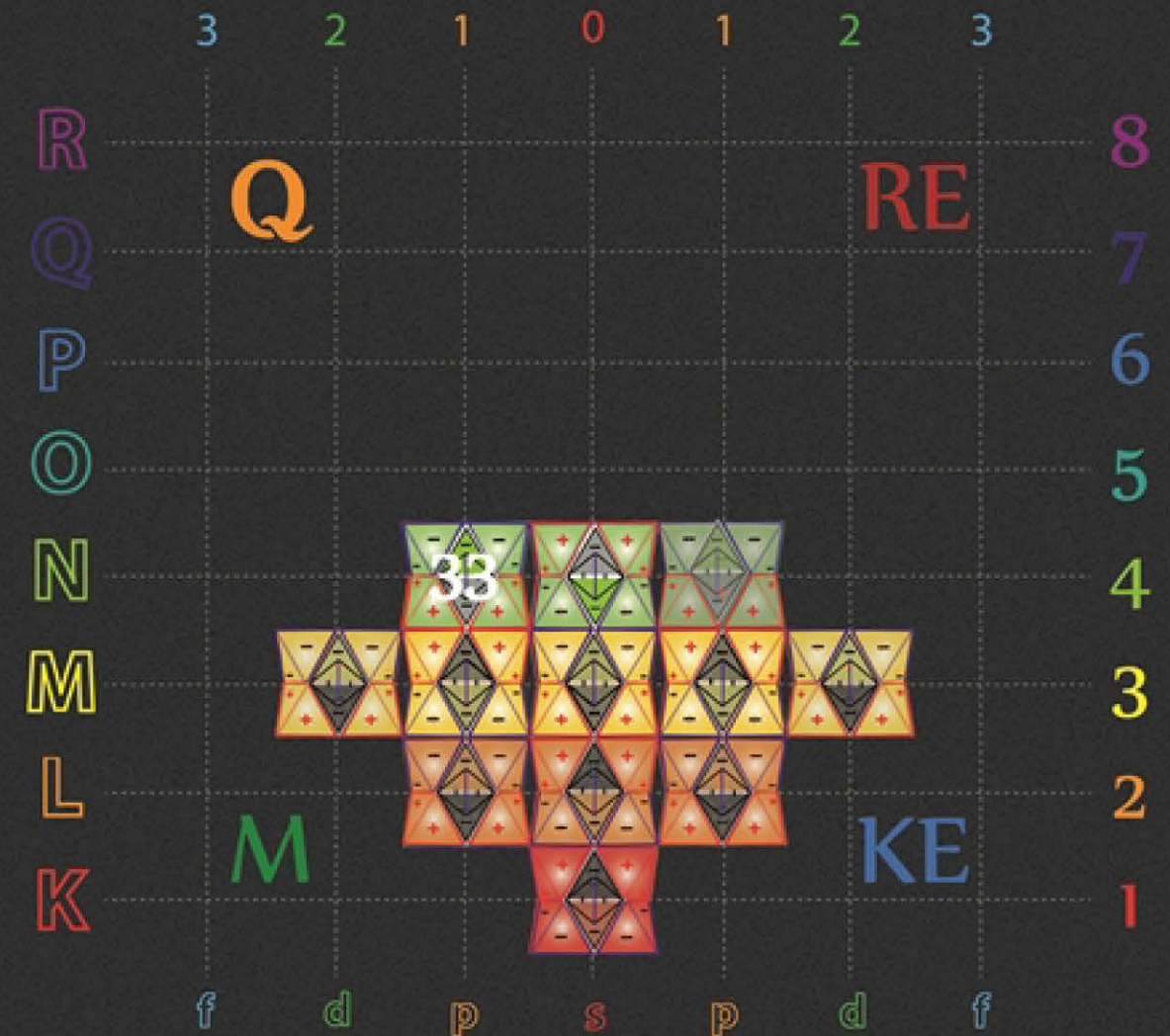


Tetryonics 51.32 - Germanium atom



Arsenic

33

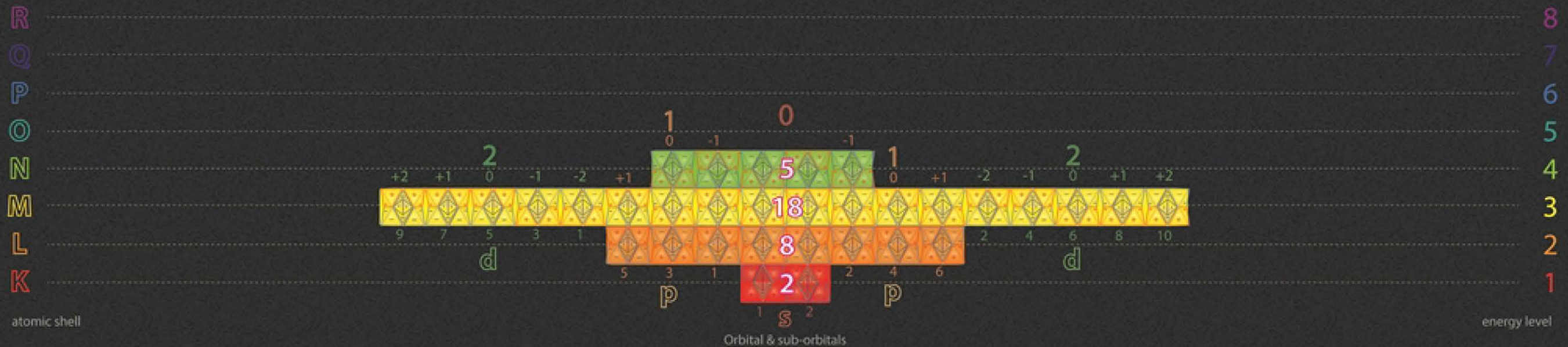


33 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-4 Metalloid

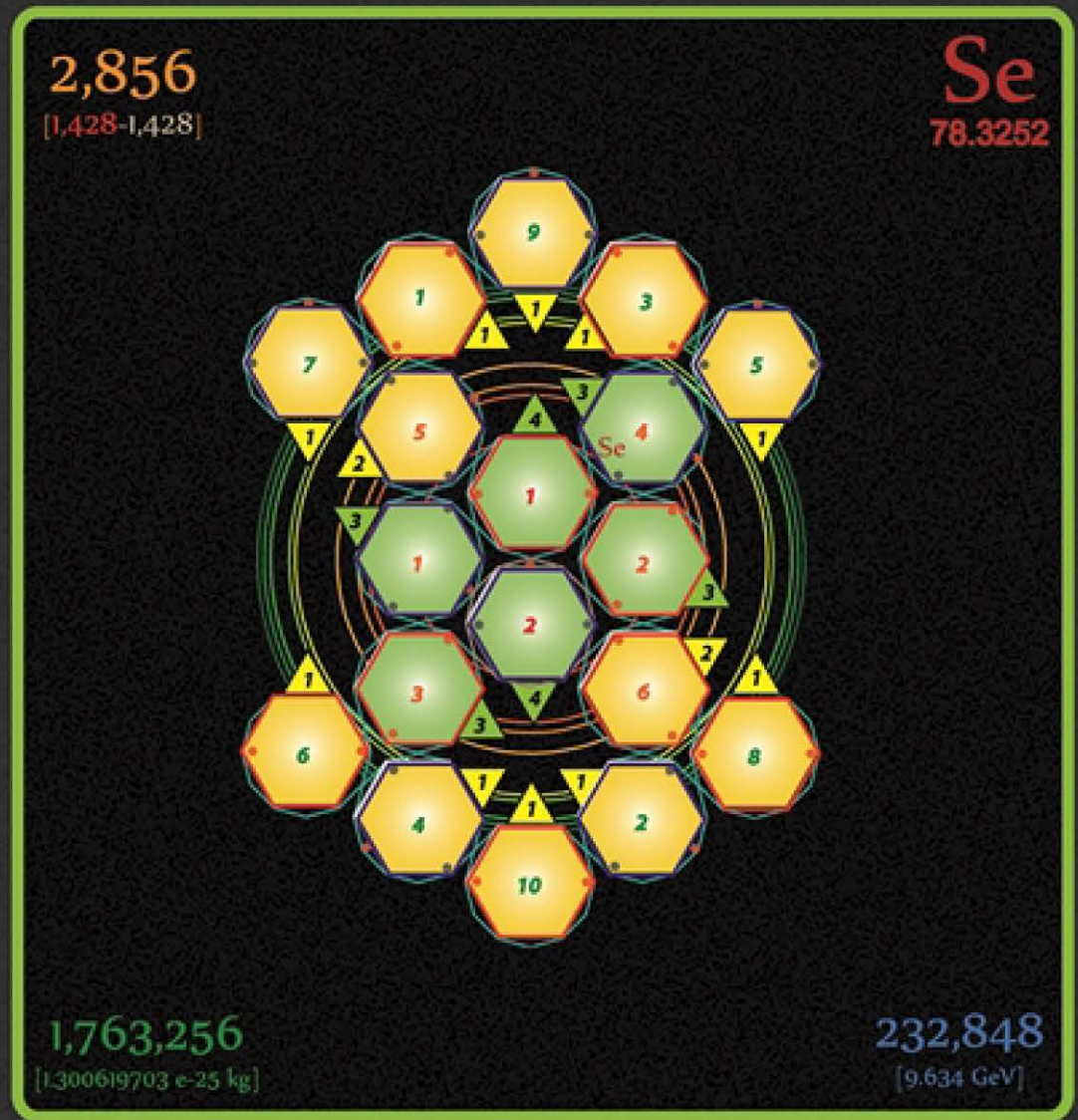
Aufbau

electron configuration
[Ar] 3d¹⁰ 4s² 4p³
18

Azimuthal & Magnetic numbers

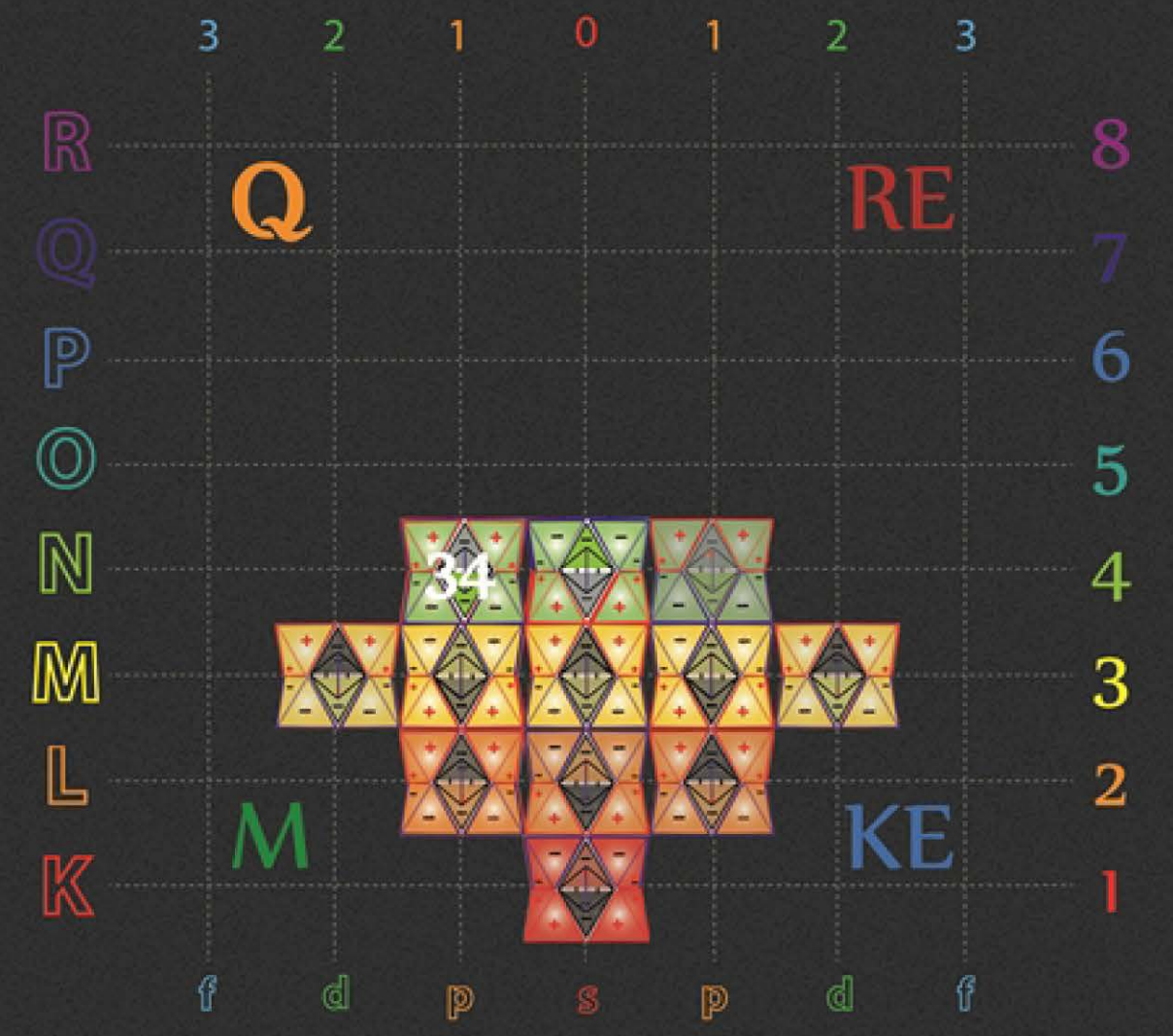


Tetryonics 51.33 - Arsenic atom



Selenium

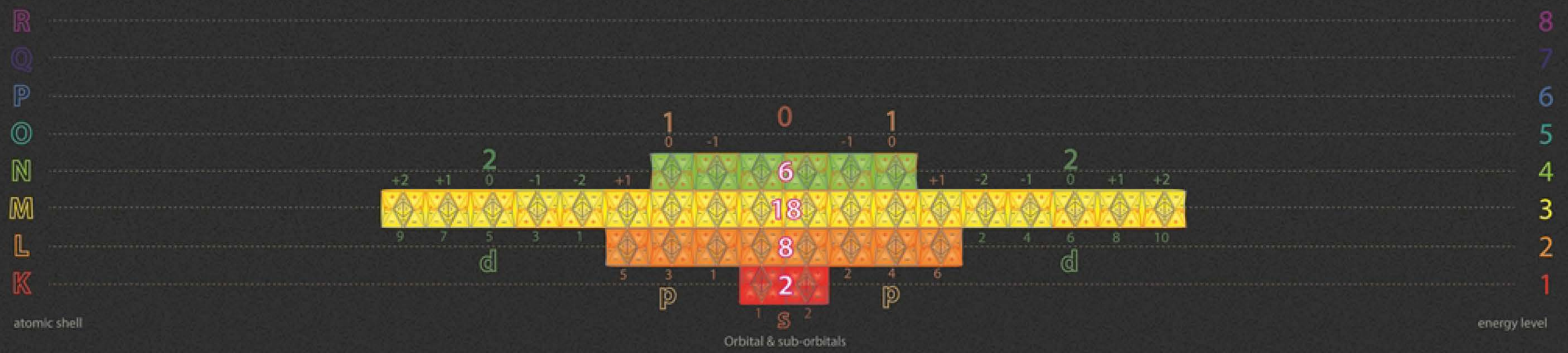
34



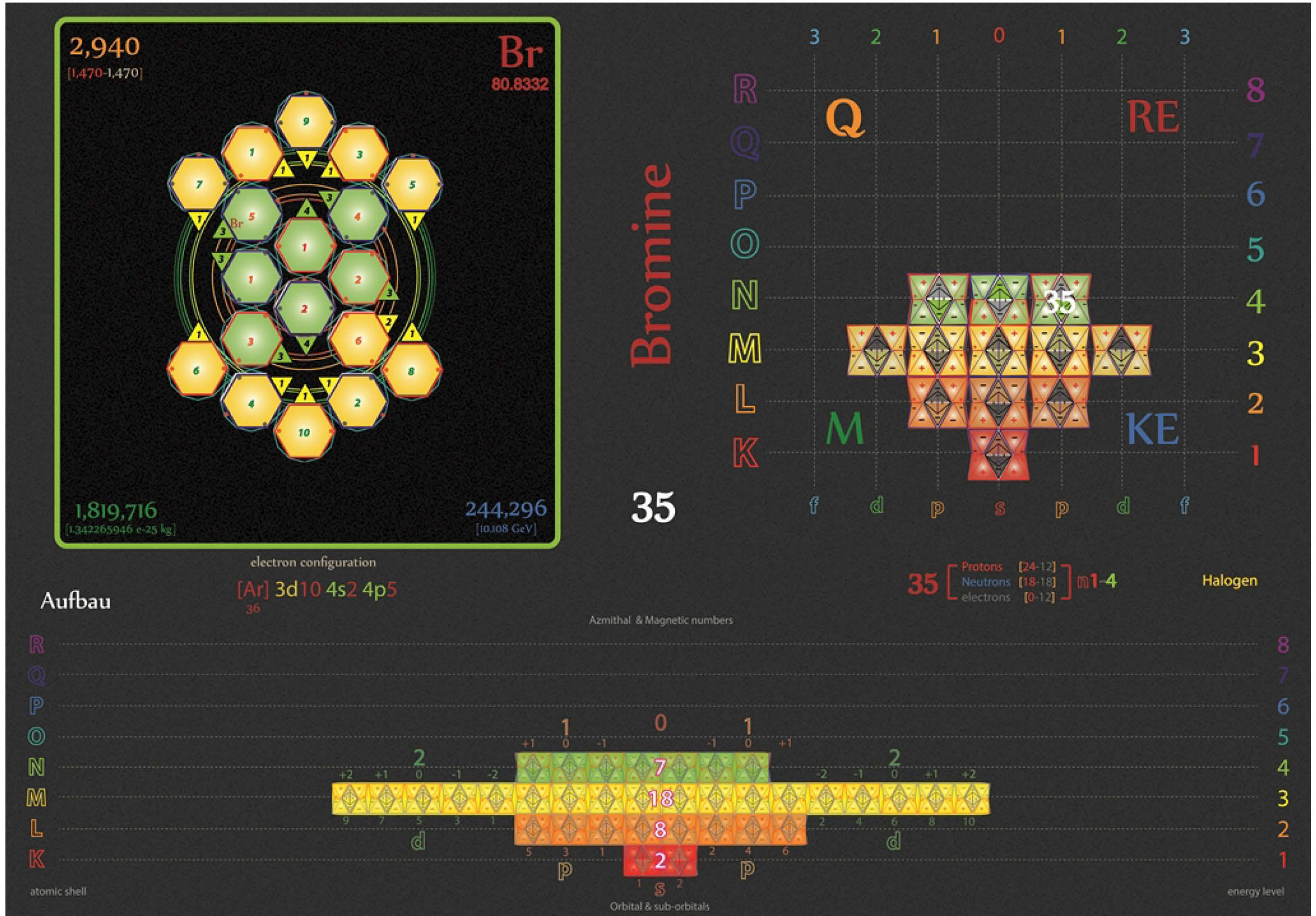
electron configuration
 $[Ar]_{18} 3d^{10} 4s^2 4p^4$

34 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n_{1-4}$ Metalloid

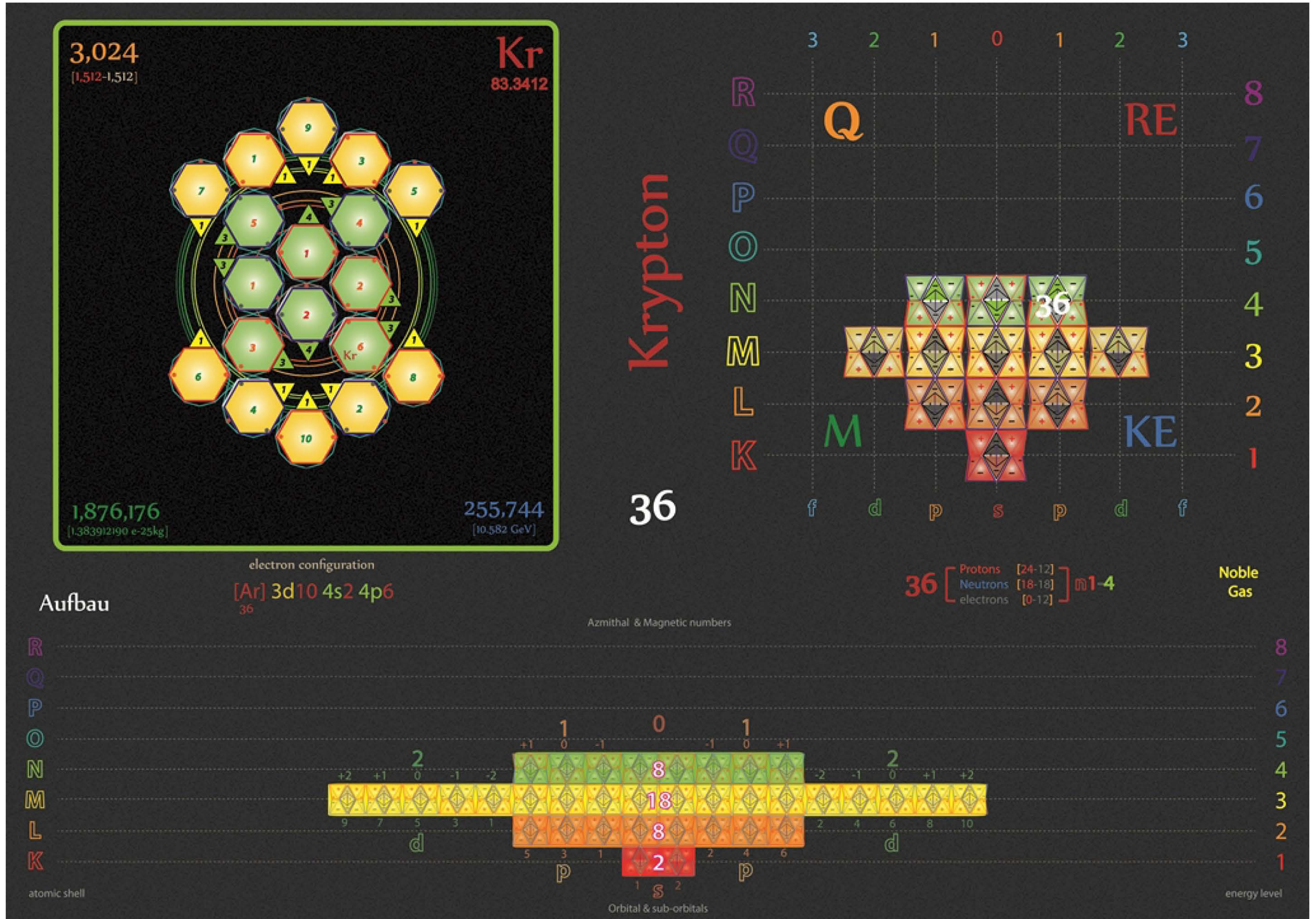
Aufbau



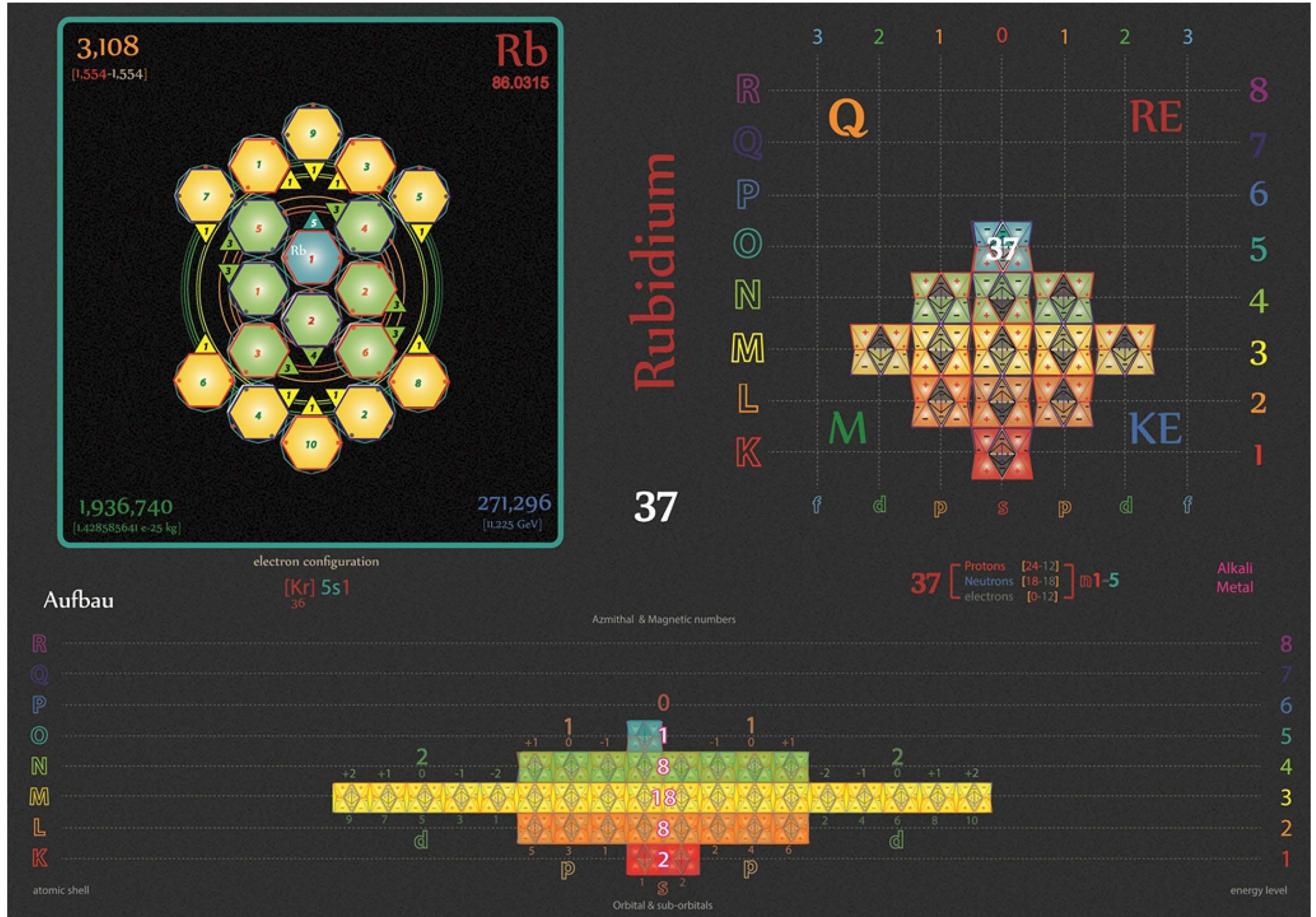
Tetryonics 51.34 - Selenium atom



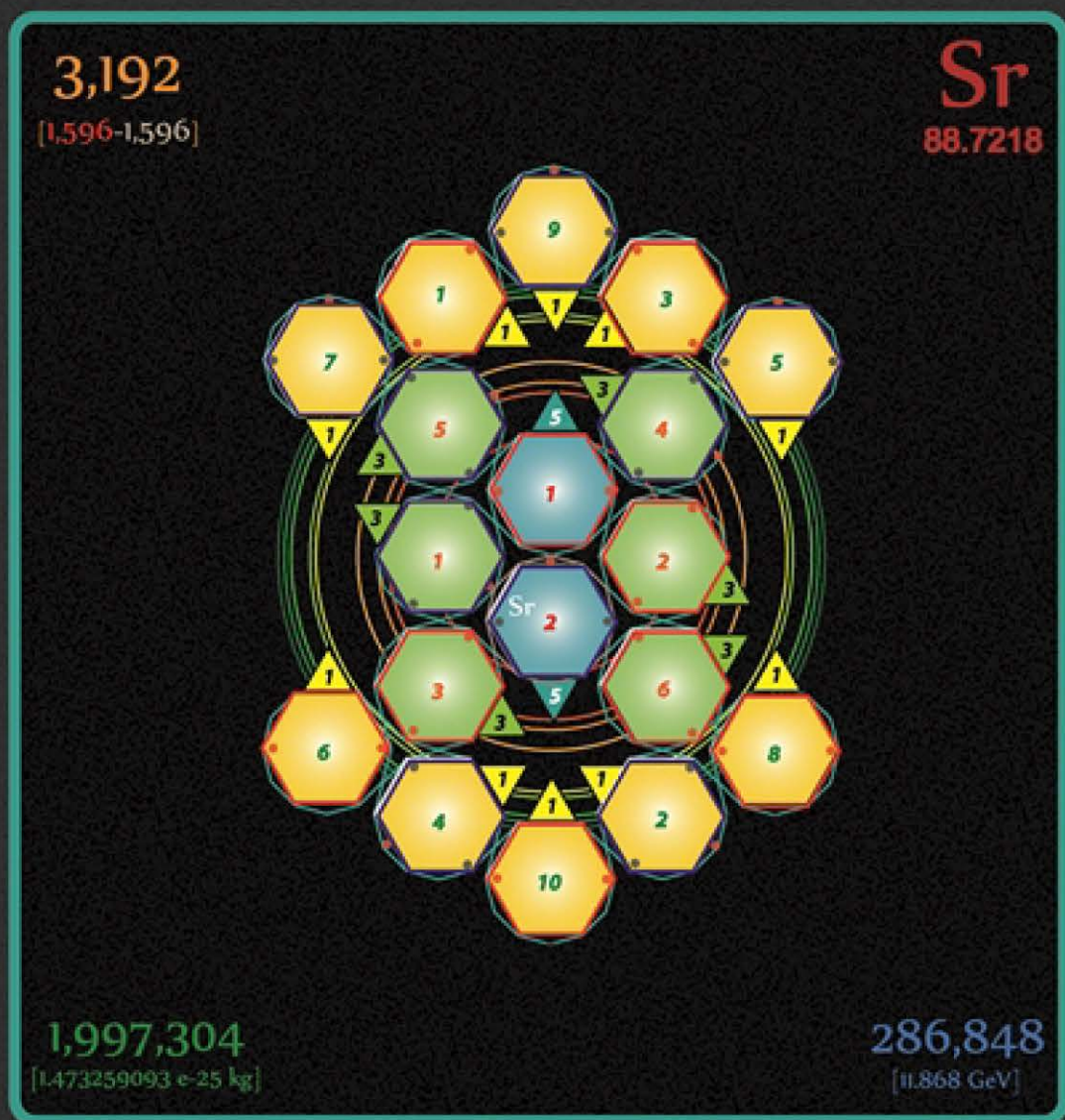
Tetryonics 51.35 - Bromine atom



Tetryonics 51.36 - Krypton atom



Tetryonics 51.37 - Rubidium atom



electron configuration



Aufbau

Strontium

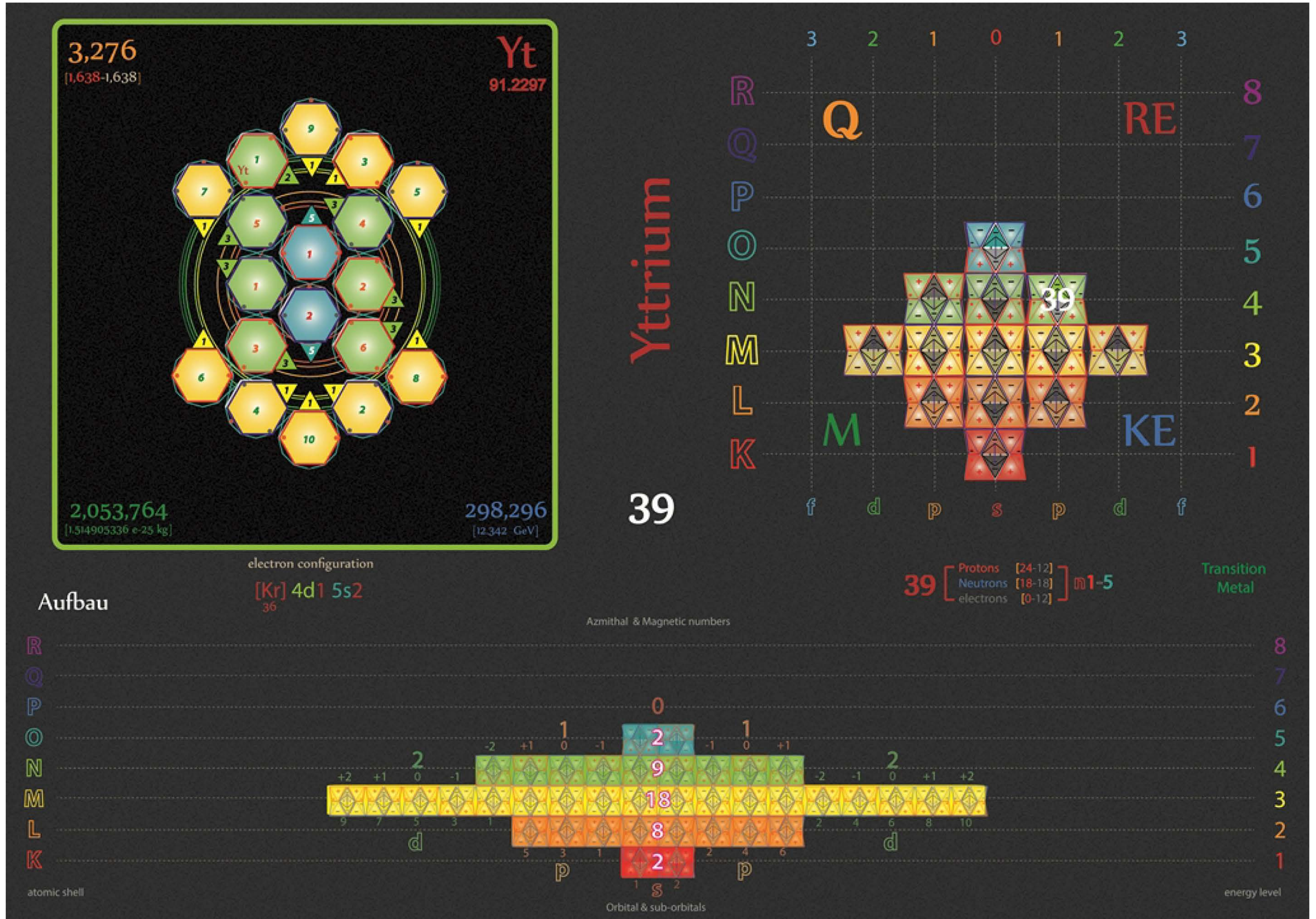
38



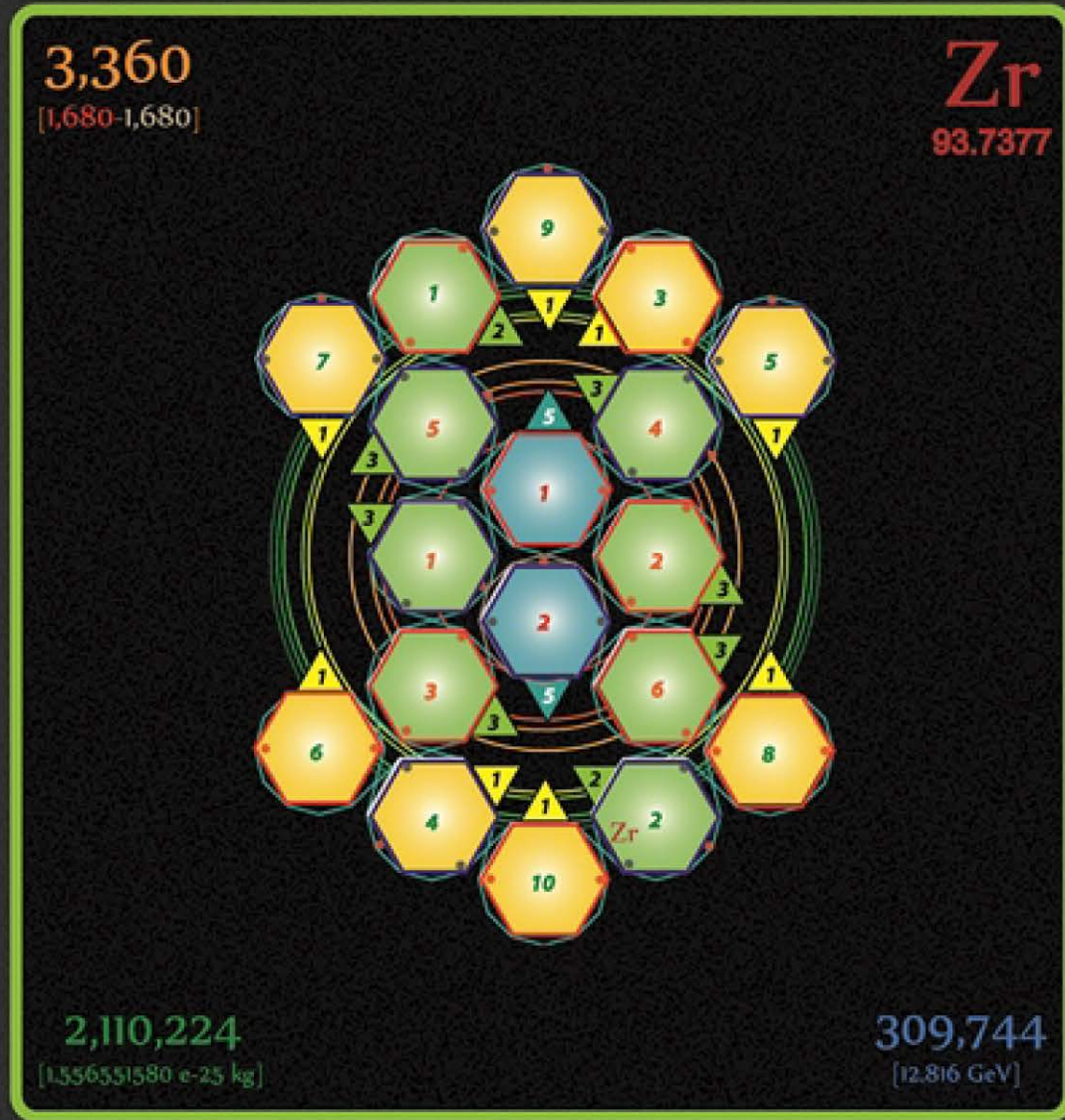
Azimuthal & Magnetic numbers



Tetryonics 51.38 - Strontium atom



Tetryonics 51.39 - Yttrium atom

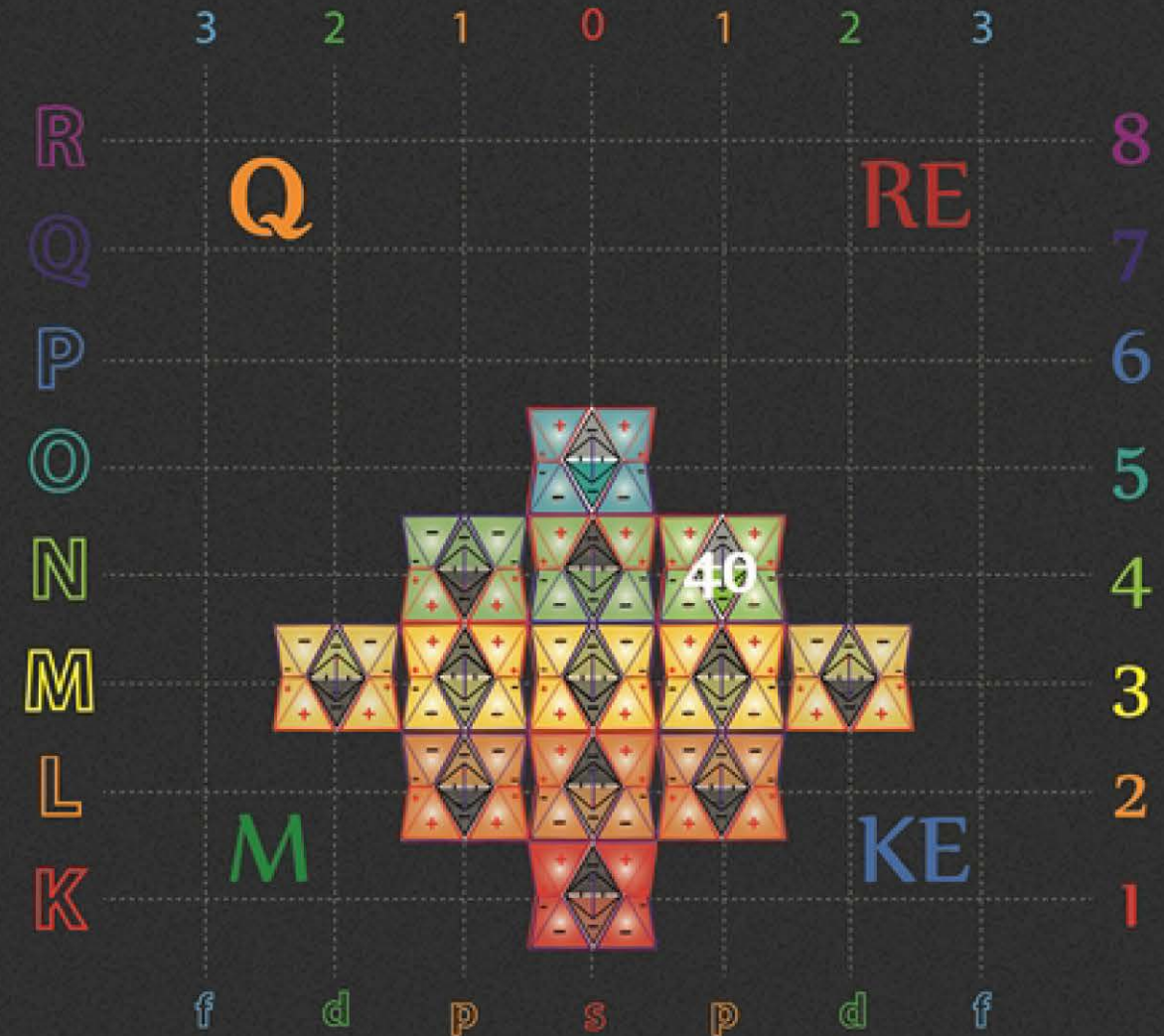


electron configuration
[Kr] 4d² 5s²
36

Aufbau

Zirconium

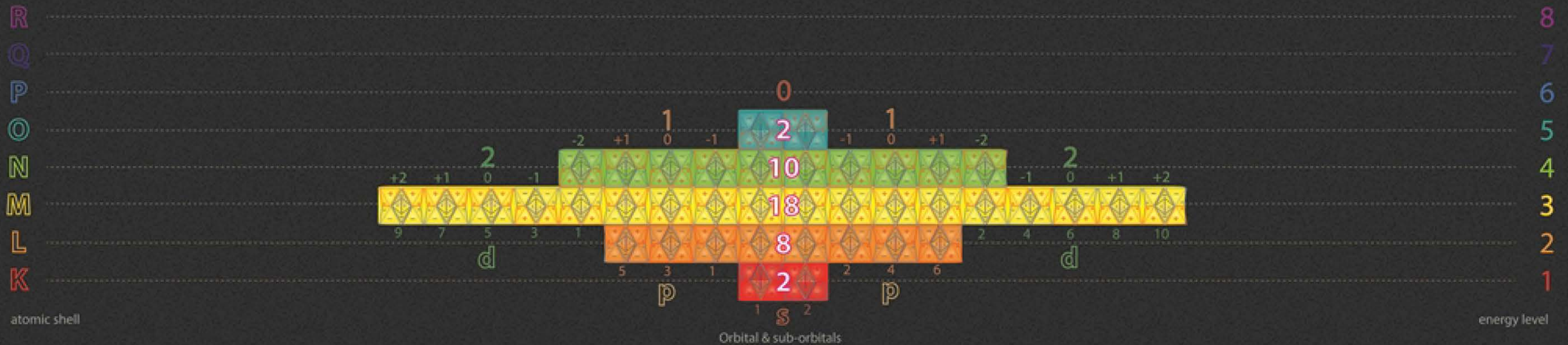
40



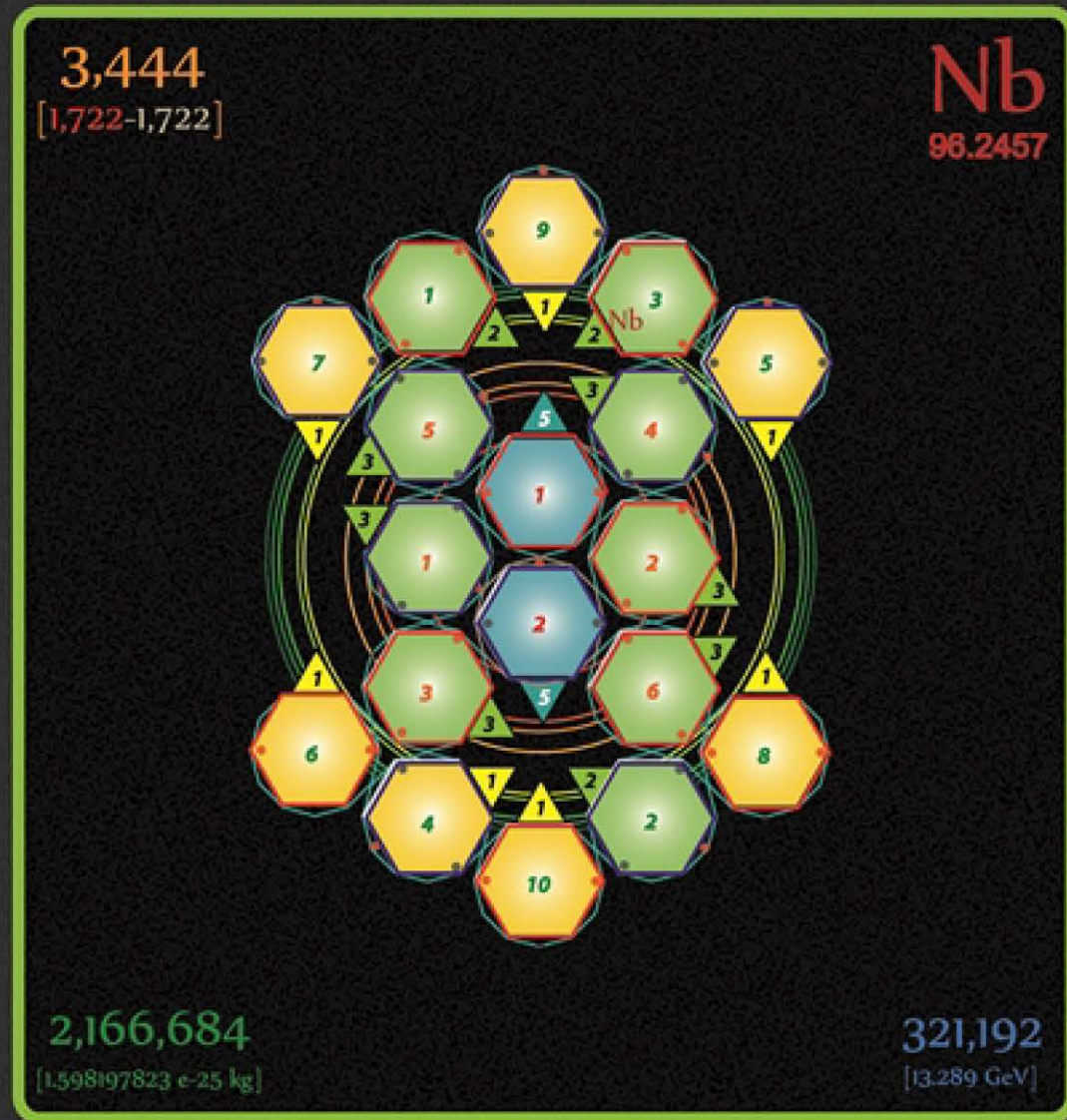
40 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Transition Metal

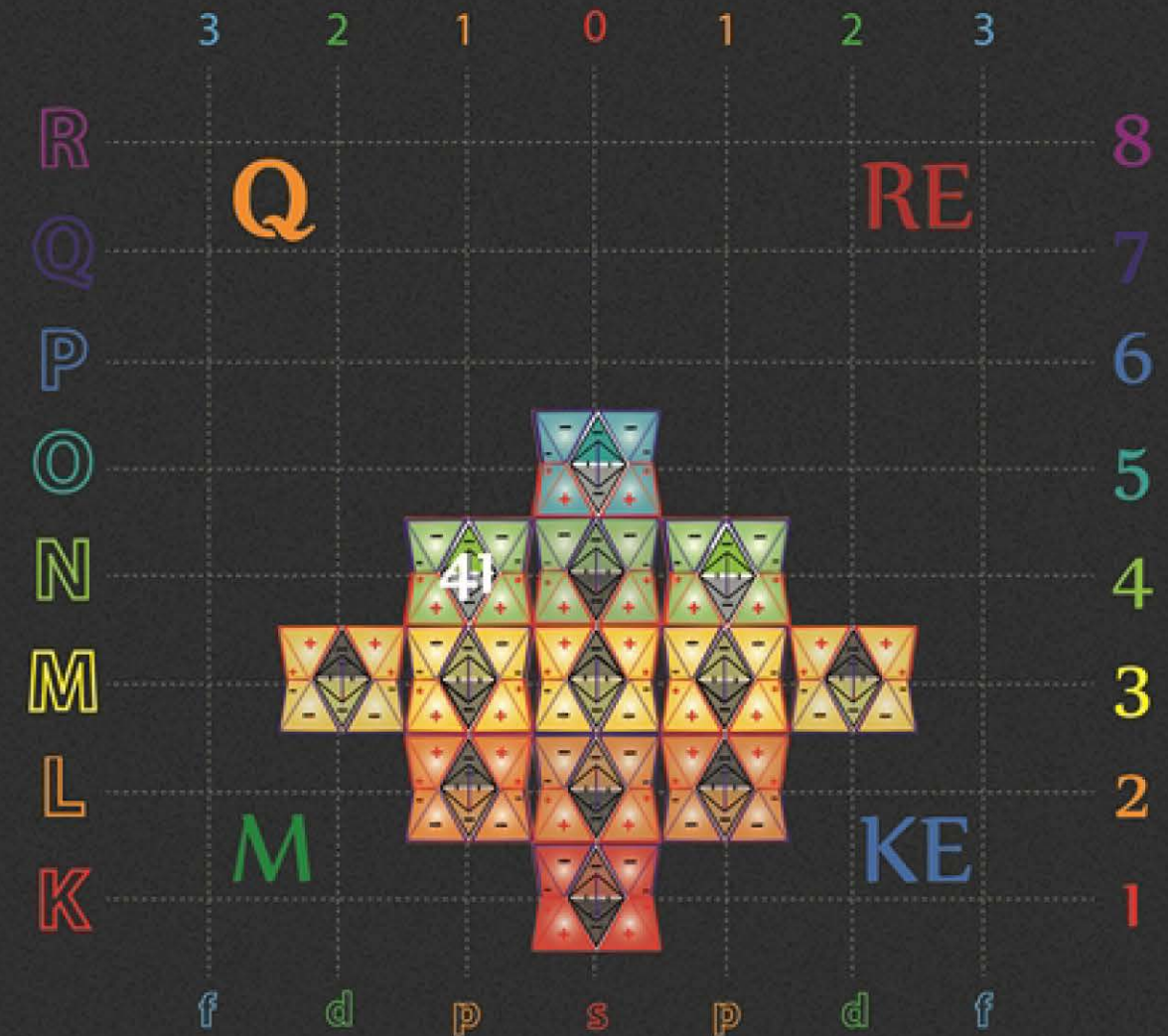
Azimuthal & Magnetic numbers



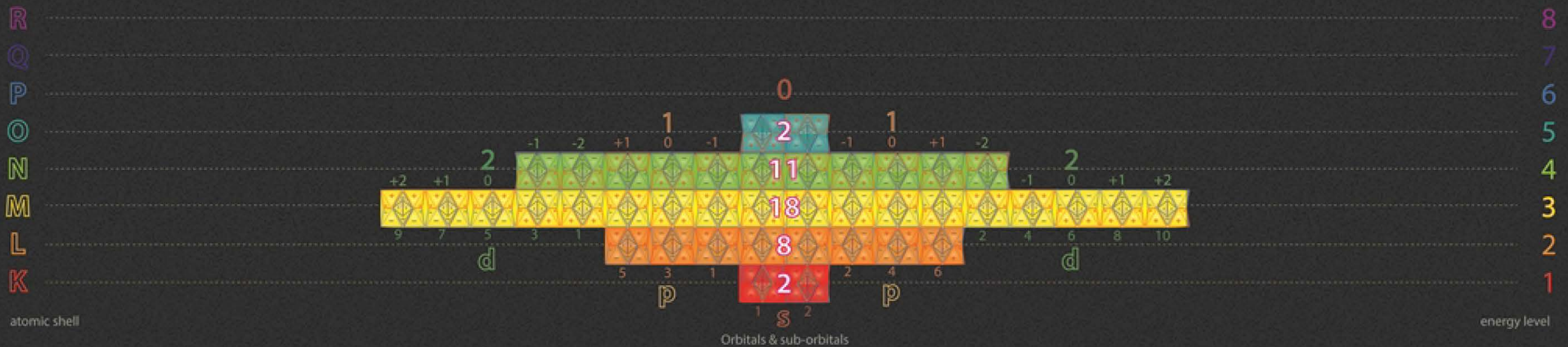
Tetryonics 51.40 - Zirconium atom



Niobium
41



Aufbau



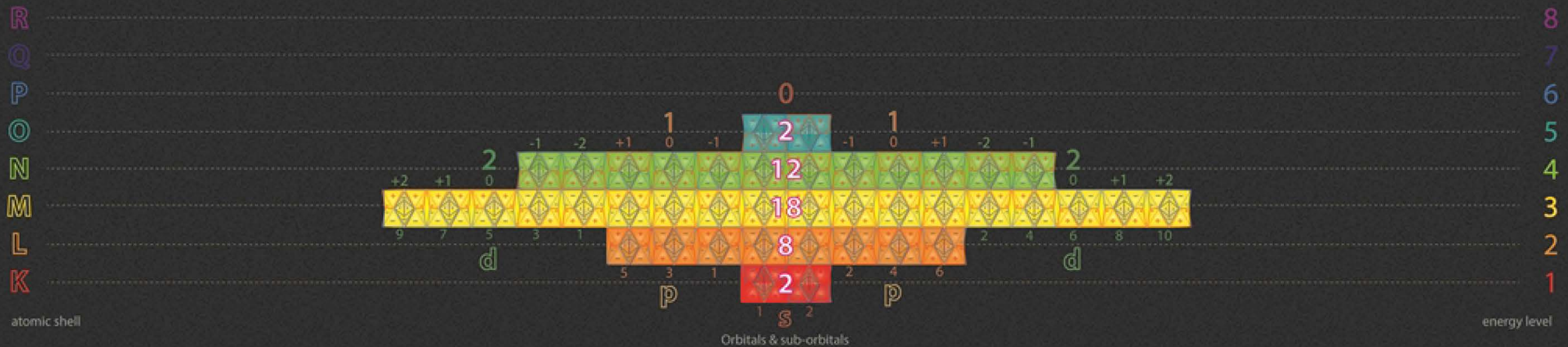
Tetryonics 51.41 - Niobium atom



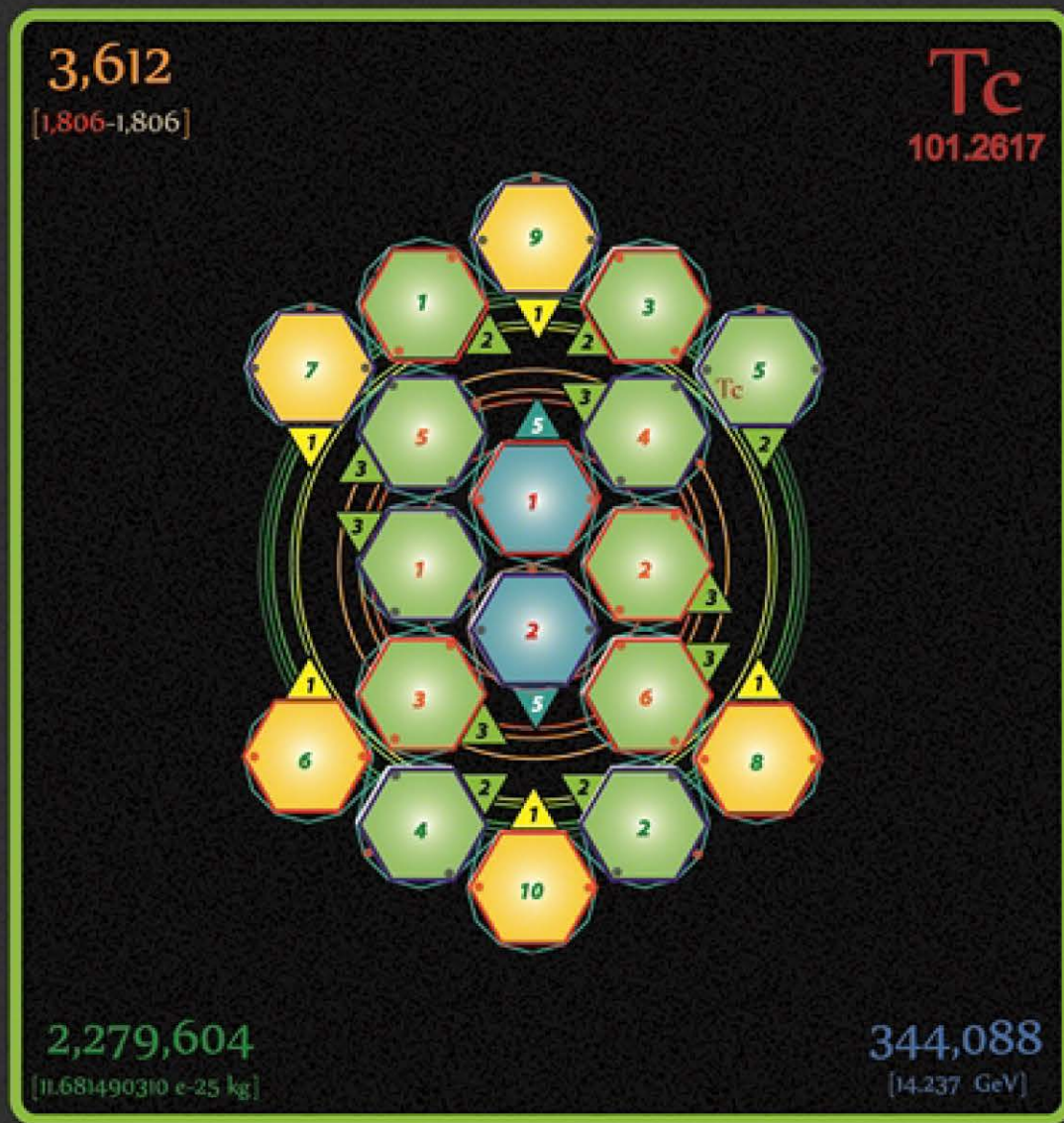
Molybdenum
42



Aufbau



Tetryonics 51.42 - Molybdenum atom



electron configuration



Technetium
43



43 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] m1-5

Transition Metal

Aufbau

Azimuthal & Magnetic numbers

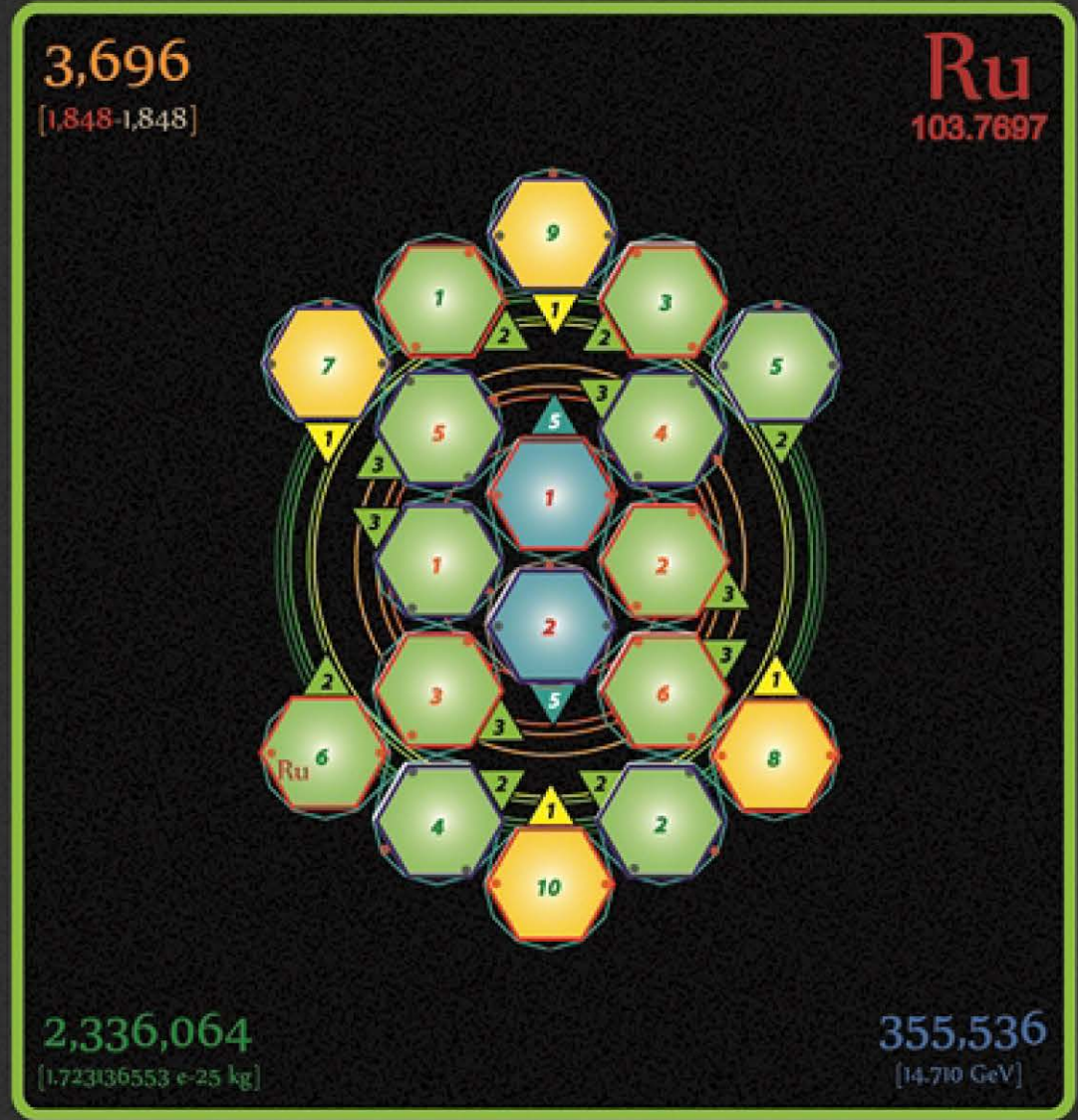


atomic shell

Orbitals & sub-orbitals

energy level

Tetryonics 51.43 - Technetium atom



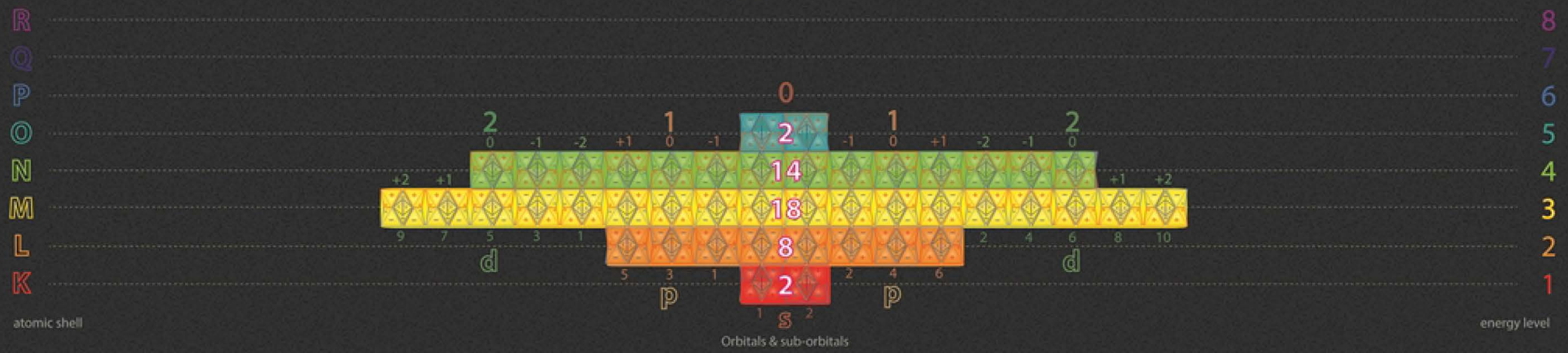
electron configuration
 $[Kr] 4d^6 5s^2$
 36

Ruthenium
 44

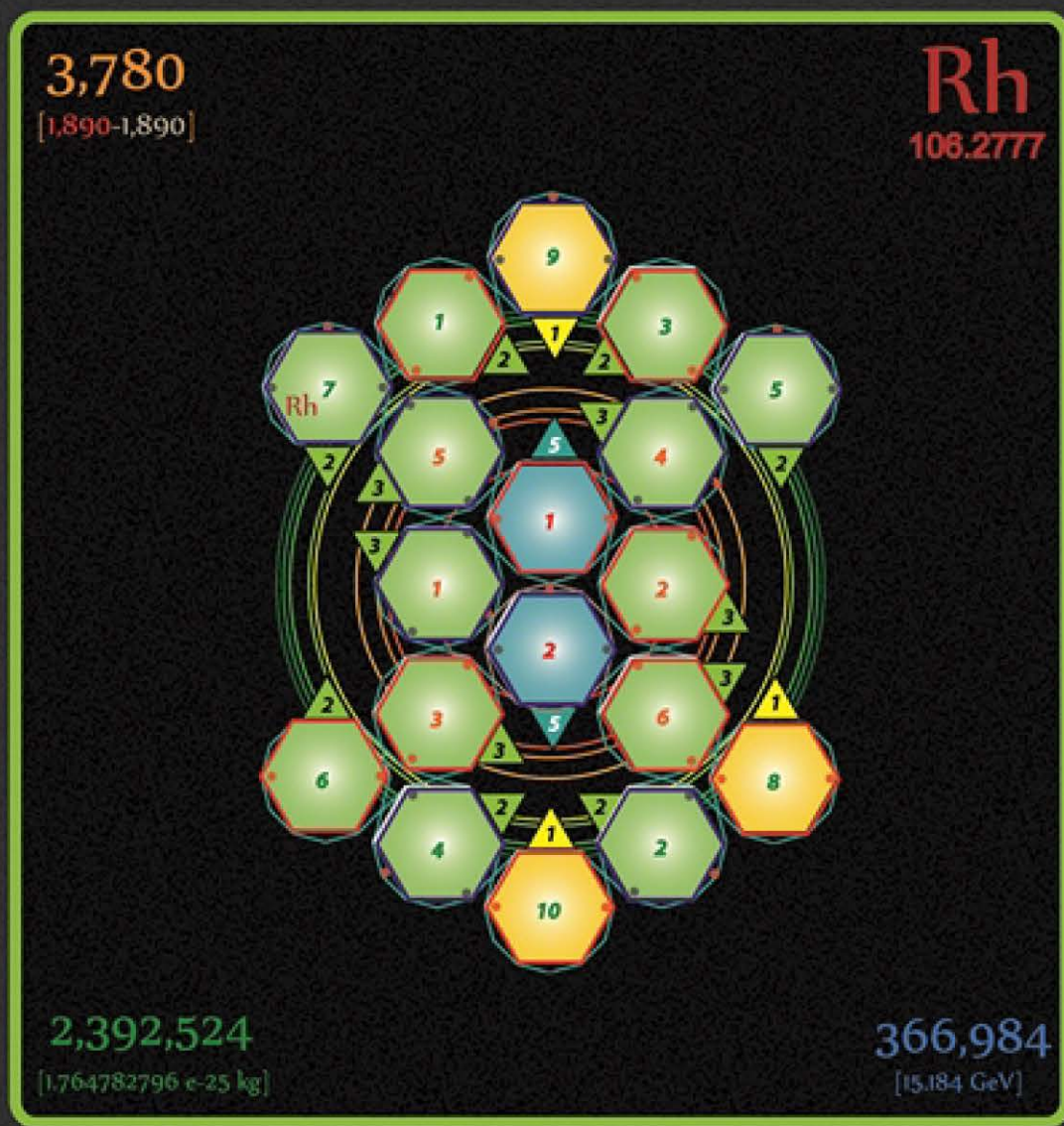


44 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-5 Transition Metal

Aufbau



Tetryonics 51.44 - Ruthenium atom



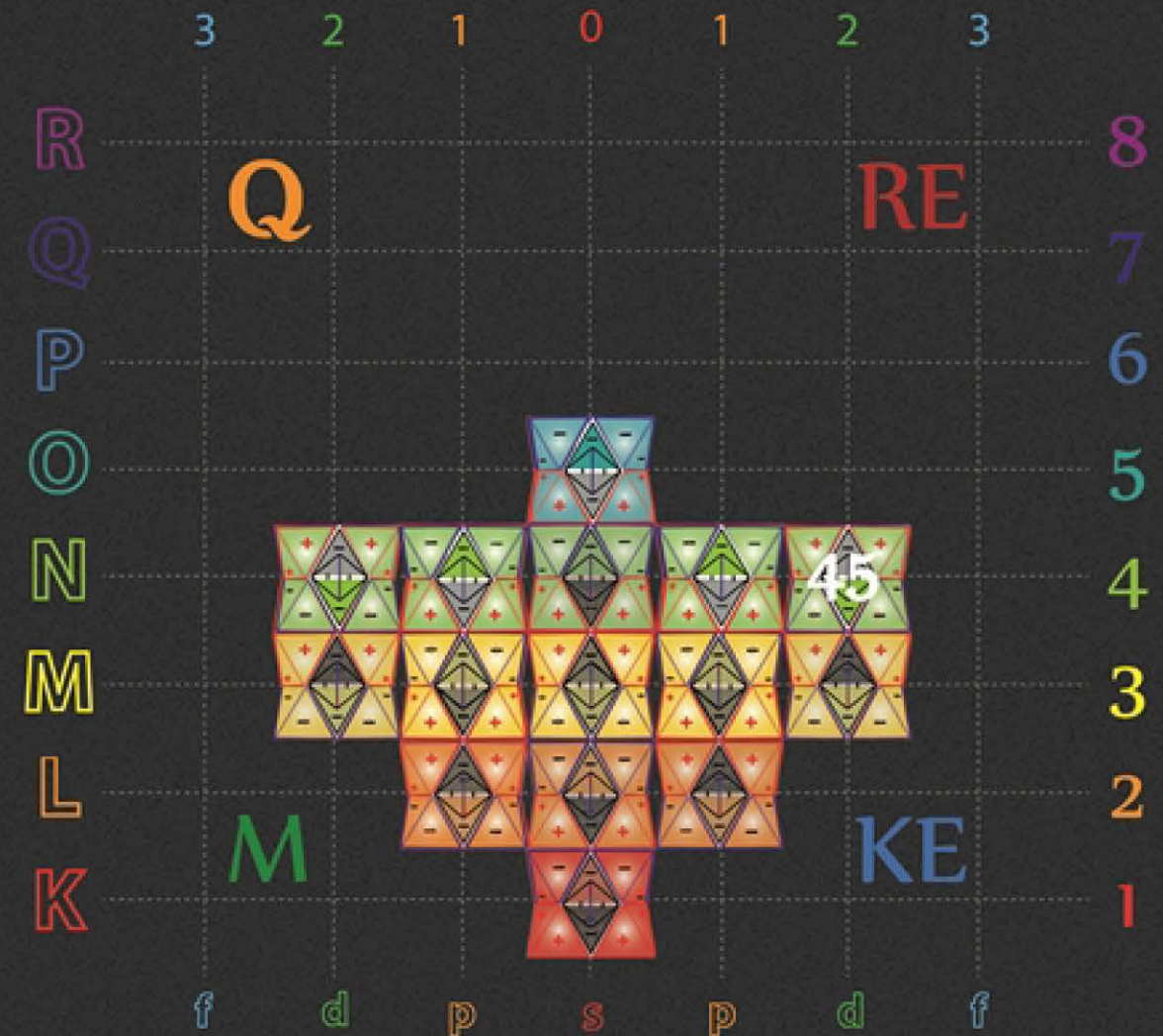
electron configuration

[Kr] 4d⁷ 5s²
36

Aufbau

Rhodium

45



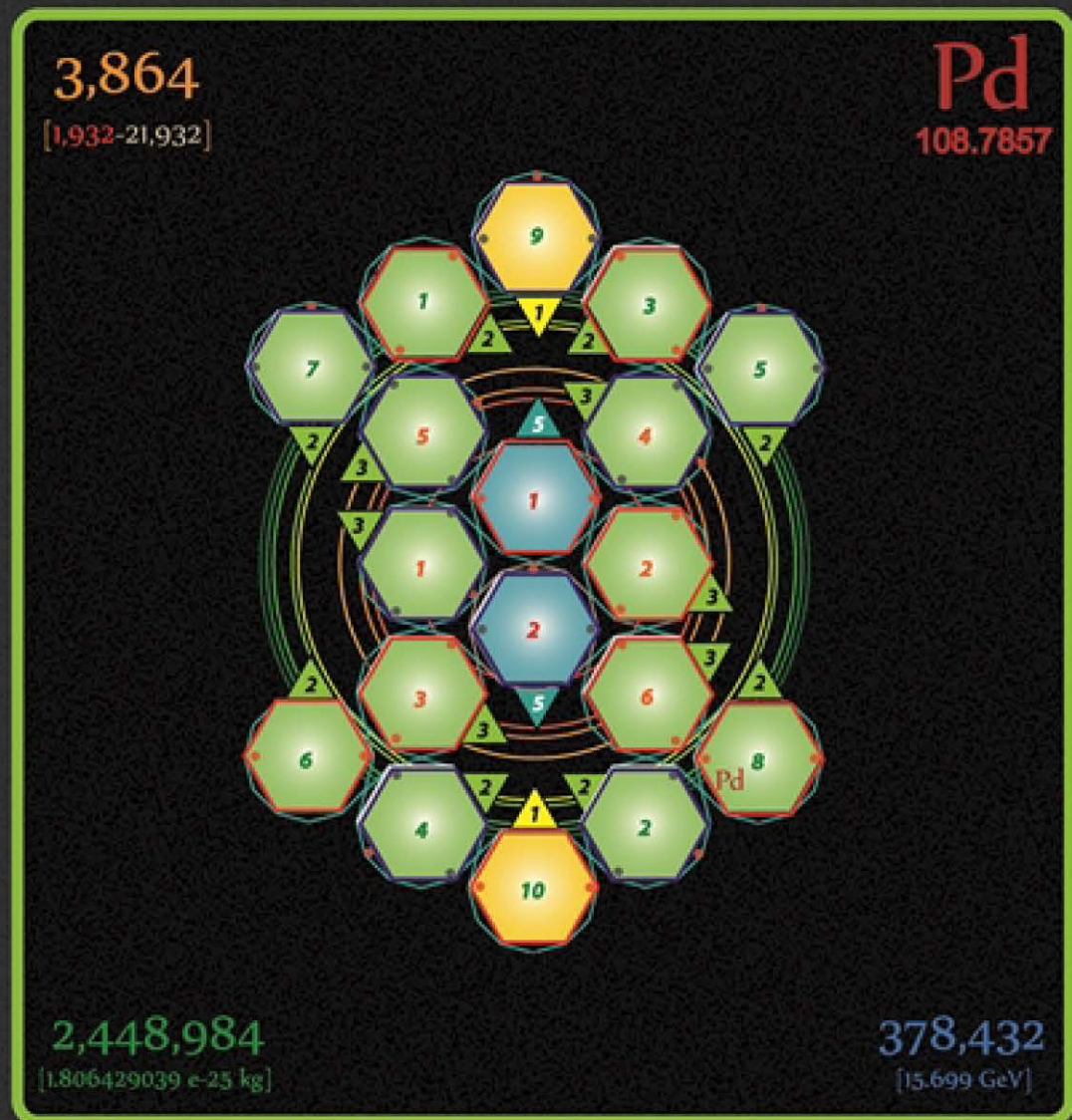
45 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Transition Metal

Azimuthal & Magnetic numbers



Tetryonics 51.45 - Rhodium atom



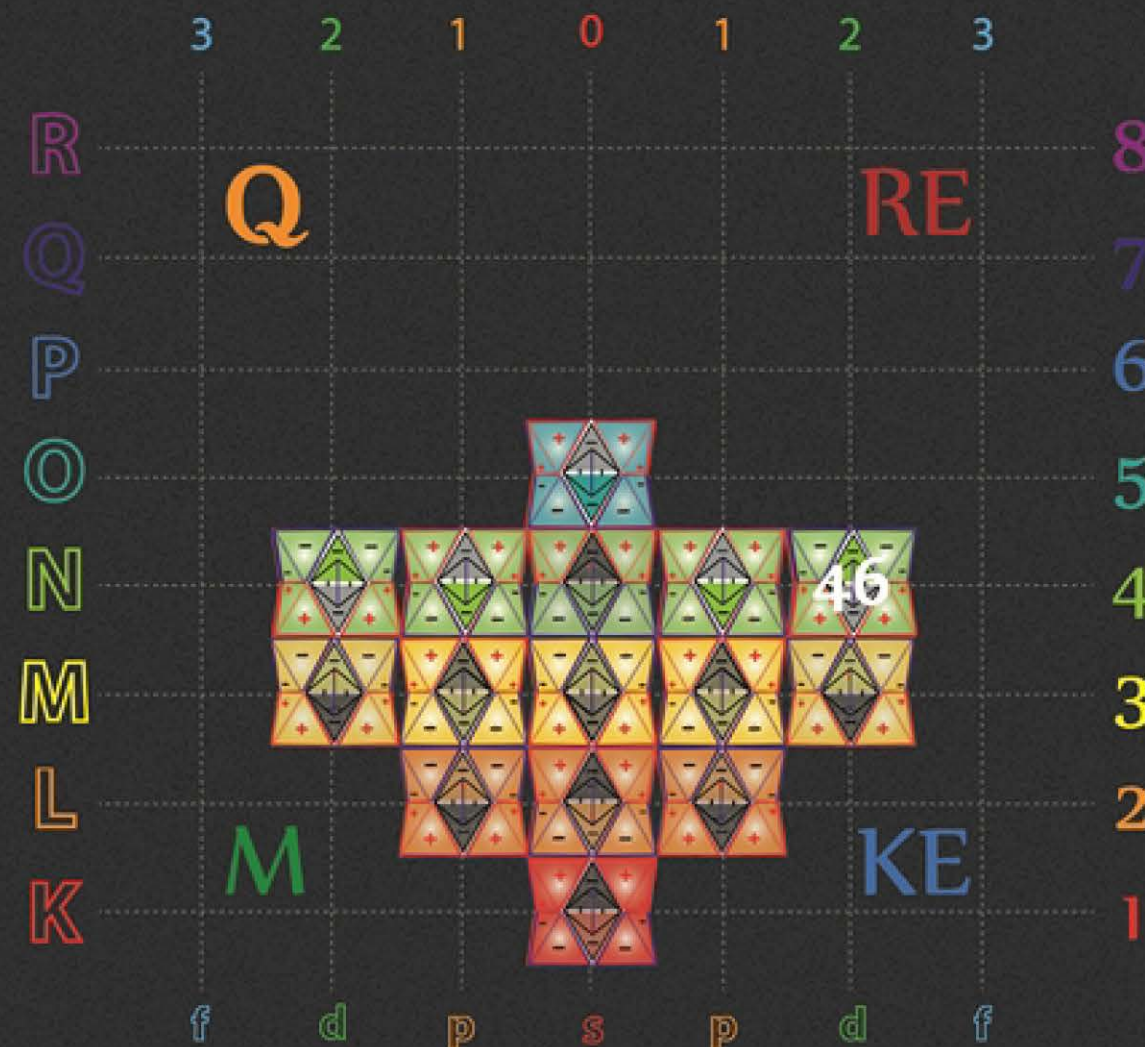
electron configuration



Aufbau

Palladium

46



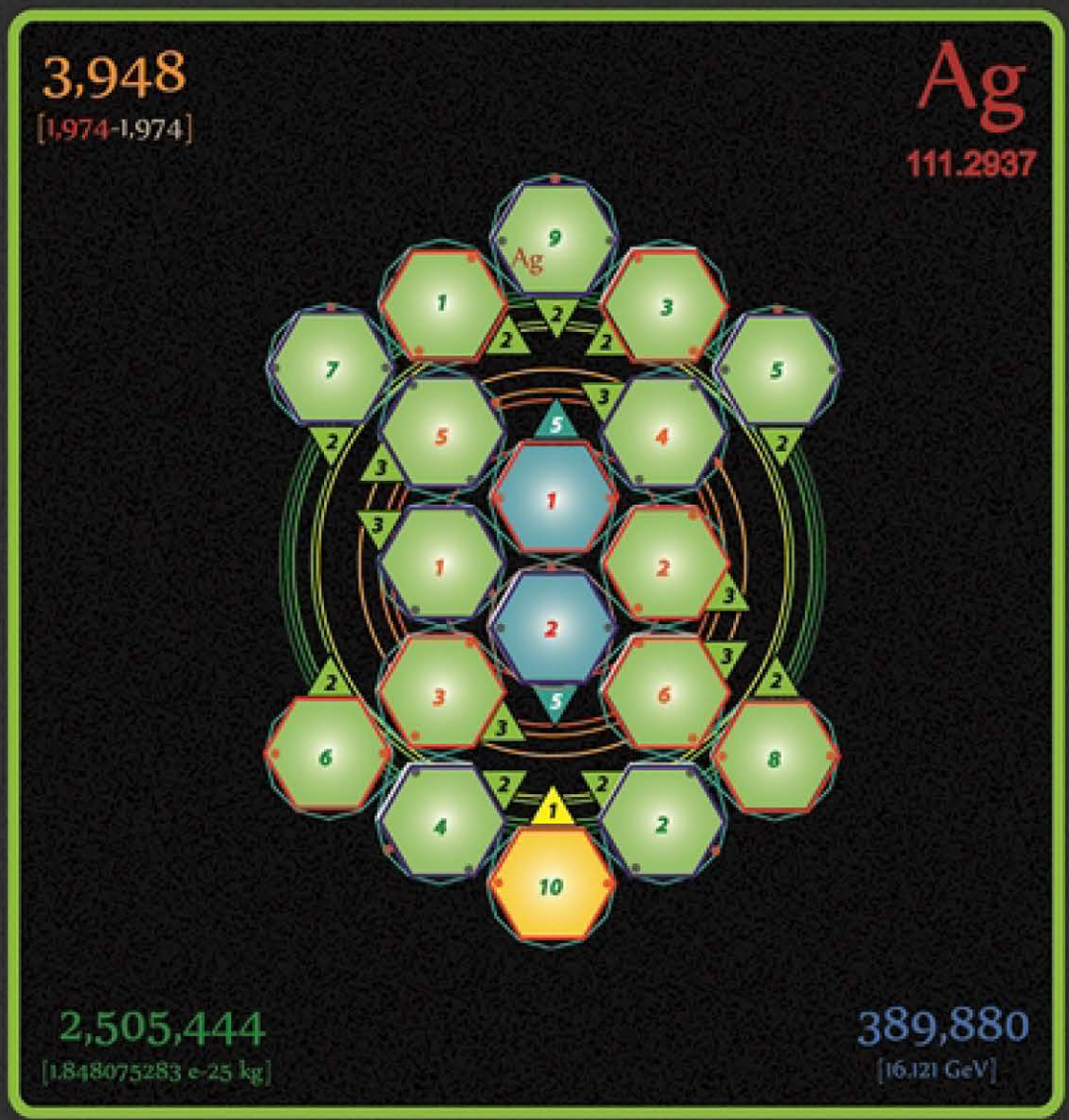
46 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Transition Metal

Azimuthal & Magnetic numbers



Tetryonics 51.46 - Palladium atom



3,948
[1,974-1,974]

Ag
111.2937

2,505,444
[1,848075283 e-25 kg]

389,880
[16,121 GeV]

electron configuration
[Kr] 4d⁹ 5s²
36

Silver

47



47 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Post
Transition
Metal

Aufbau

Azimuthal & Magnetic numbers

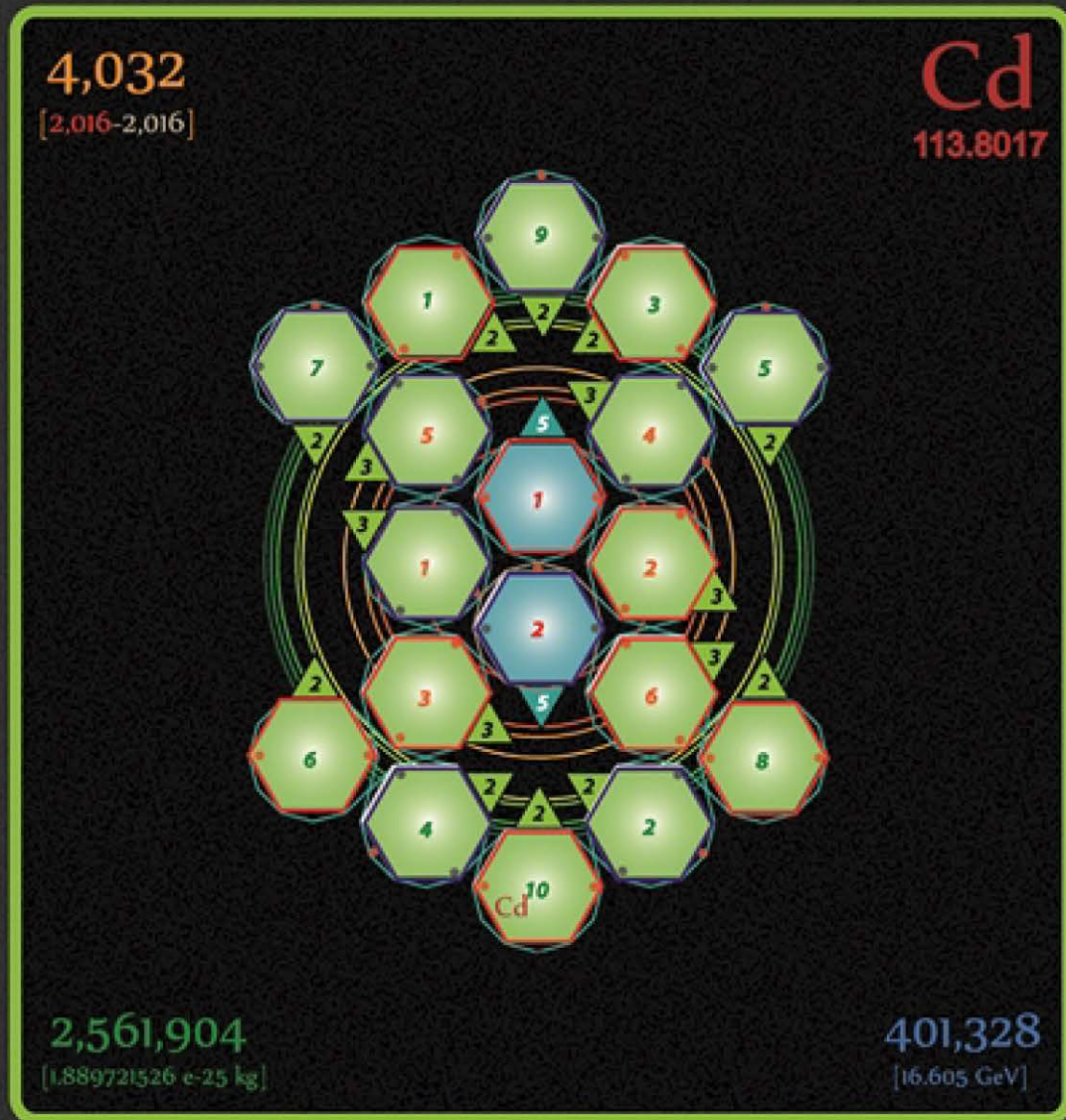


atomic shell

Orbitals & sub-orbitals

energy level

Tetryonics 51.47 - Silver atom



Cadmium

48



electron configuration

$[\text{Kr}] 4d^{10} 5s^2$
36

48 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Post
Transition
Metal

Aufbau

Azimuthal & Magnetic numbers



atomic shell

Orbitals & sub-orbitals

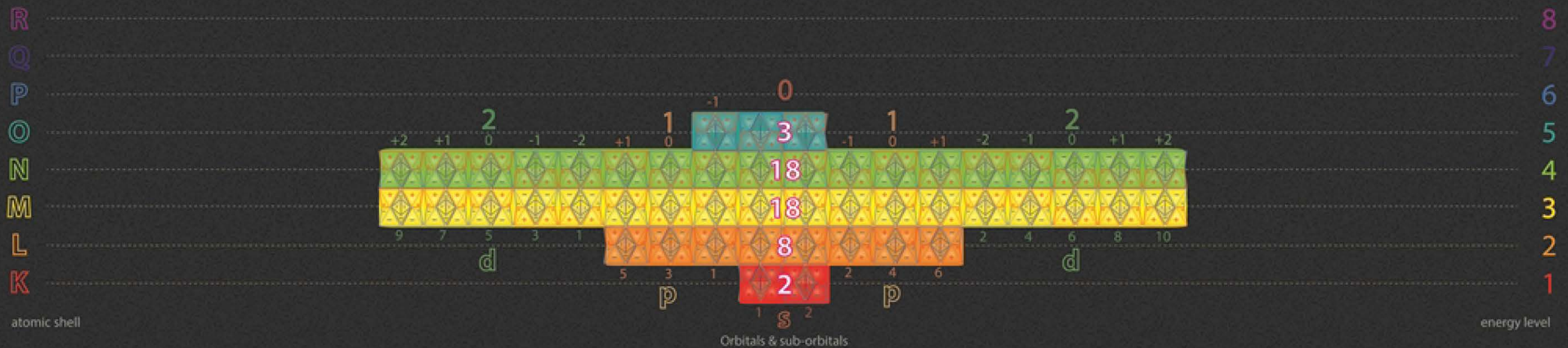
energy level

Tetryonics 51.48 - Cadmium atom



electron configuration
 $[Kr] 4d^{10} 5s^2 5p^1$
 36

Aufbau



Indium

49

49 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-5

Tetryonics 51.49 - Indium atom



electron configuration
 $[Kr] 4d^{10} 5s^2 5p^2$
 36

Aufbau

Tin
 50



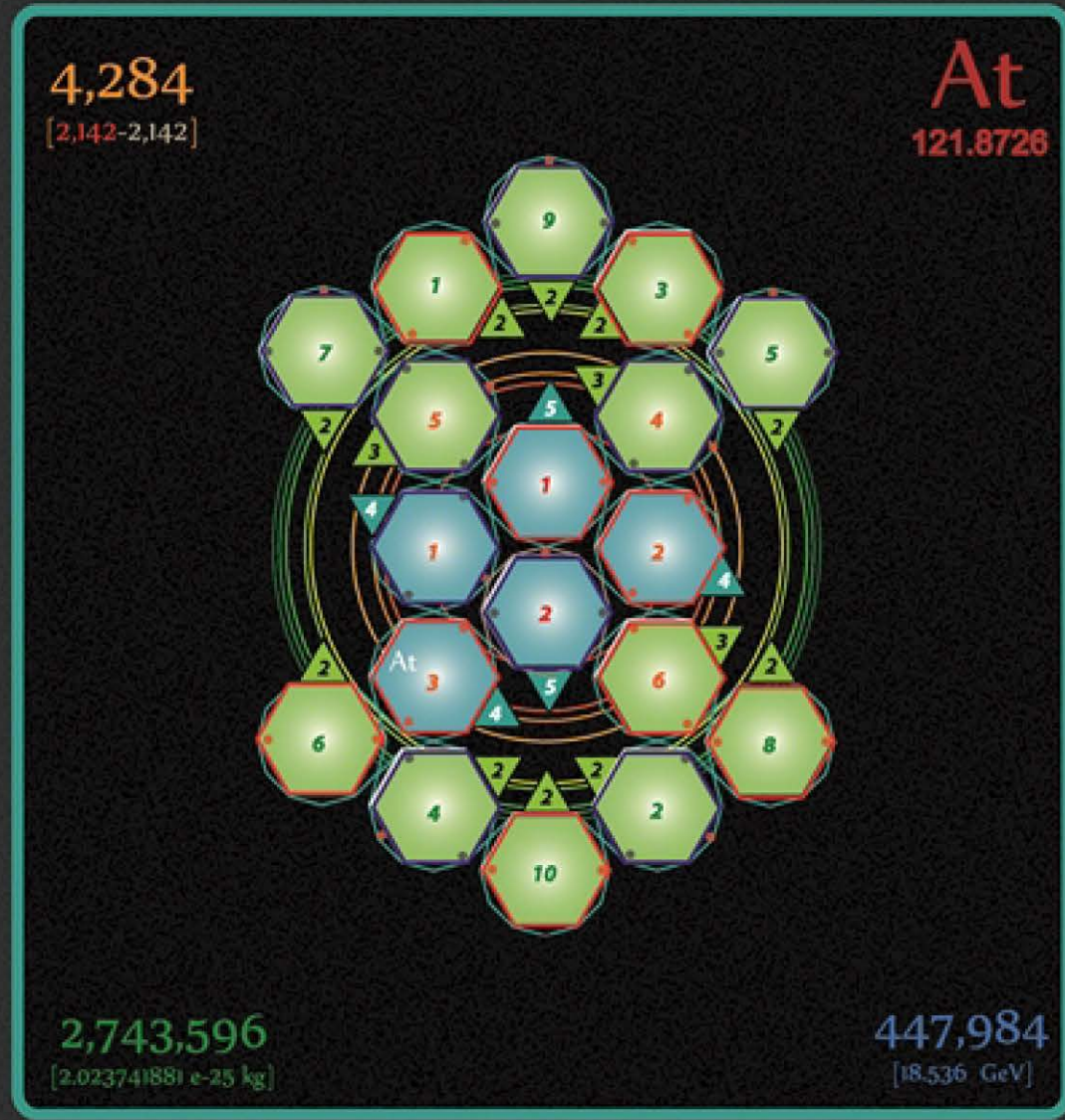
50 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-5$ Metalloid

Azimuthal & Magnetic numbers



Orbitals & sub-orbitals

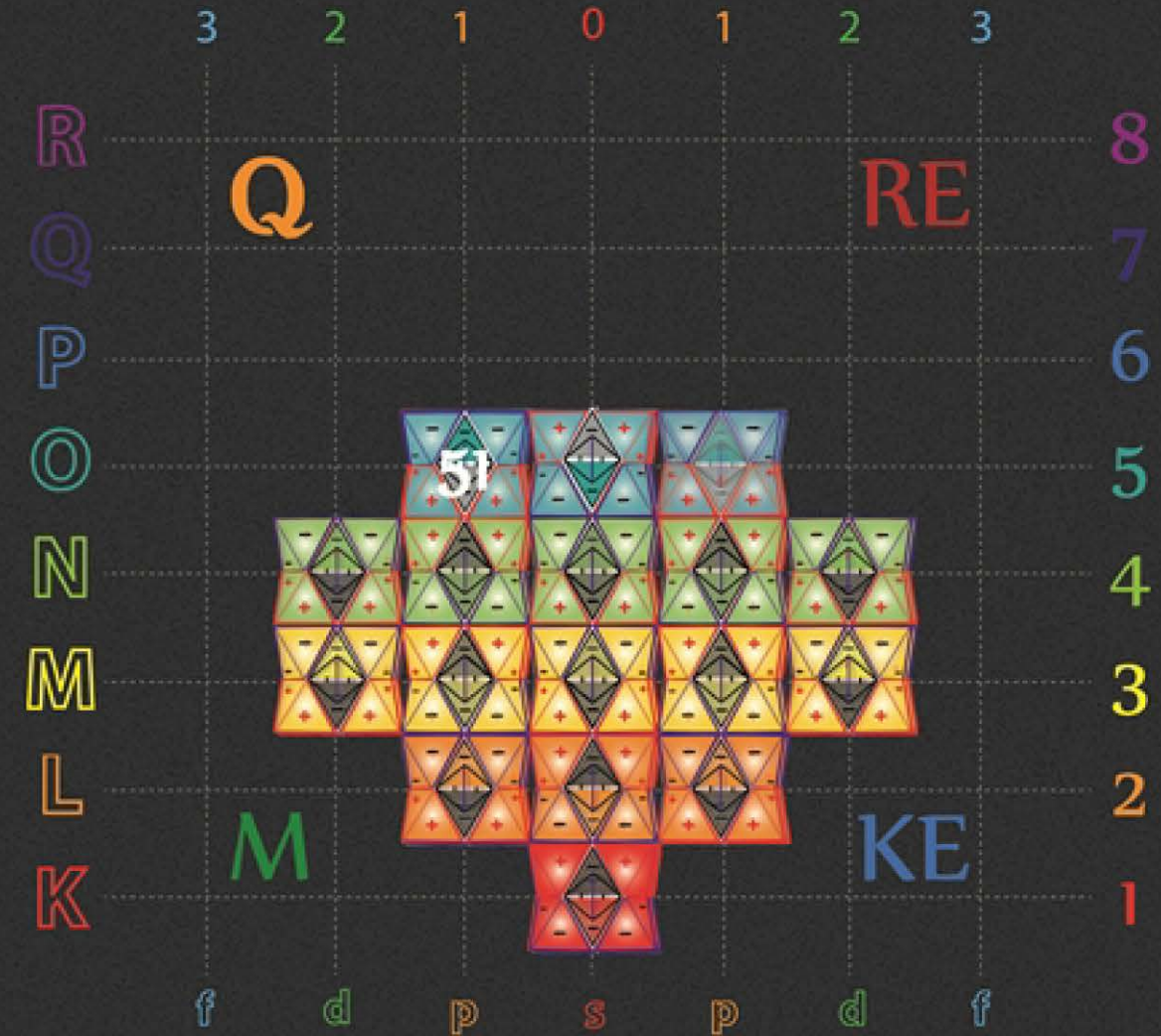
Tetryonics 51.50 - Tin atom



electron configuration
 $[Kr] 4d^{10} 5s^2 5p^3$
 36

Aufbau

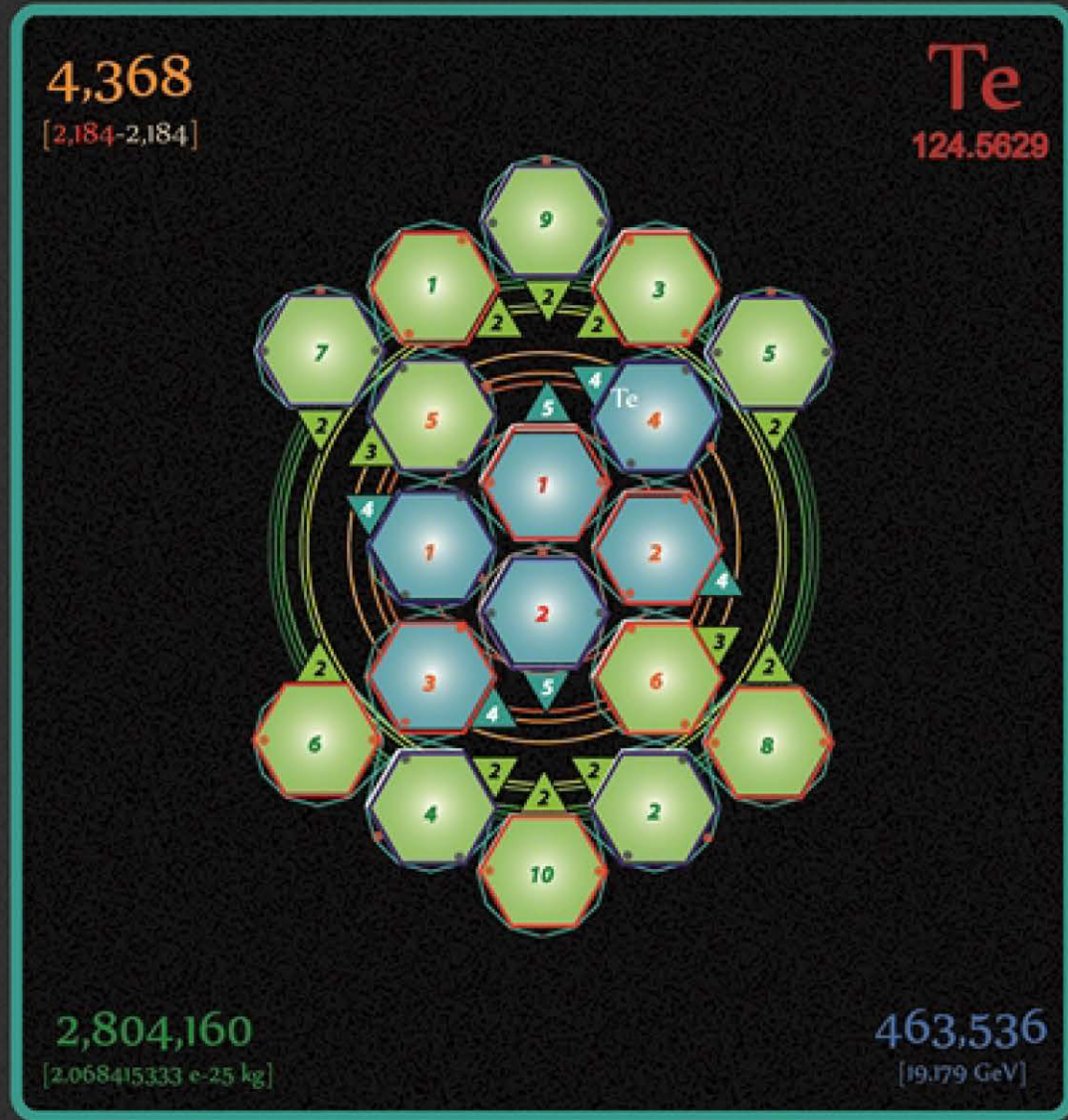
Antimony
51



Azimuthal & Magnetic numbers



Tetryonics 51.51 - Antimony atom



electron configuration
[Kr] 4d¹⁰ 5s² 5p⁴
36

Aufbau



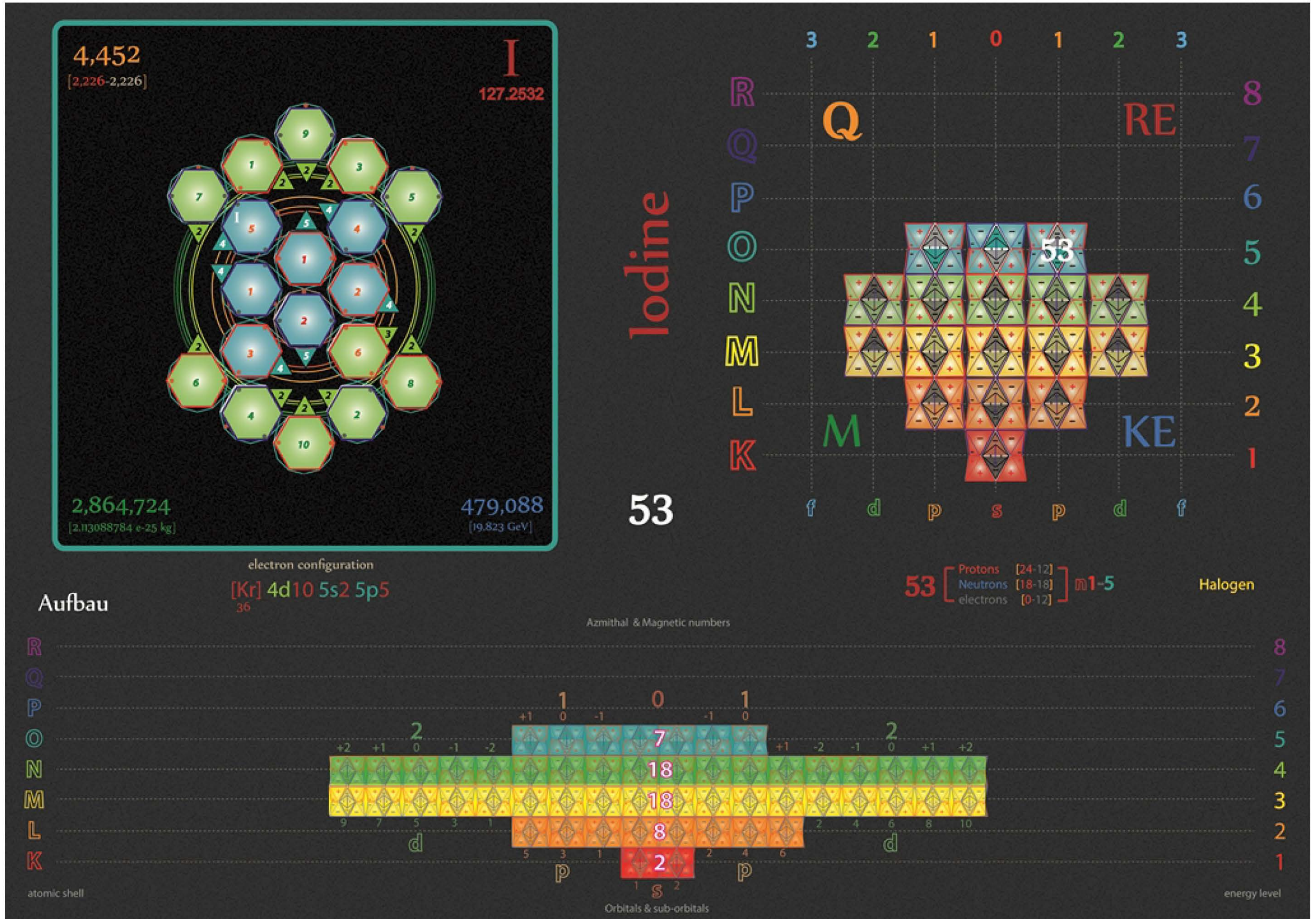
Tellurium

52

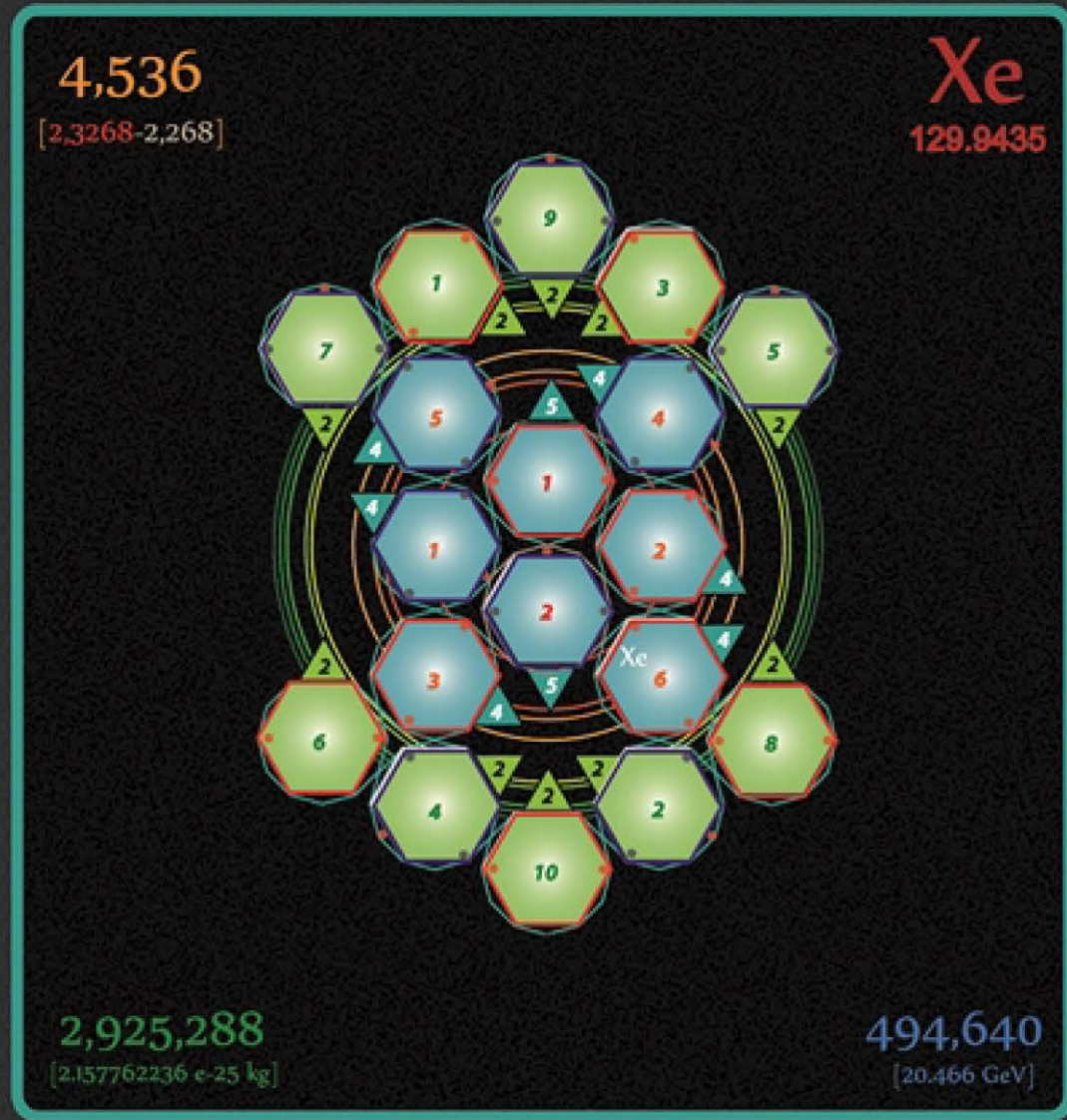


52 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5 Metalloid

Tetryonics 51.52 - Tellurium atom



Tetryonics 51.53 - Iodine atom



Xenon

54



54 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-5

Noble Gas

Aufbau

Azimuthal & Magnetic numbers



Tetryonics 51.54 - Xenon atom

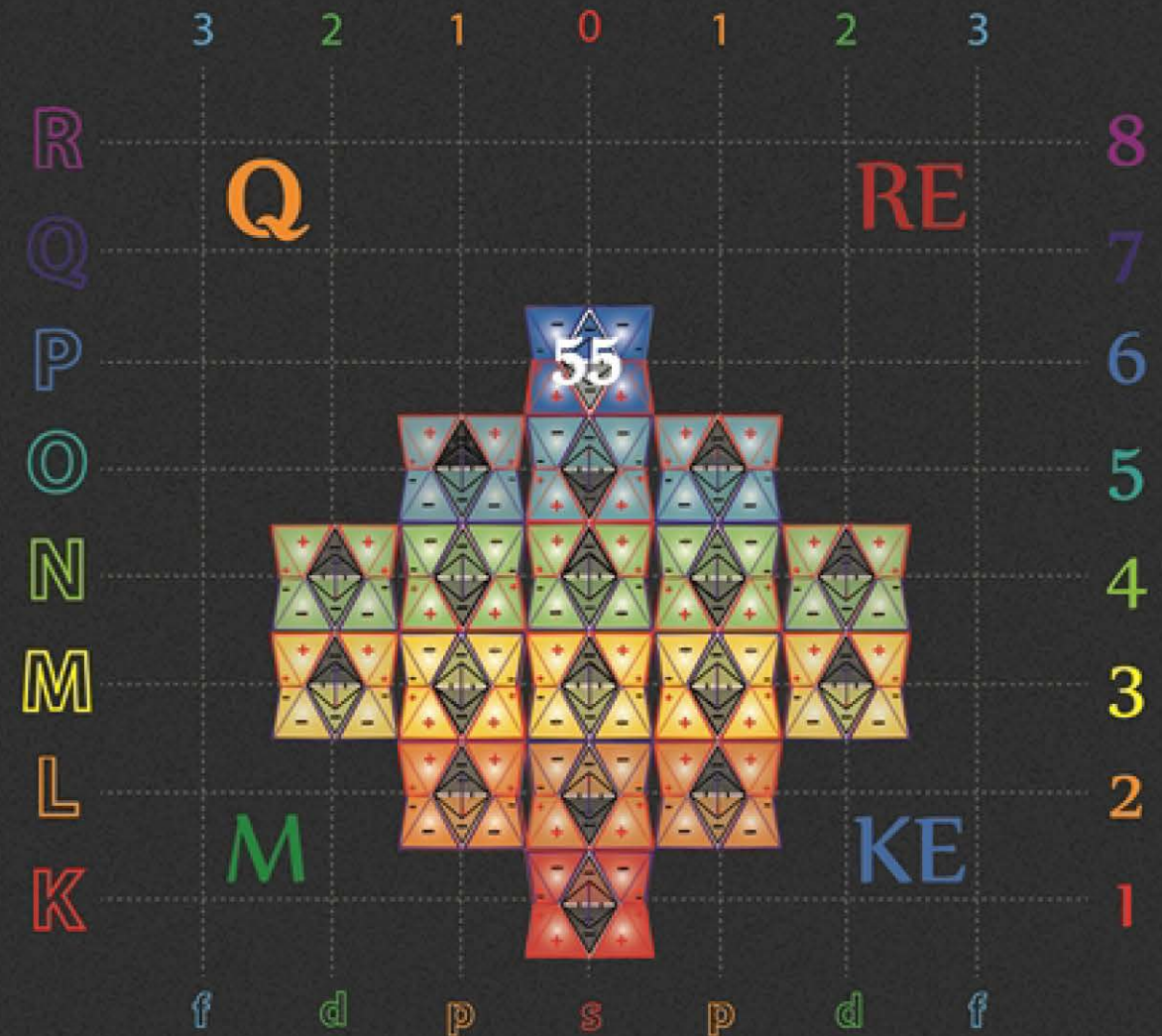


electron configuration



Caesium

55

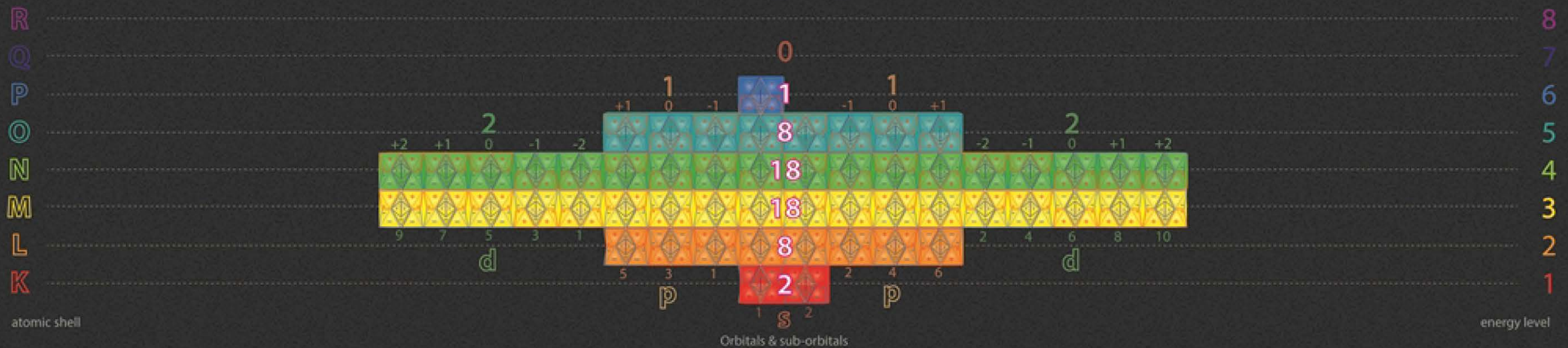


55 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-6

Alkali
Metal

Aufbau

Azimuthal & Magnetic numbers

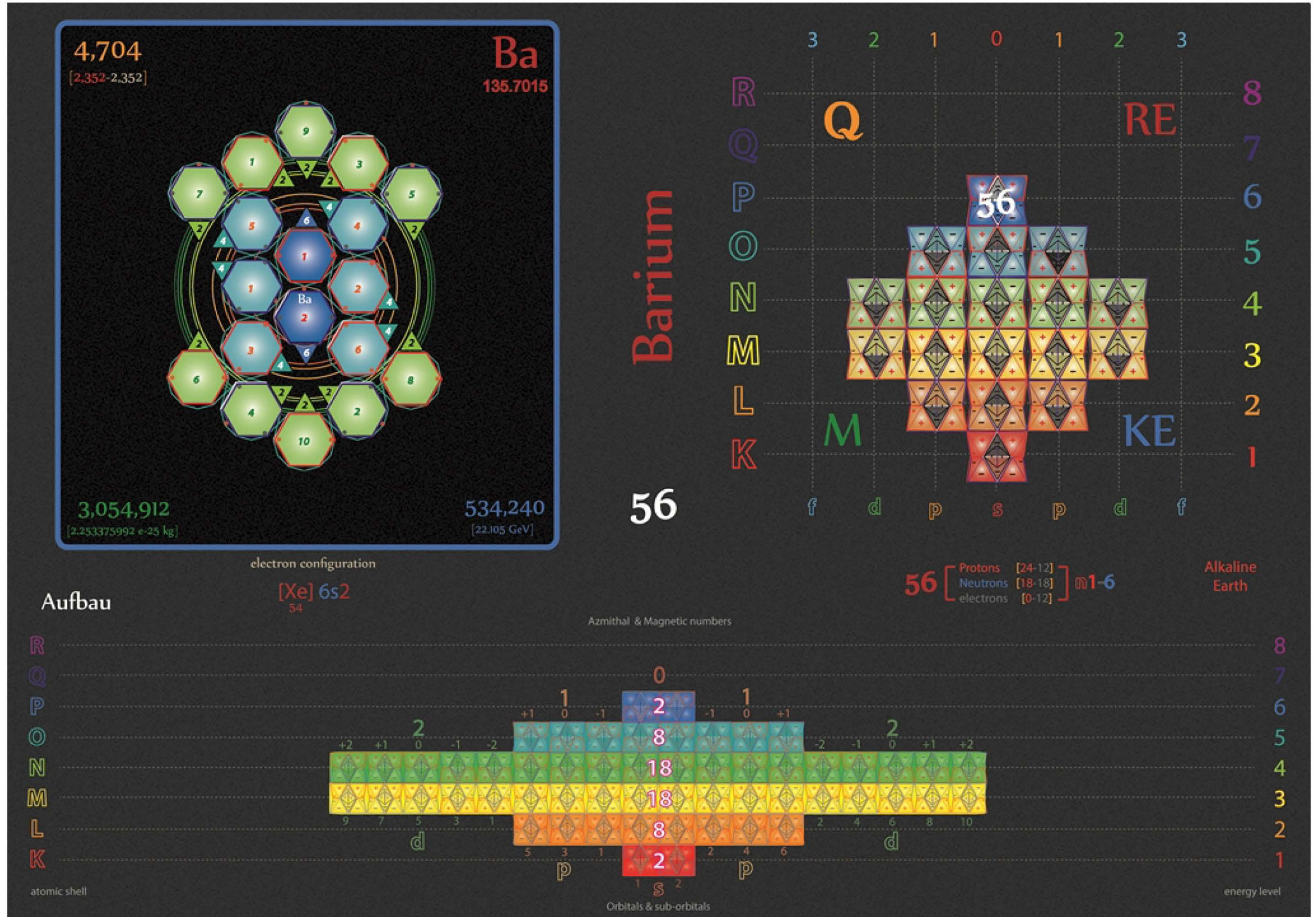


atomic shell

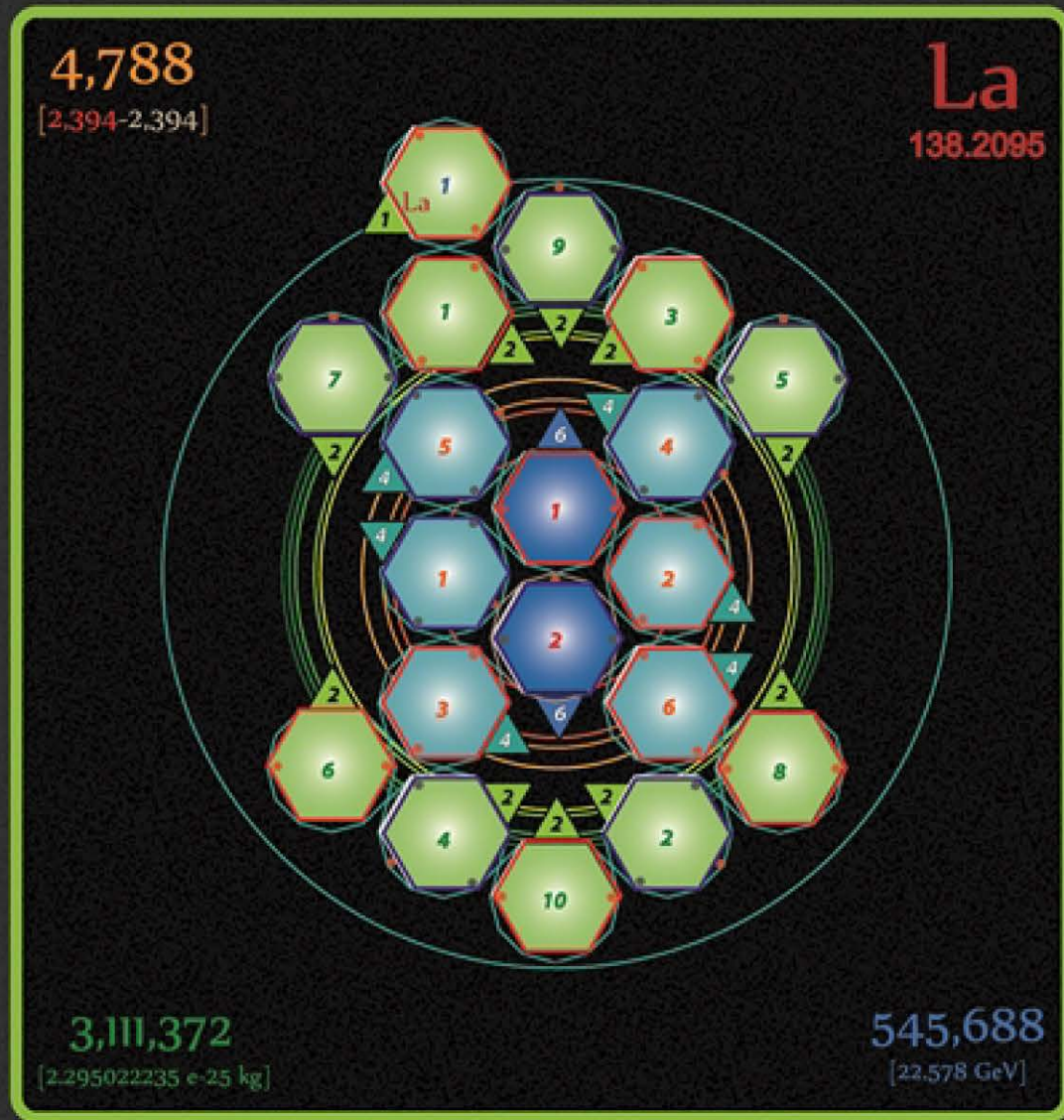
Orbitals & sub-orbitals

energy level

Tetryonics 51.55 - Caesium atom



Tetryonics 51.56 - Barium atom



electron configuration



Lanthanum

57



57 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-6

Lanthanoid

Aufbau

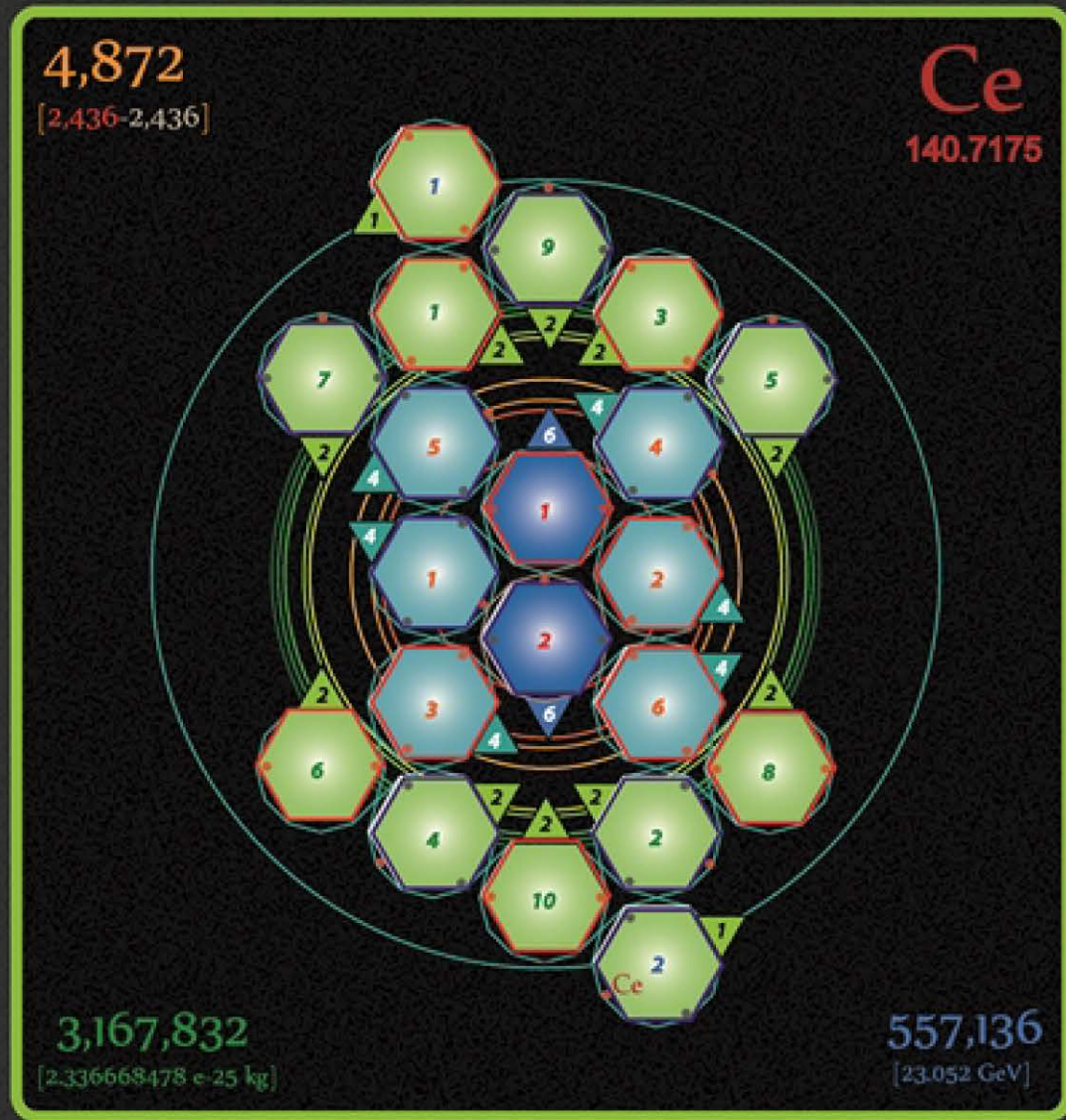
Azimuthal & Magnetic numbers



atomic shell

Orbitals & sub-orbitals

energy level



electron configuration



Cerium

58

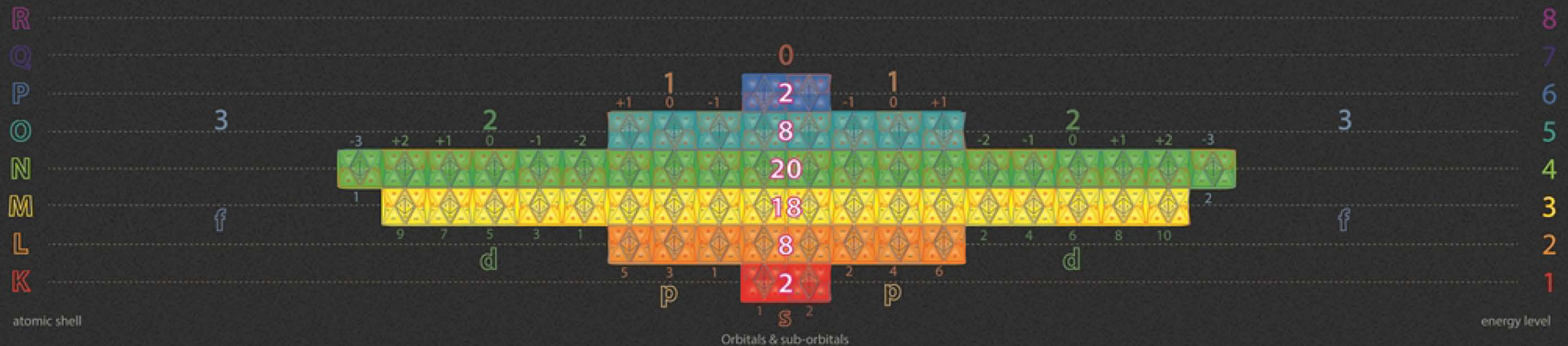


58 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-6

Lanthanoid

Aufbau

Azimuthal & Magnetic numbers

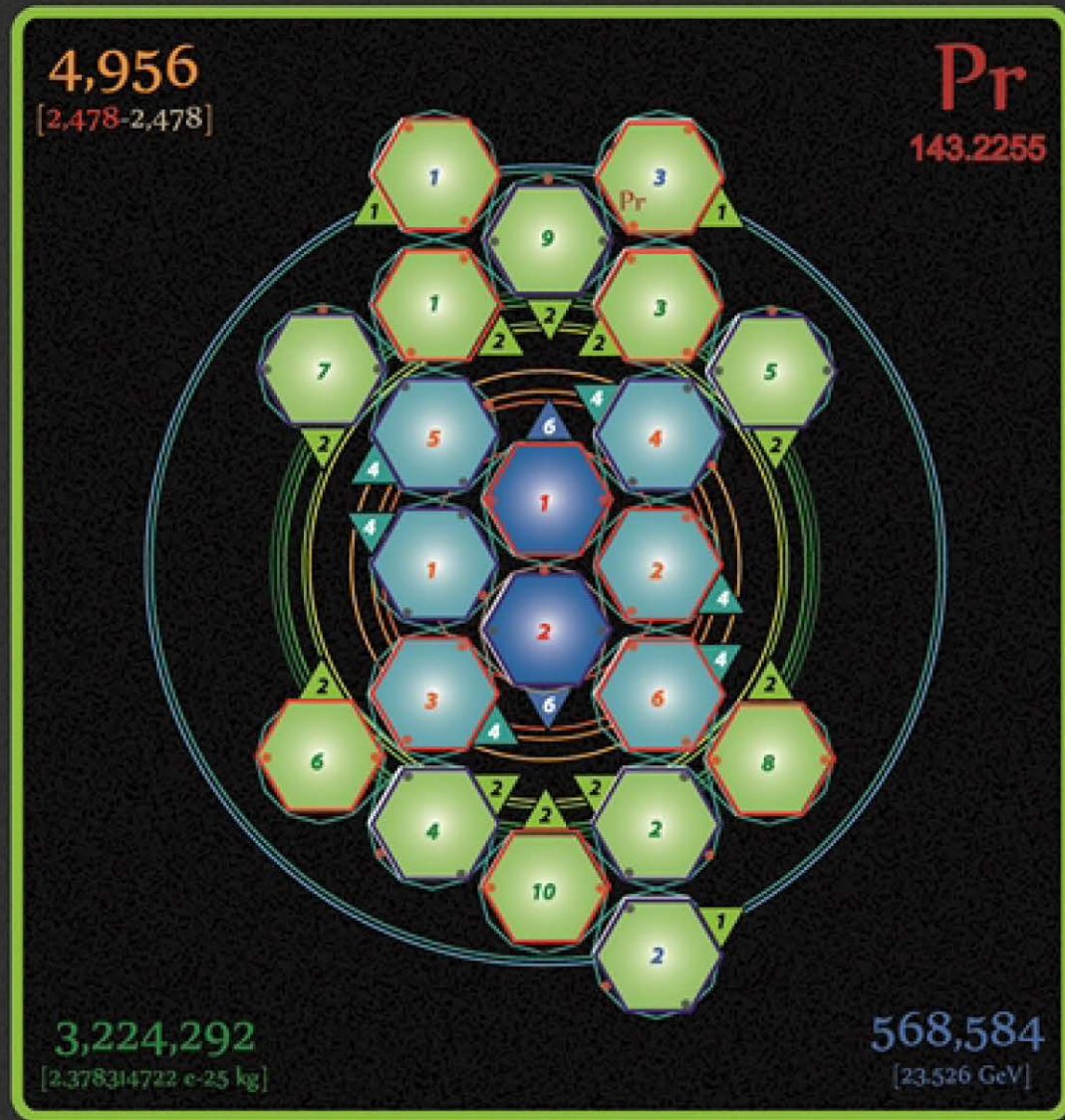


atomic shell

Orbitals & sub-orbitals

energy level

Tetryonics 51.58 - Cerium atom



electron configuration
[Xe] 4f³ 6s²
54

Praseodymium
59



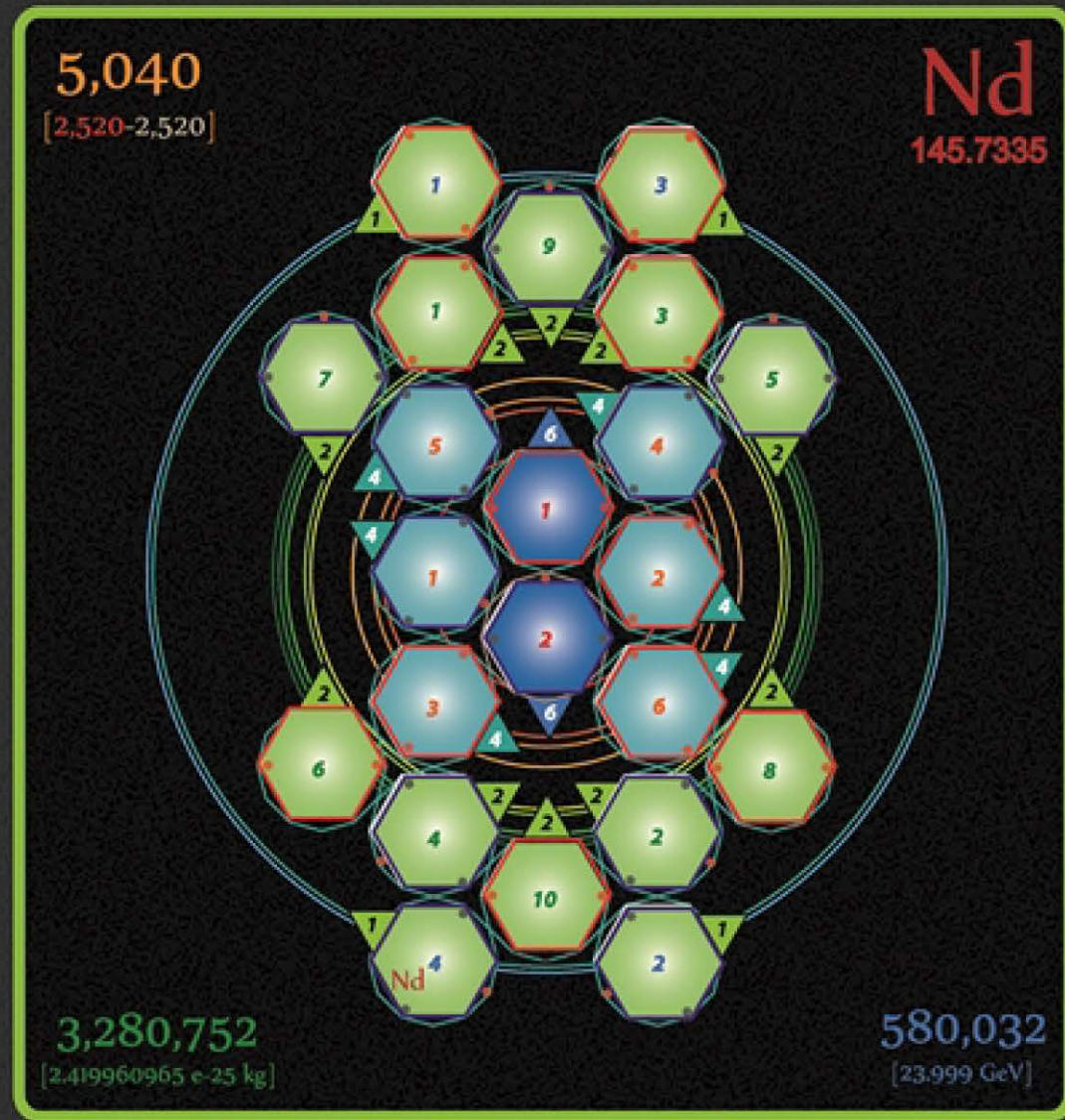
59 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-6 Lanthanoid

Aufbau

Azimuthal & Magnetic numbers



Tetryonics 51.59 - Praseodymium atom

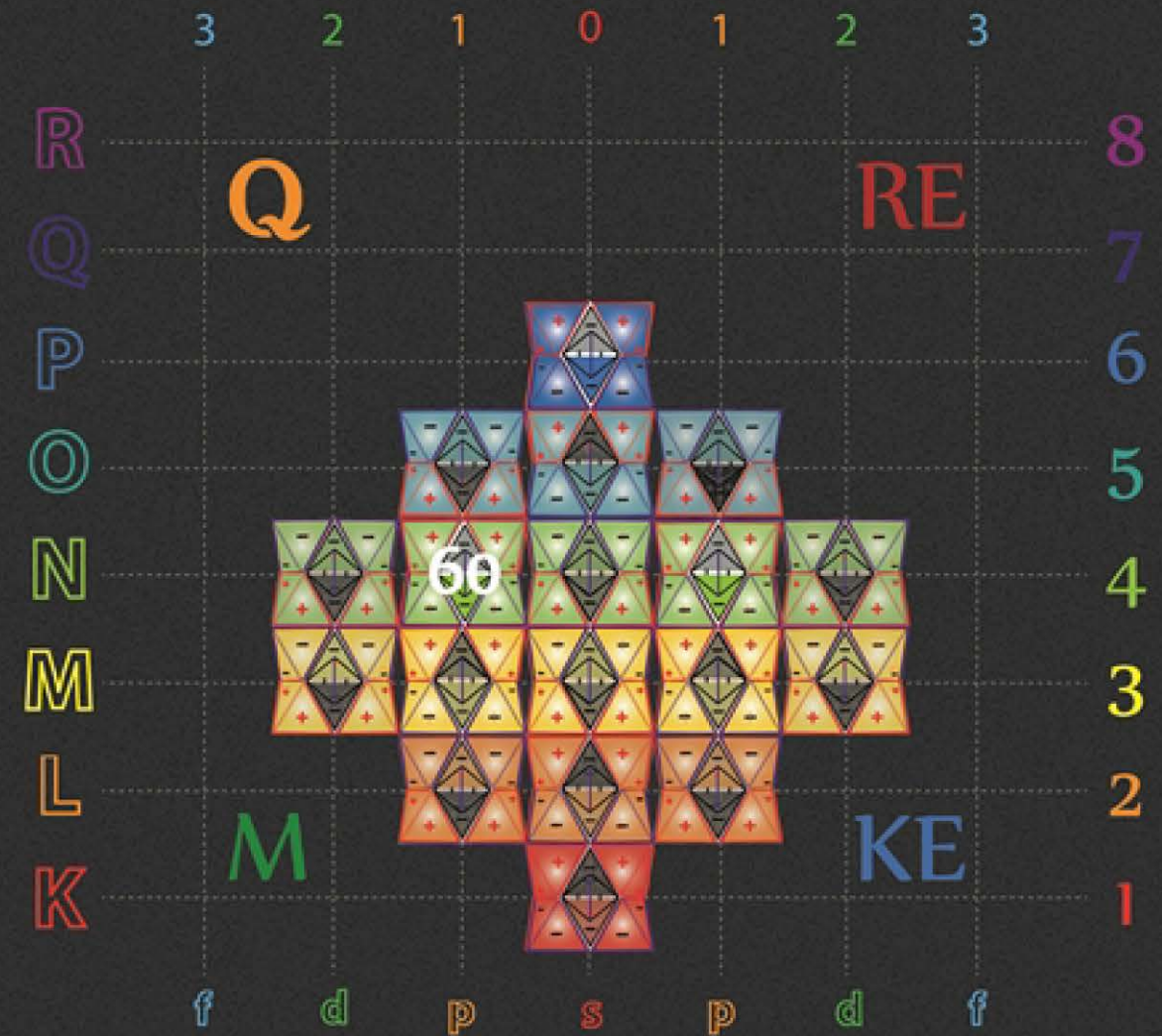


electron configuration



Aufbau

Neodymium
60

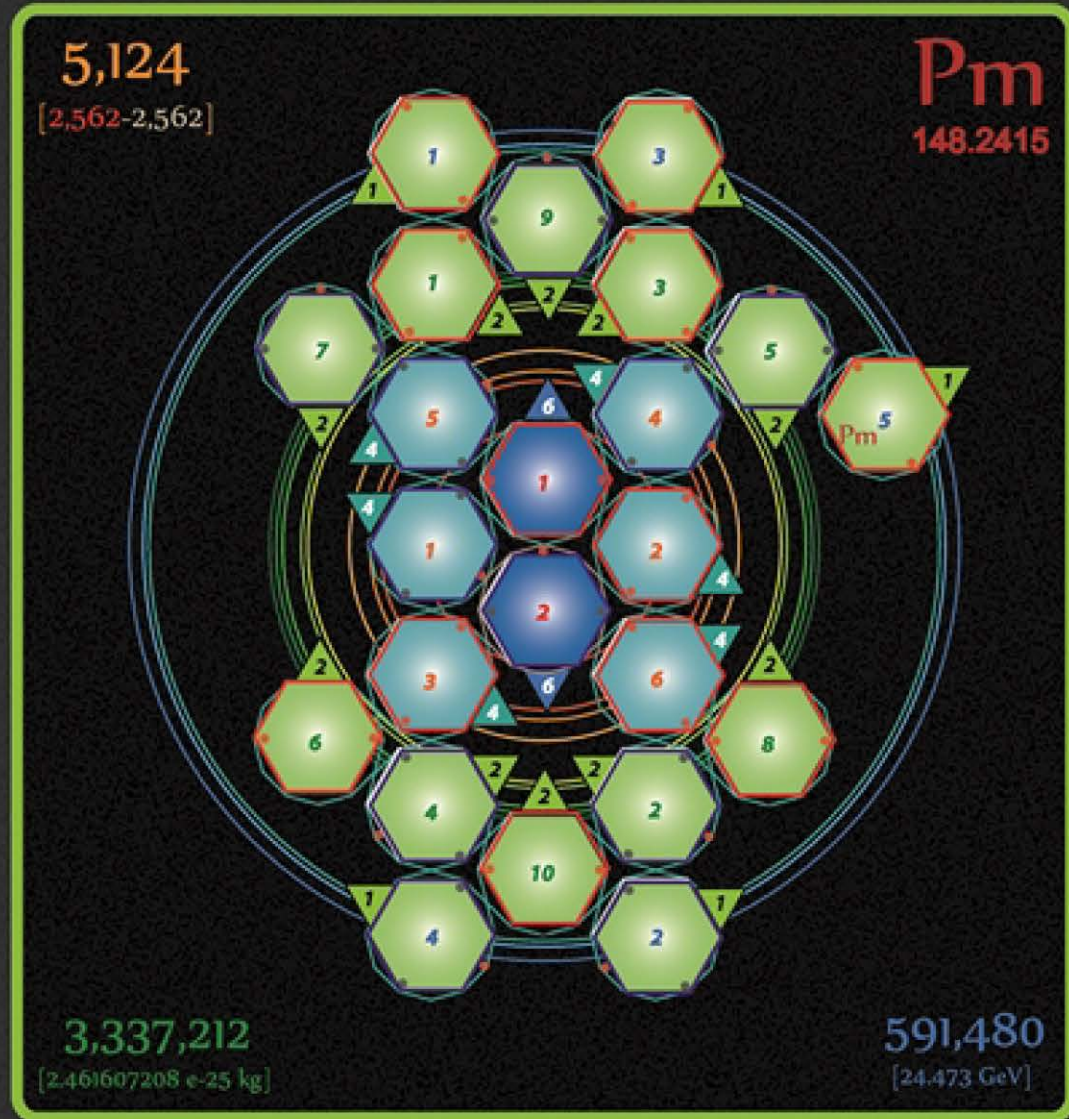


60 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n1-6$ Lanthanoid

Azimuthal & Magnetic numbers



Tetryonics 51.60 - Neodymium atom



electron configuration
 $[Xe] 4f^5 6s^2$
 54

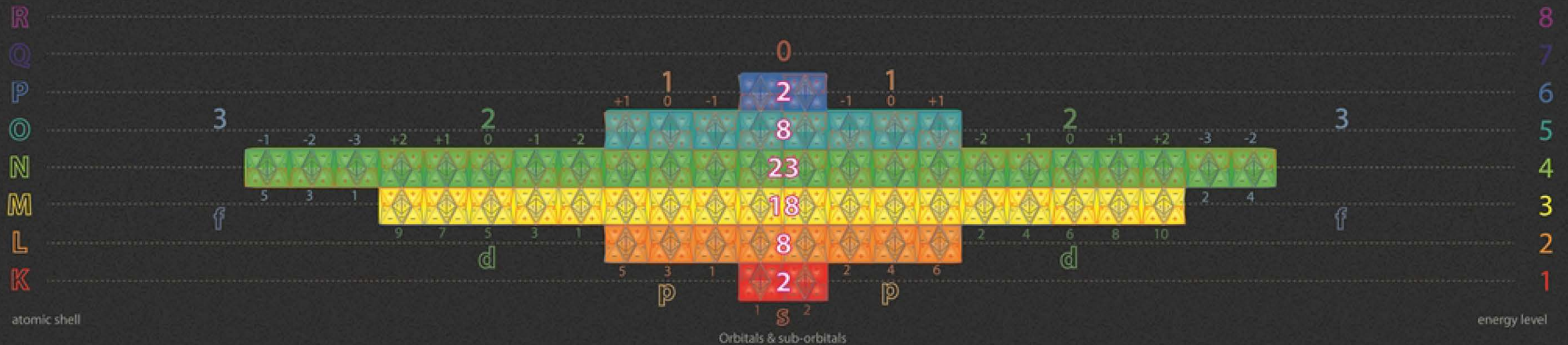
Promethium

61



61 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-6$ Lanthanoid

Aufbau



Tetryonics 51.61 - Promethium atom



electron configuration
 $[Xe] 4f^6 6s^2$
 54

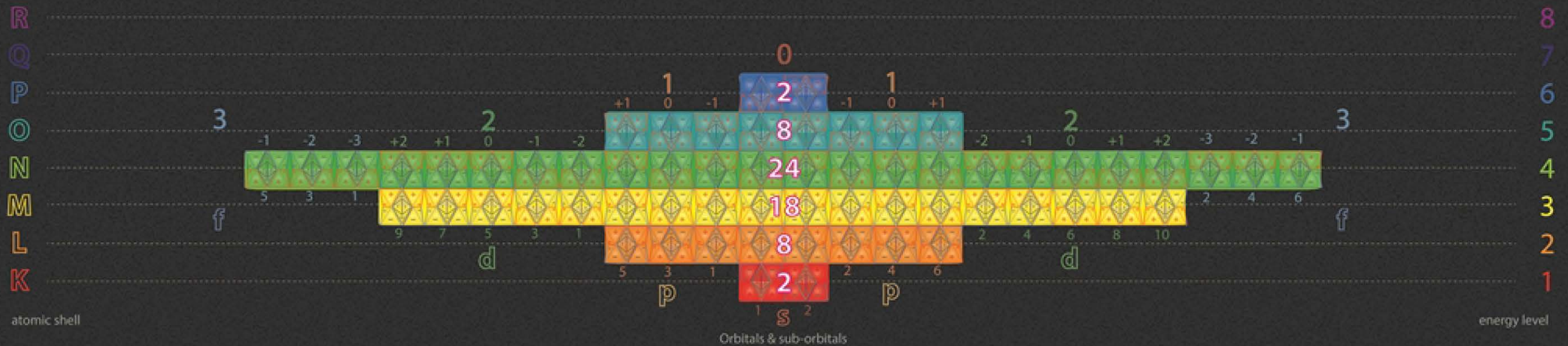
Samarium



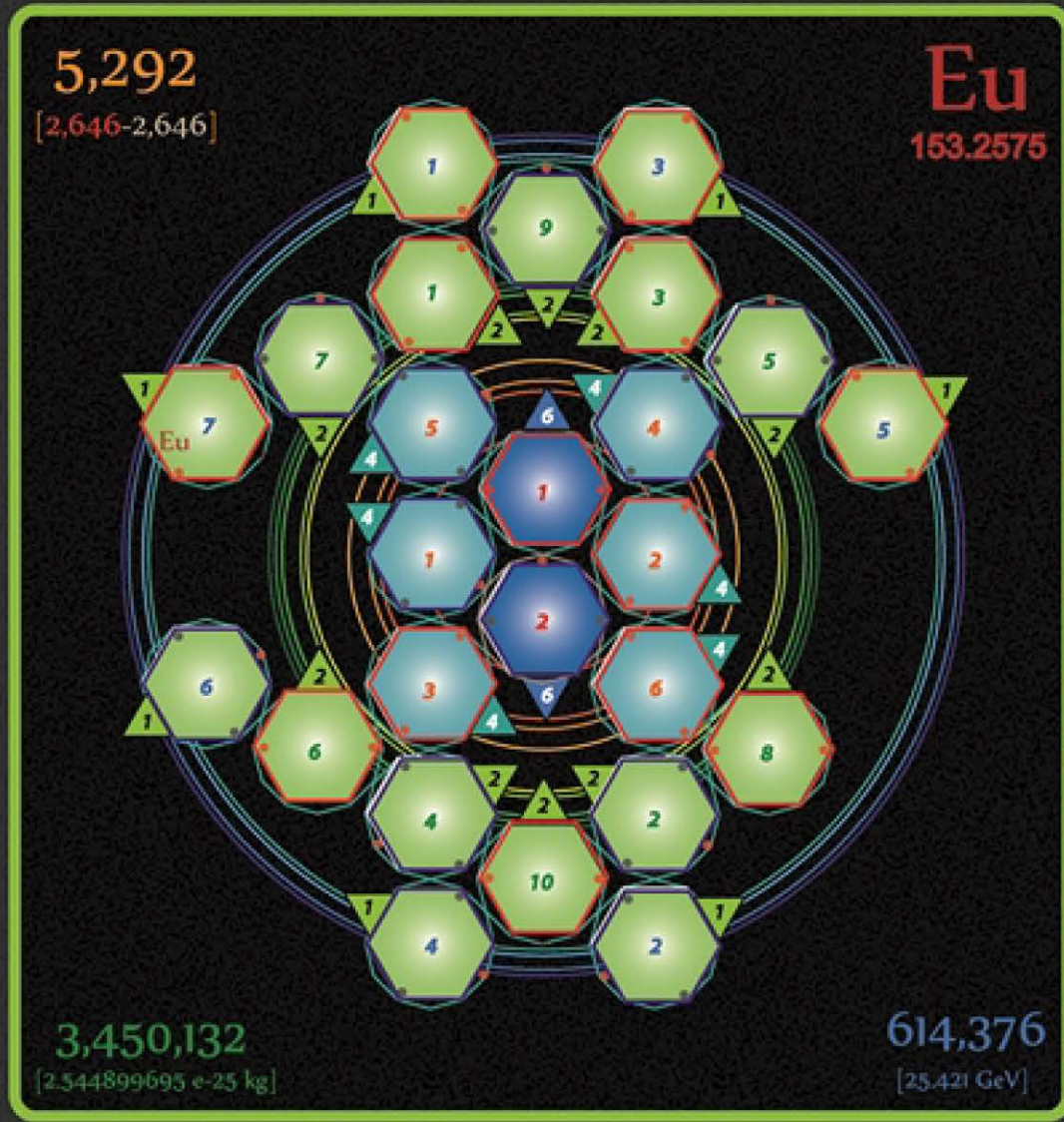
62 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-6$ Lanthanoid

Aufbau

Azimuthal & Magnetic numbers



Tetryonics 51.62 - Samarium atom



Europium

63



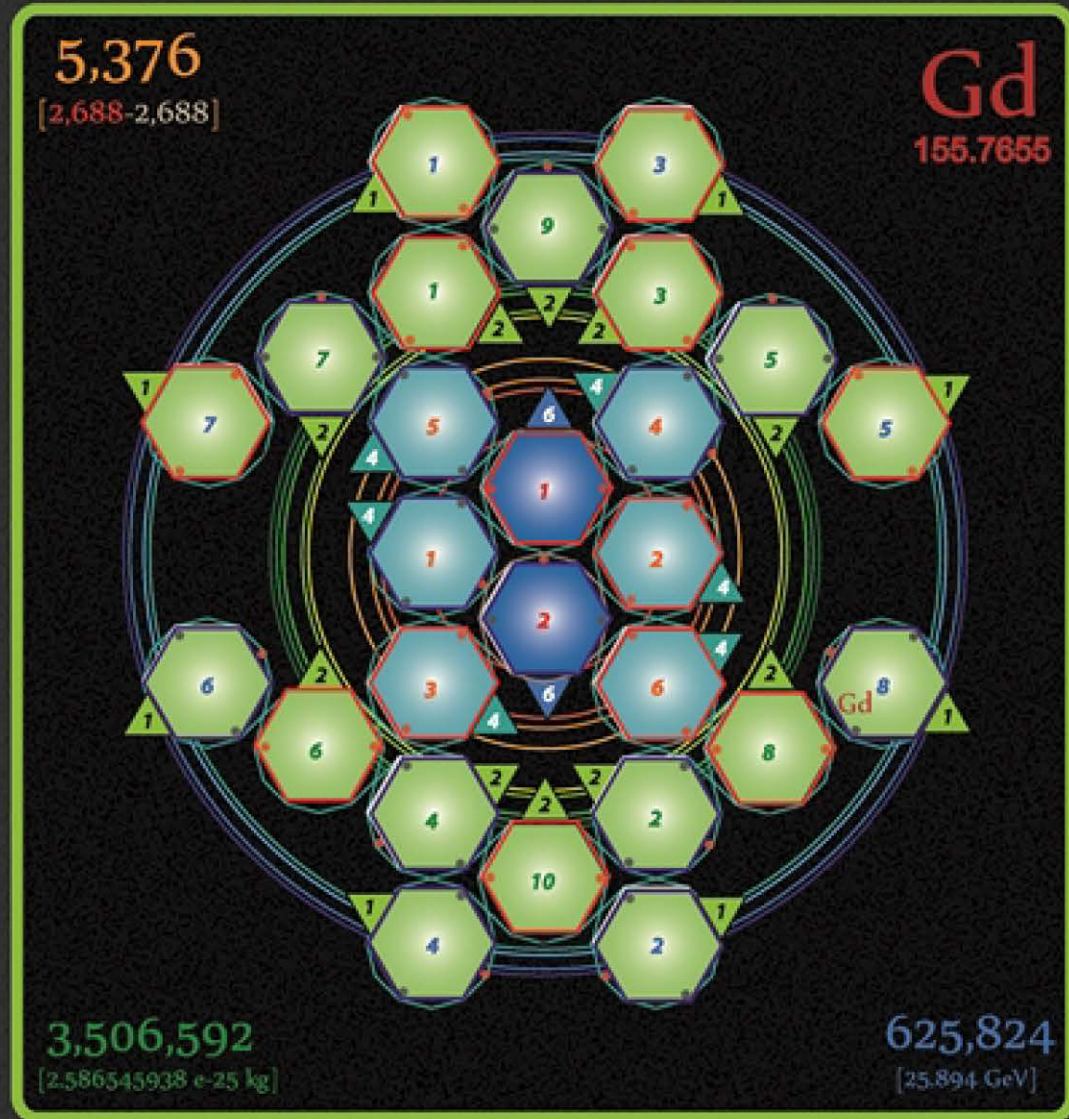
Aufbau

electron configuration
 $[Xe] 4f^7 6s^2$
 54

63 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-6$ Lanthanoid

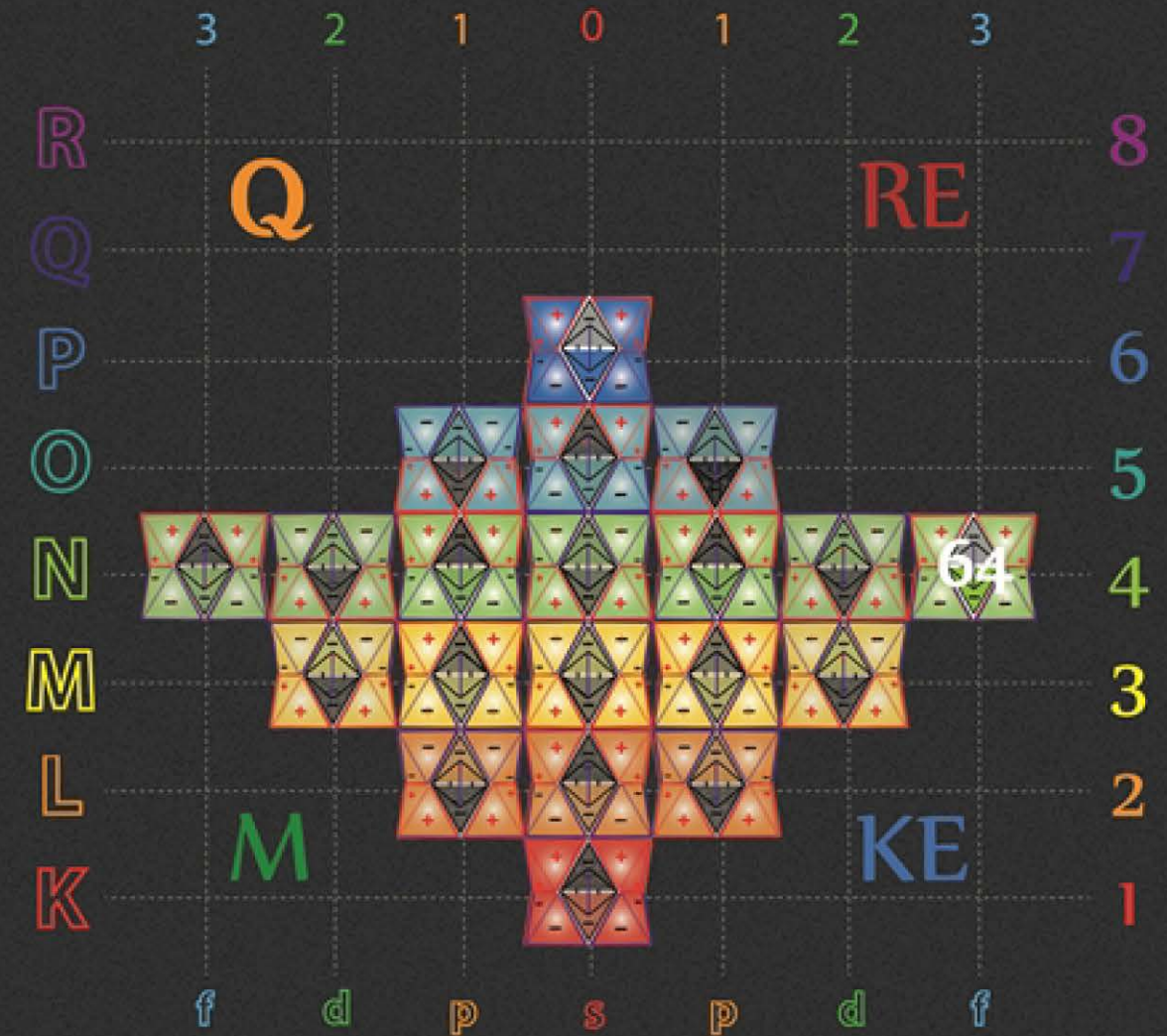


Tetryonics 51.63 - Europium atom



Gadolinium

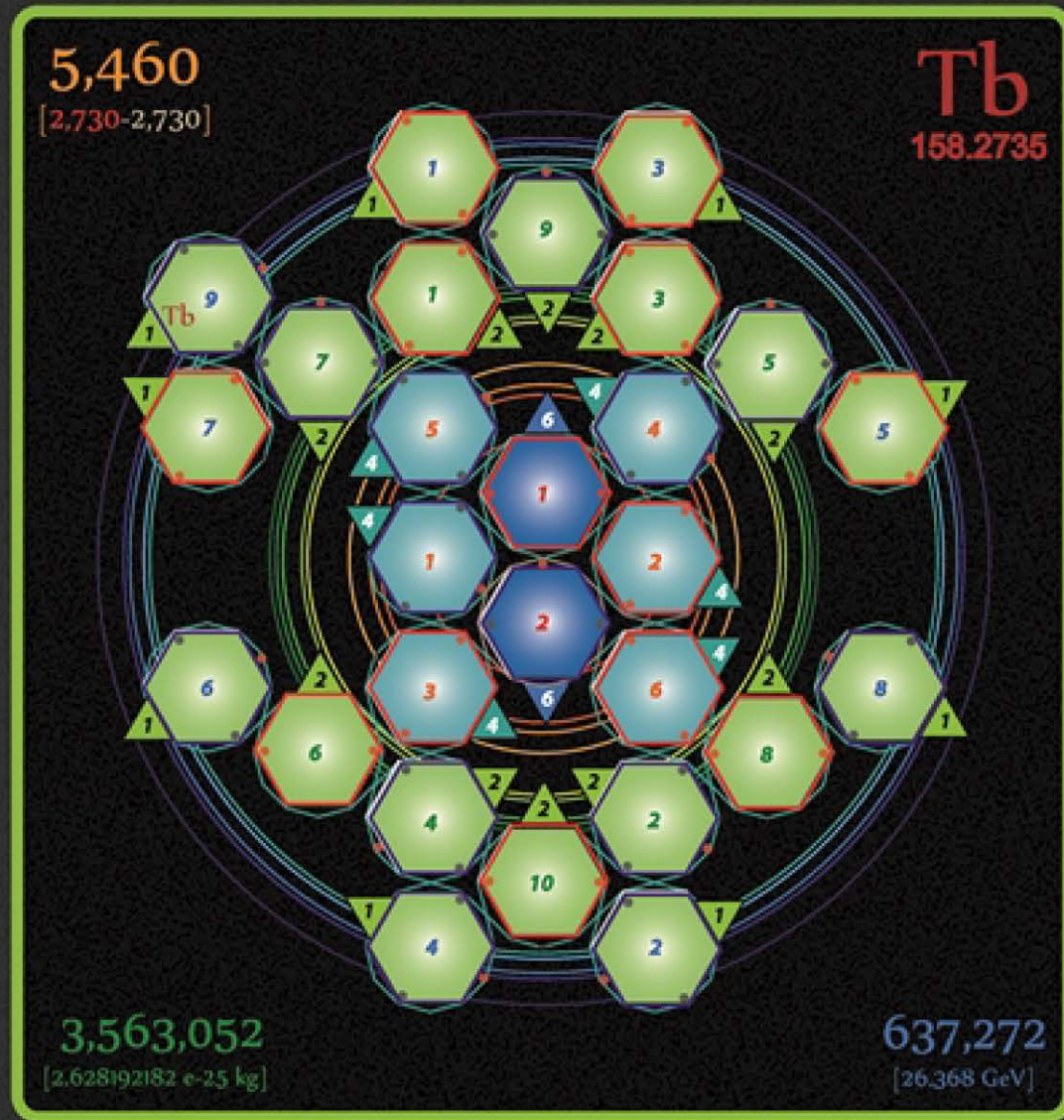
64



Aufbau



Tetryonics 51.64 - Gadolinium atom



electron configuration
 $[Xe] 4f^9 6s^2$
 54

Terbium
65

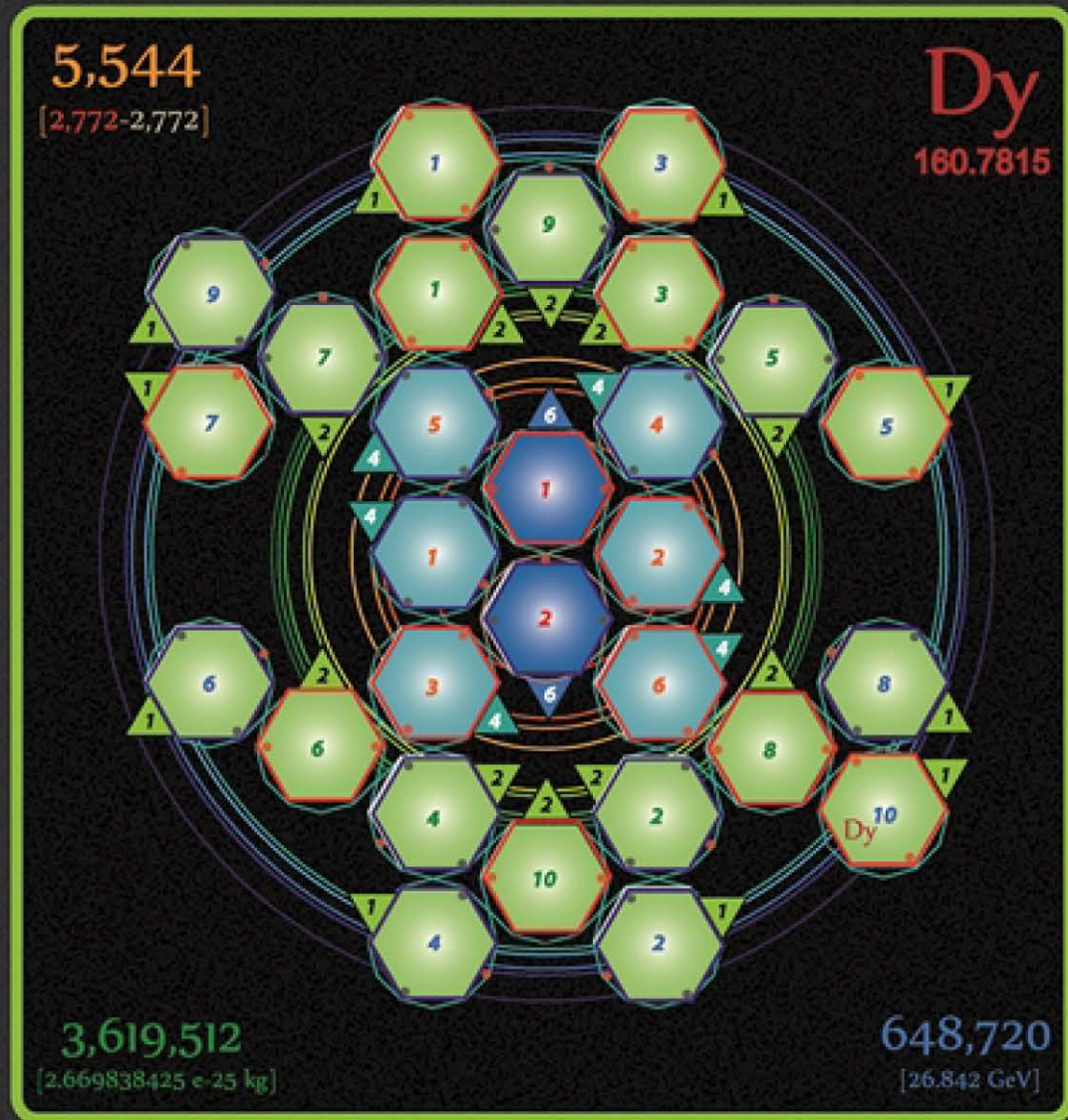


65 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6 Lanthanoid

Aufbau

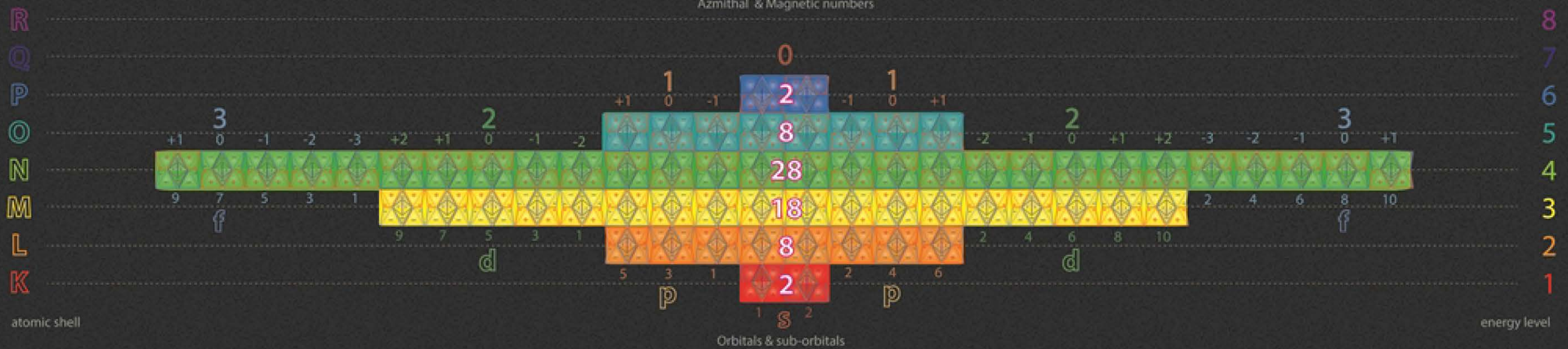


Tetryonics 51.65 -Terbium atom

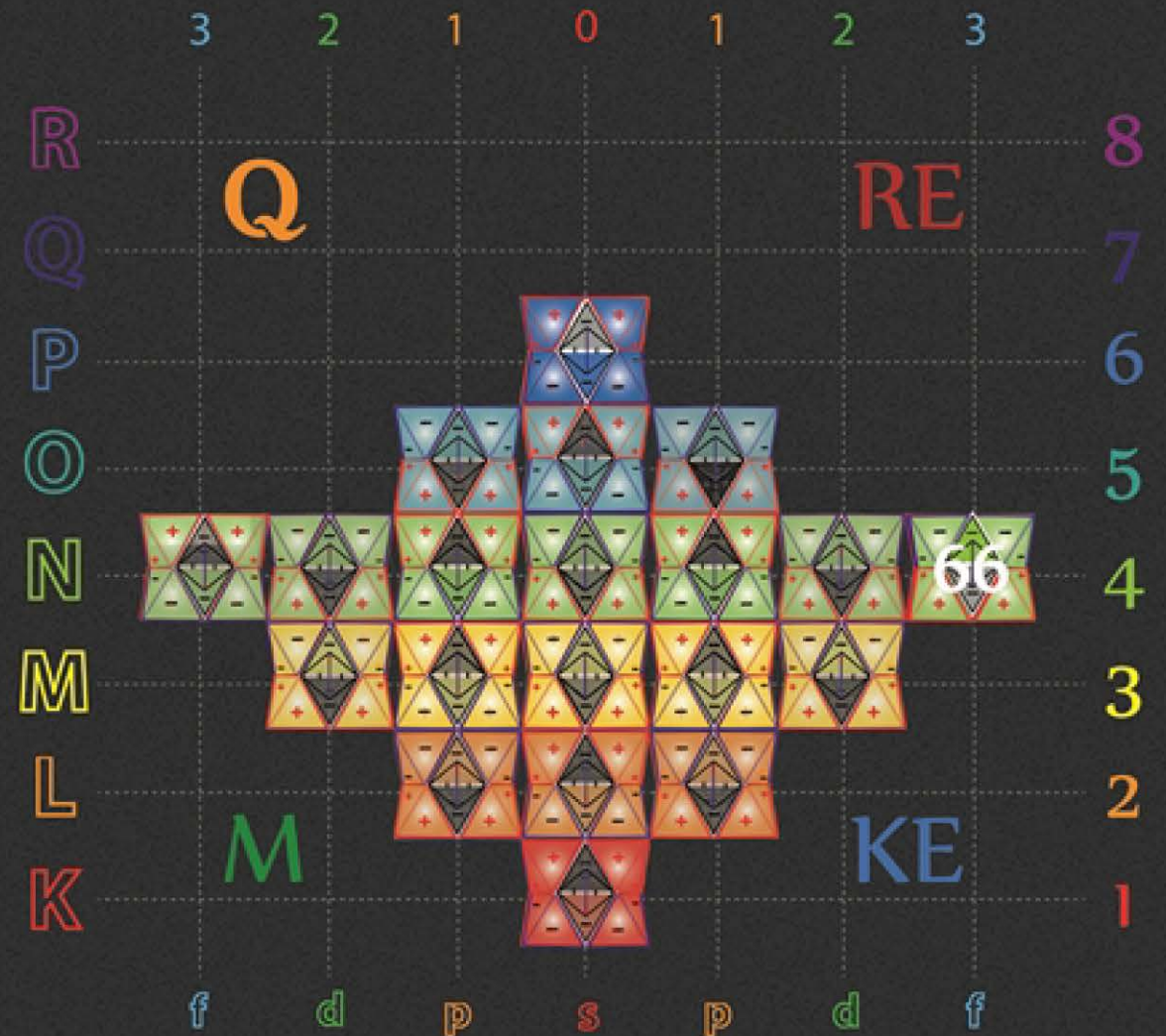


electron configuration
 $[Xe] 4f^{10} 6s^2$
 54

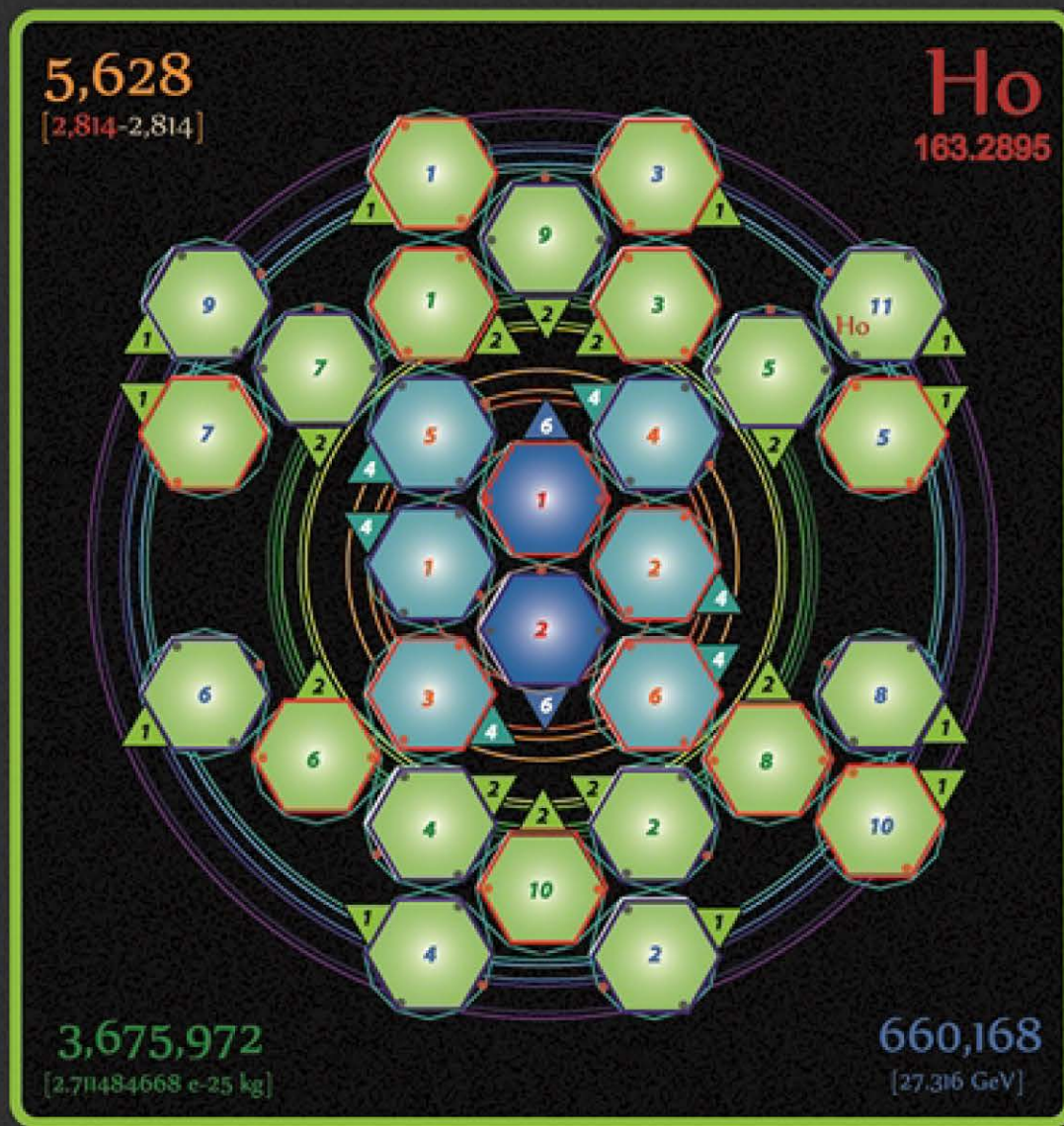
Aufbau



Dysprosium
66



Tetryonics 51.66 - Dysprosium atom



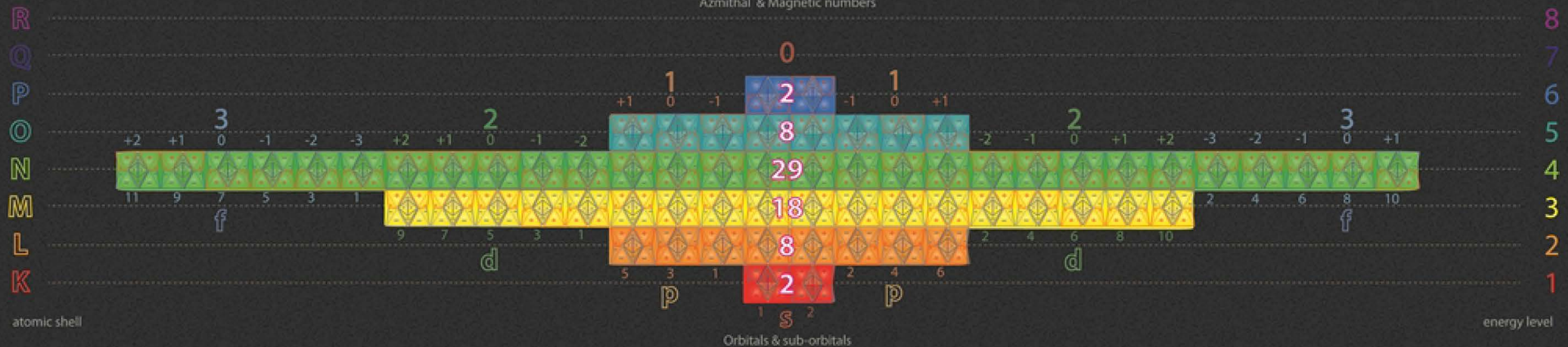
electron configuration
 $[Xe] 4f^{11} 6s^2$
 54

Aufbau

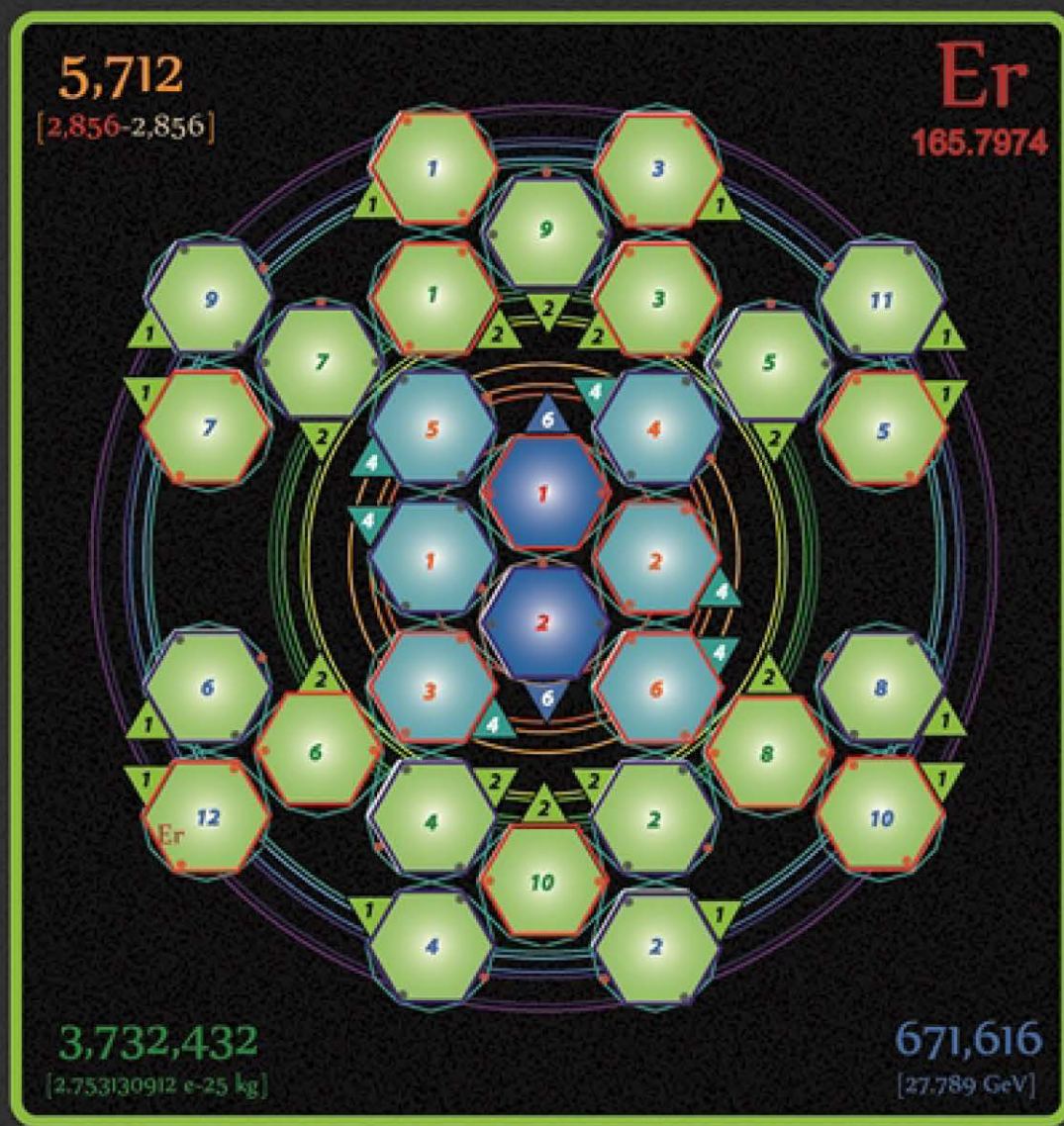
Holmium
67



Azimuthal & Magnetic numbers



Tetryonics 51.67 - Holmium atom



5,712
[2,856-2,856]

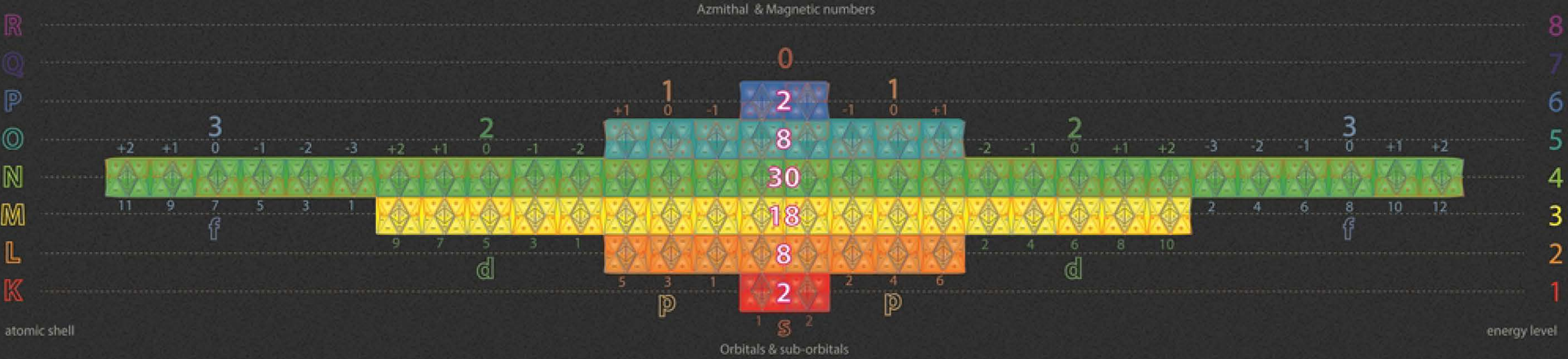
Er
165.7974

3,732,432
[2.753130912 e-25 kg]

671,616
[27.789 GeV]

electron configuration
[Xe] 4f¹² 6s²
54

Aufbau

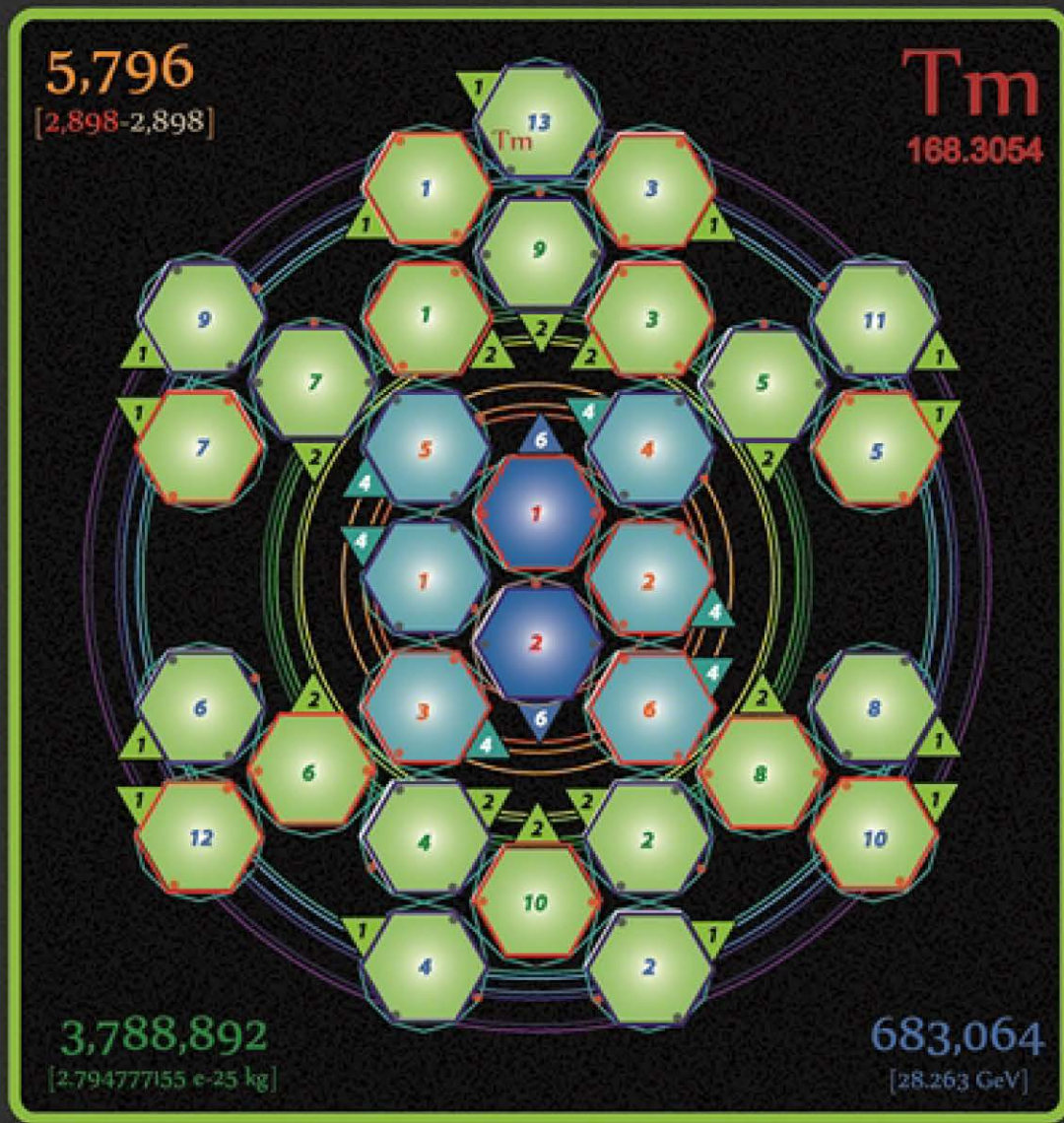


Azimuthal & Magnetic numbers

68 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] m¹⁻⁶ Lanthanoid

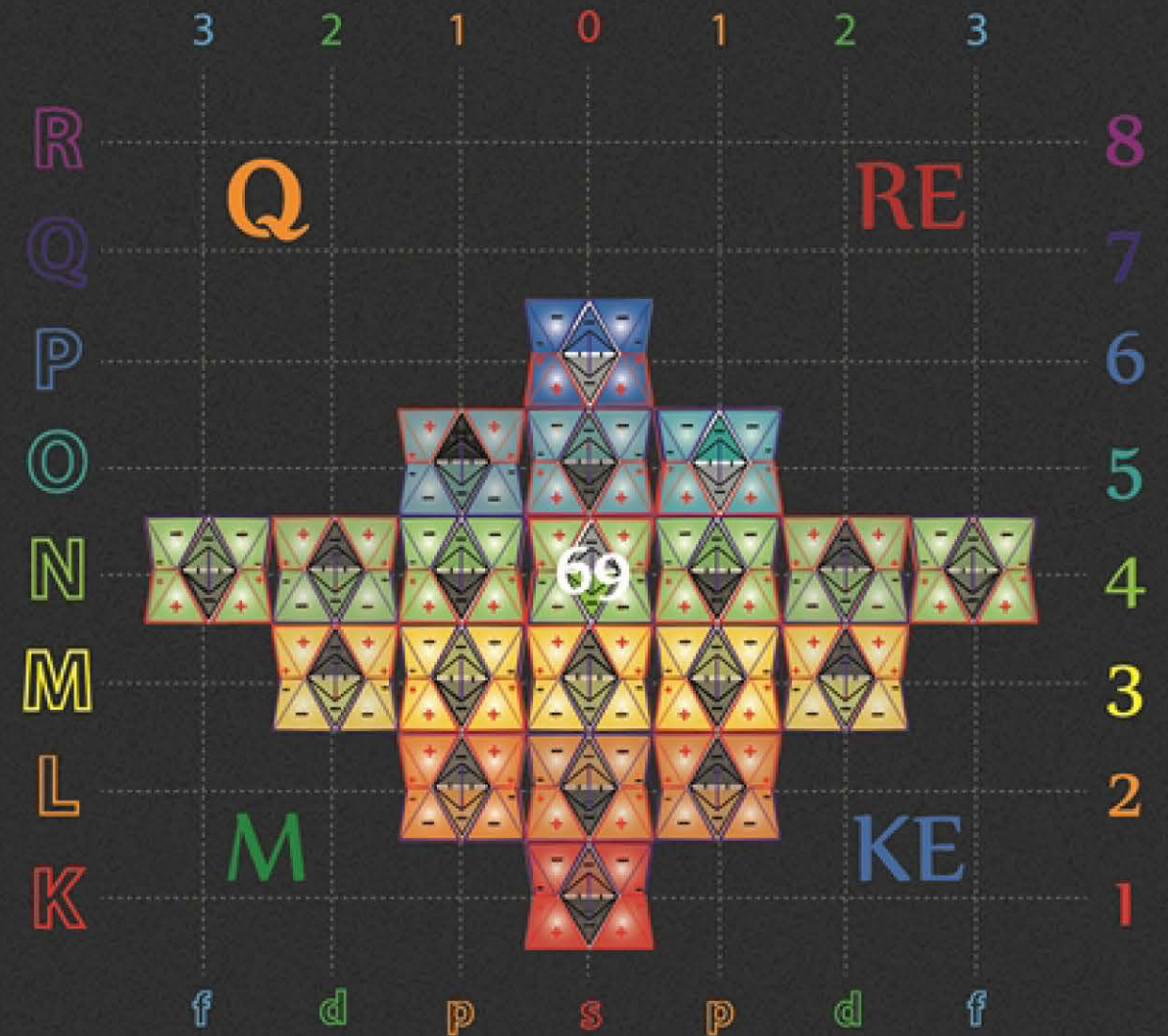
Erbium
68

Tetryonics 51.68 - Erbium atom



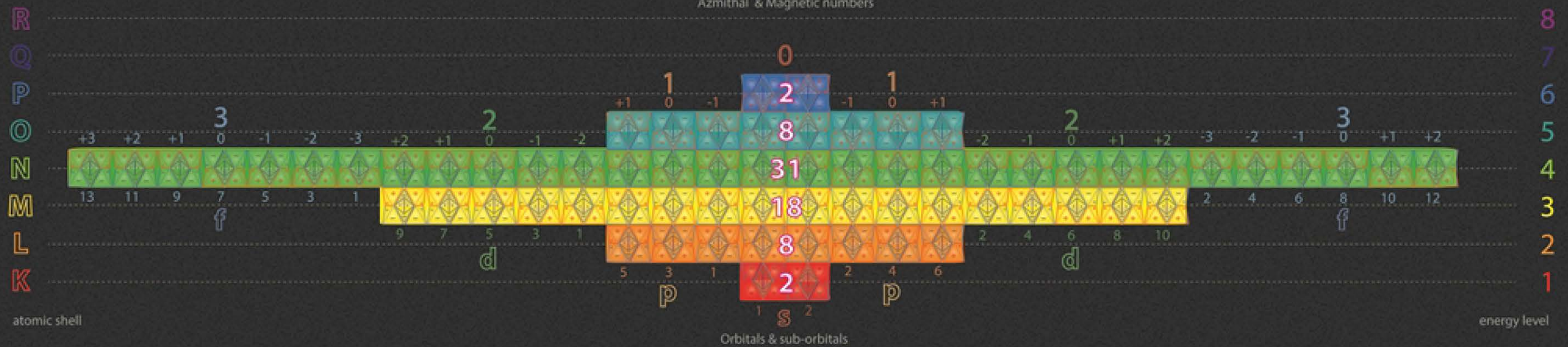
Thulium

69

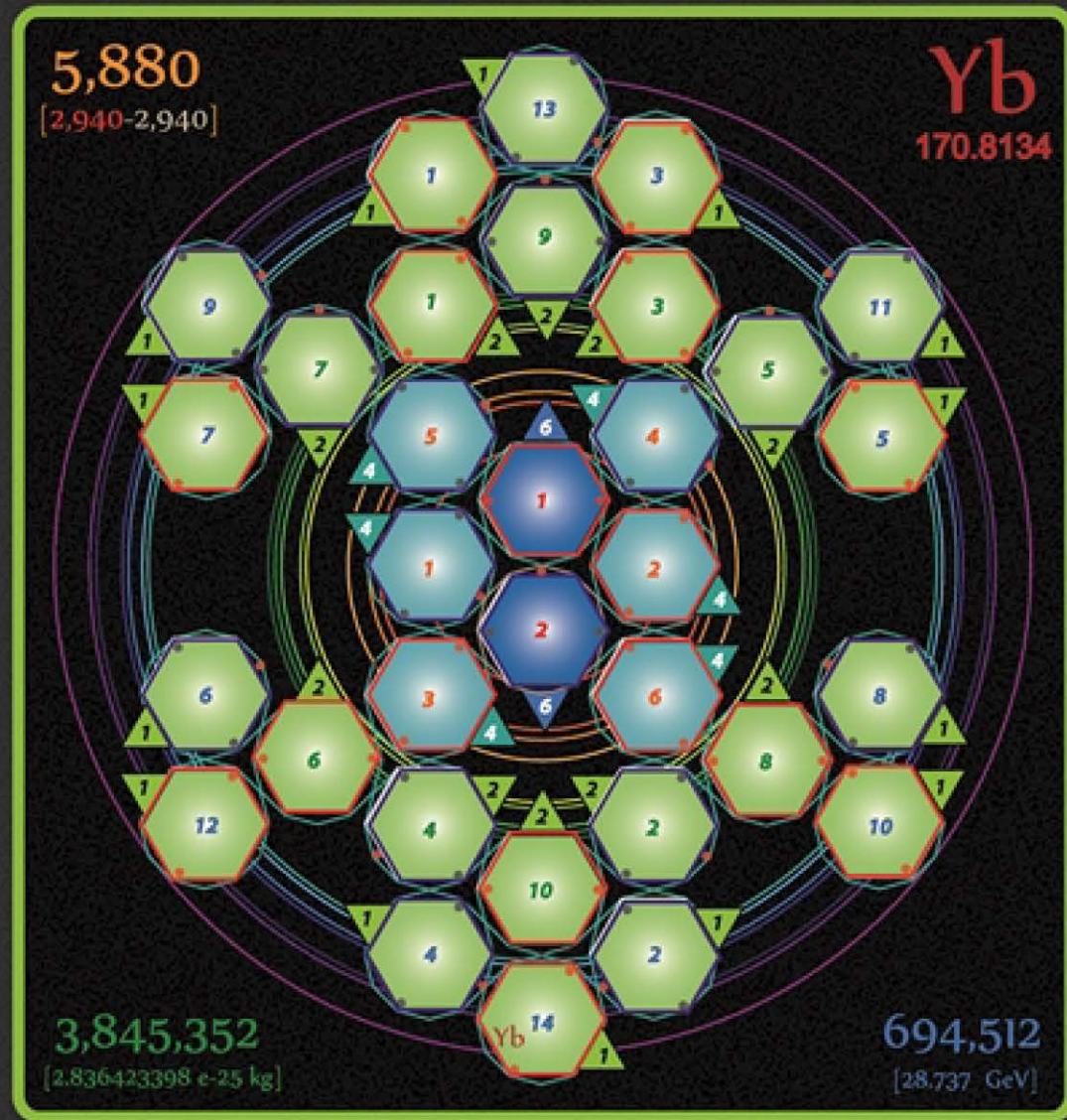


69 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] m1-6 Lanthanoid

Aufbau

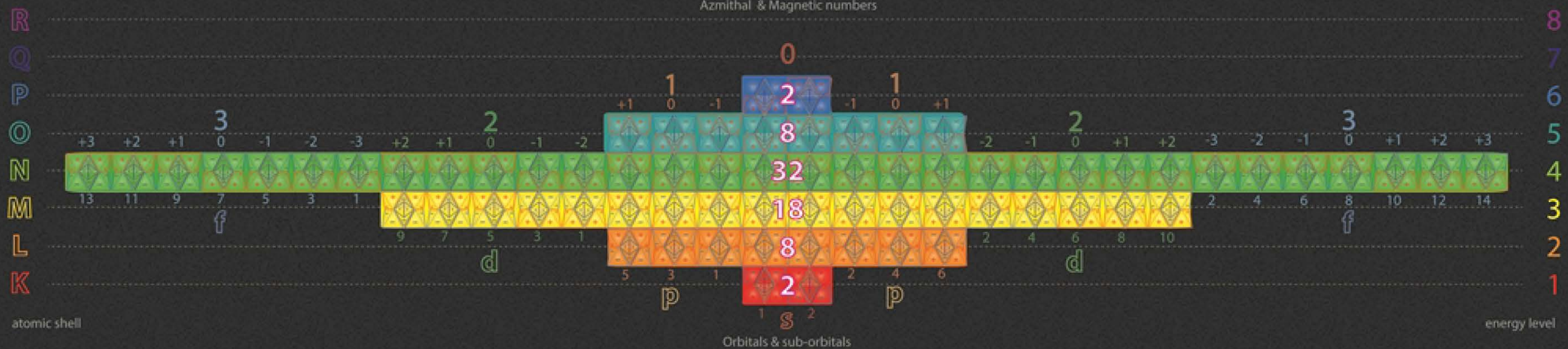


Tetryonics 51.69 - Thulium atom



electron configuration
 $[Xe] 4f^{14} 6s^2$
 54

Aufbau

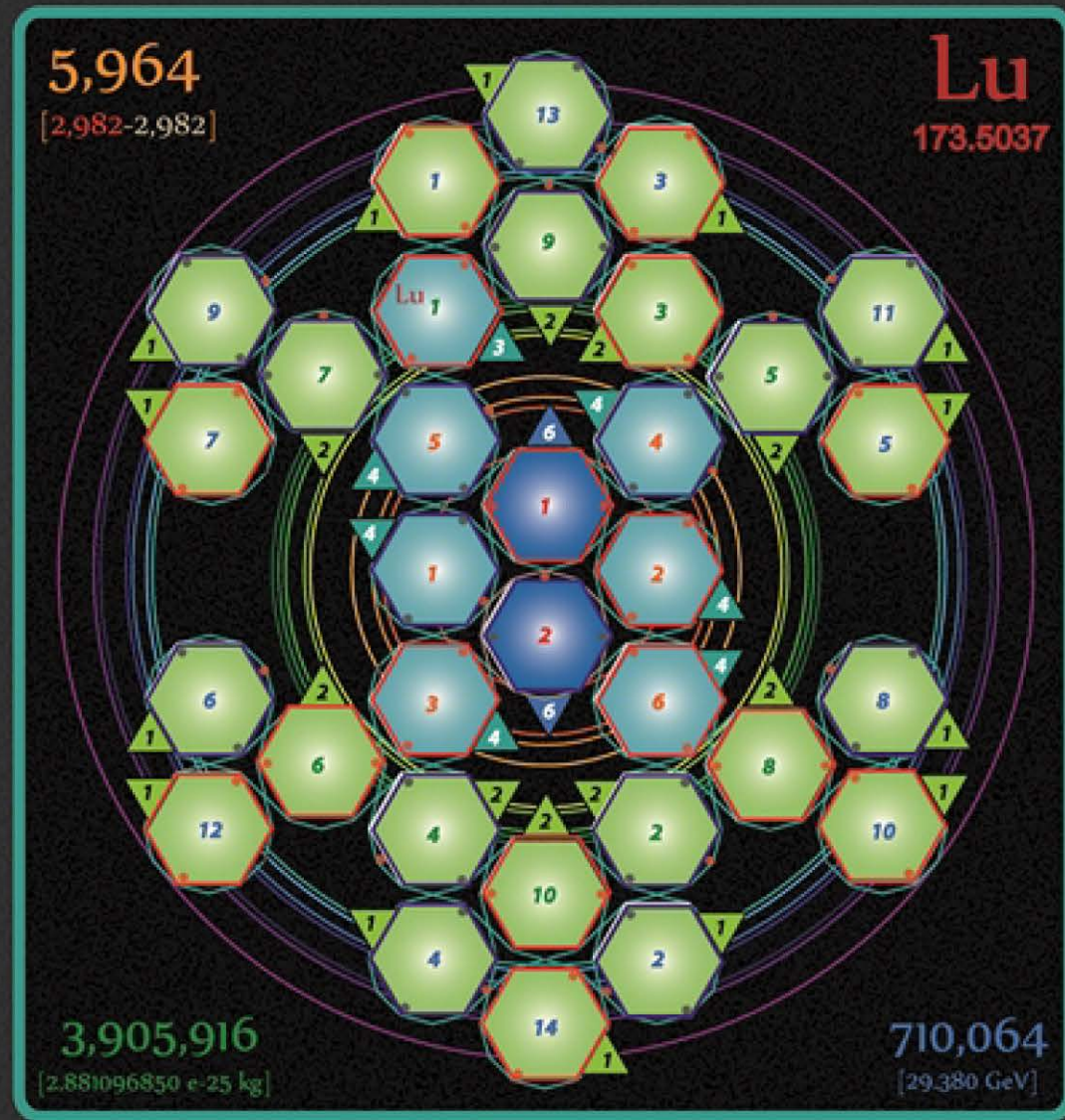


Ytterbium

70



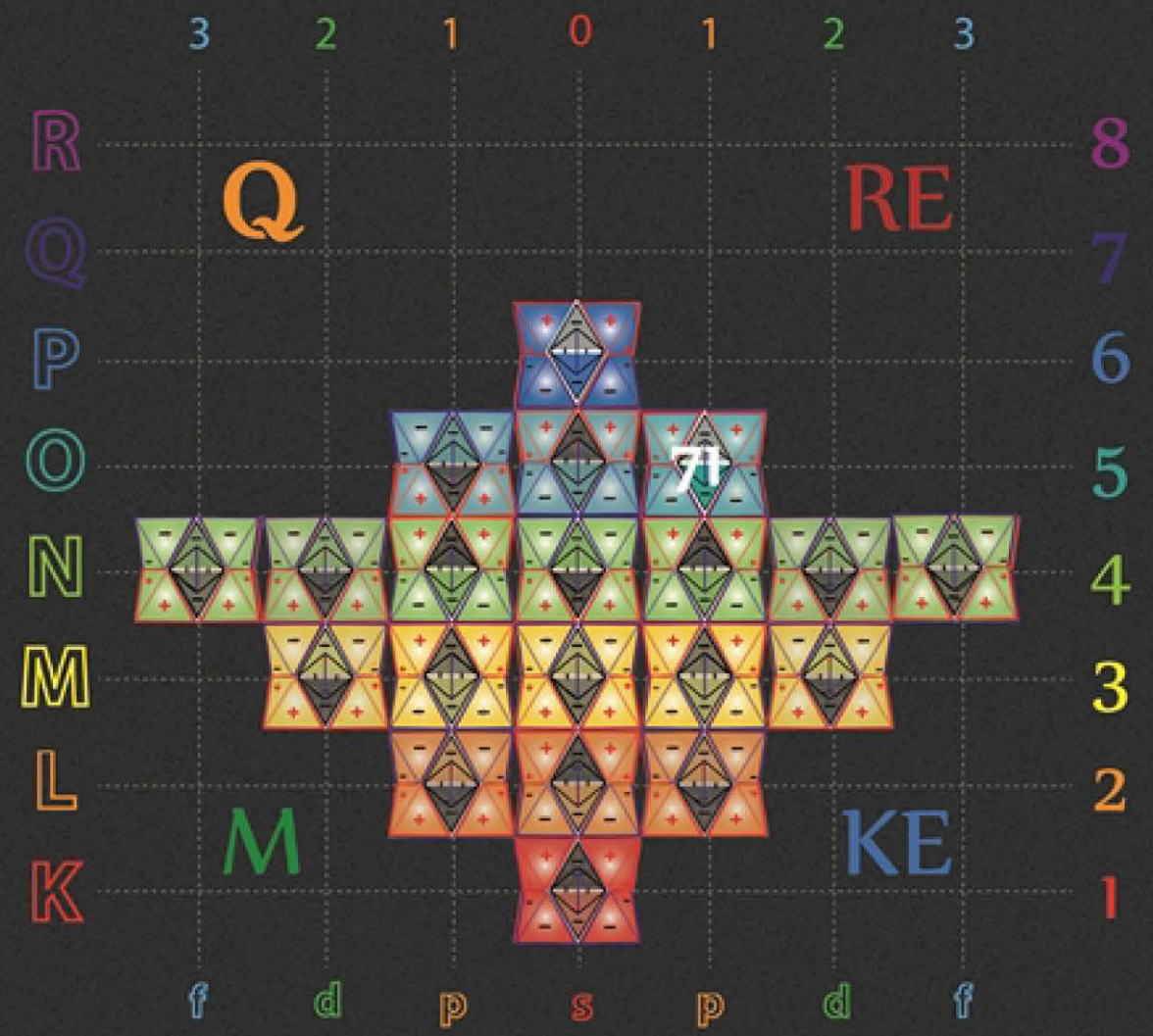
Tetryonics 51.70 - Ytterbium atom



electron configuration
 $[Xe] 4f^{14} 5d^1 6s^2$
 54

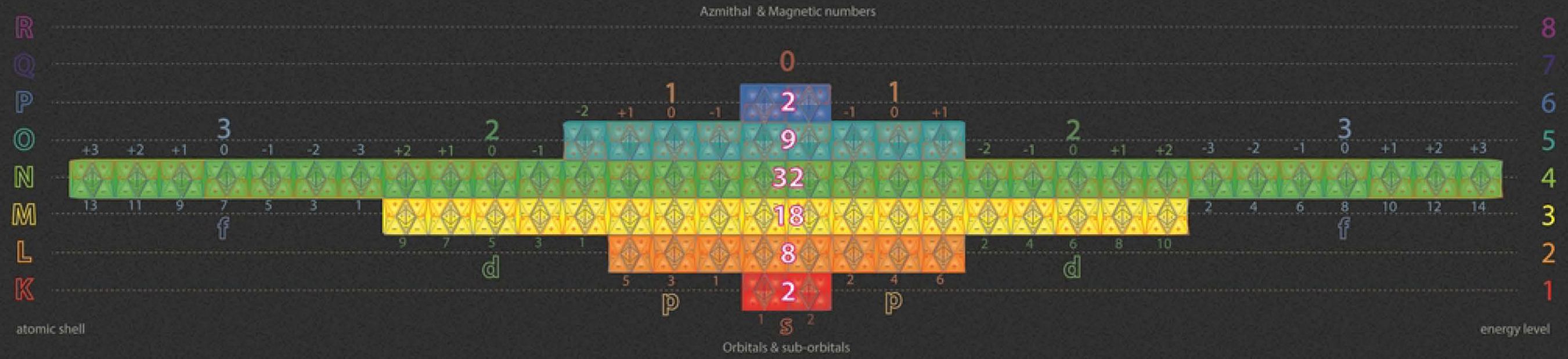
Lutetium

71

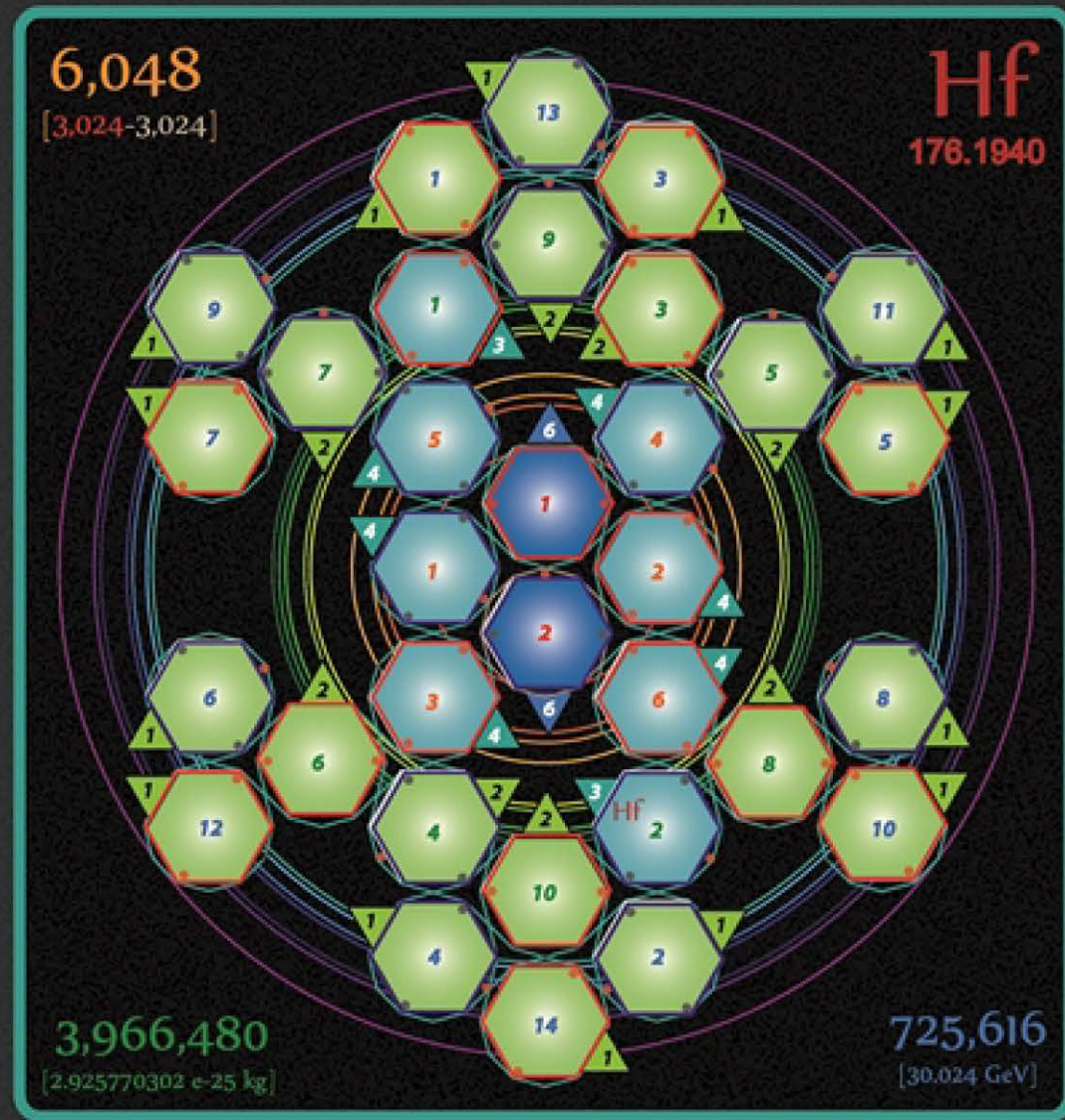


71 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6 Lanthanoid

Aufbau



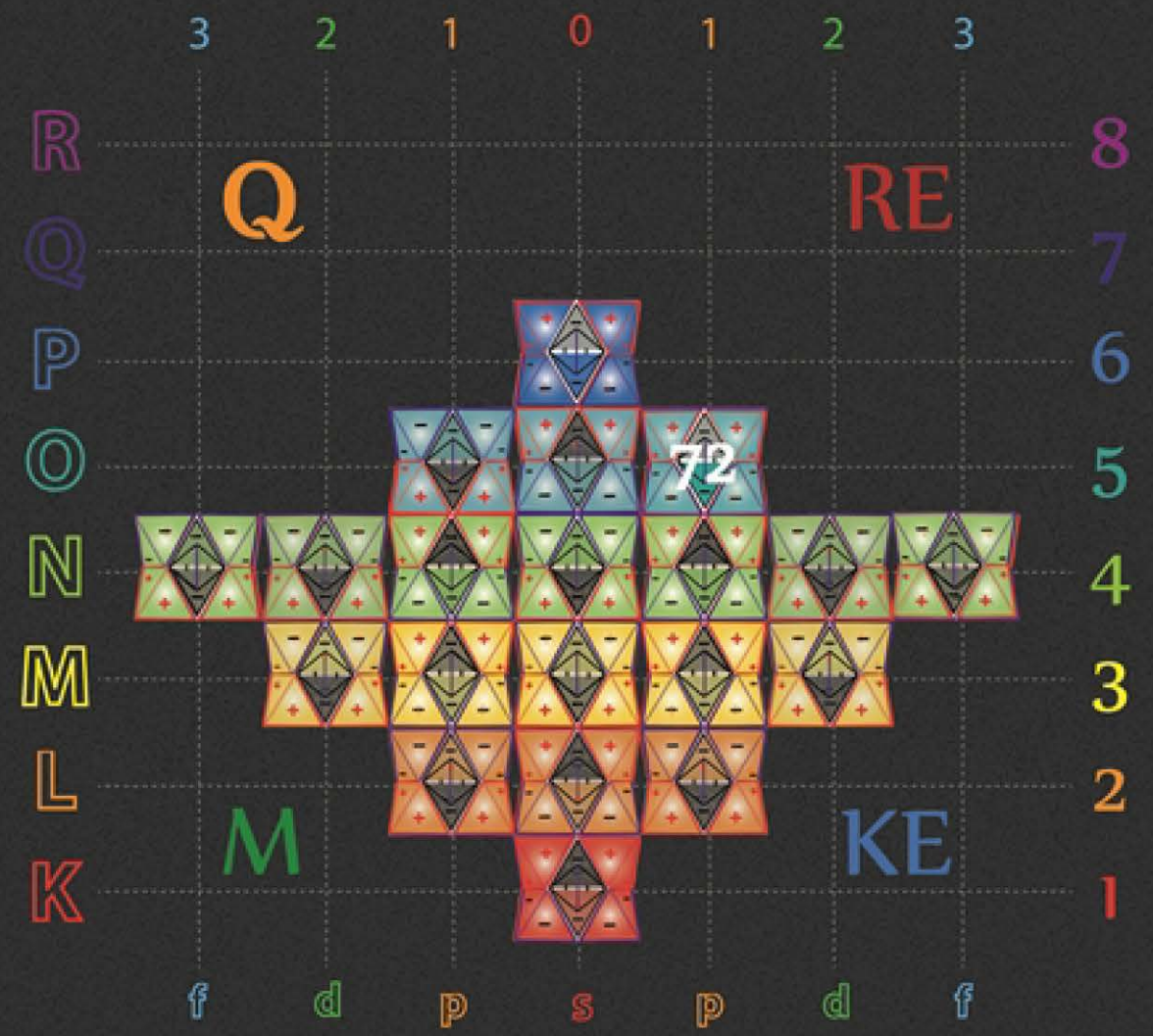
Tetryonics 51.71 - Lutetium atom



electron configuration
 $[Xe] 4f^{14} 5d^2 6s^2$
 54

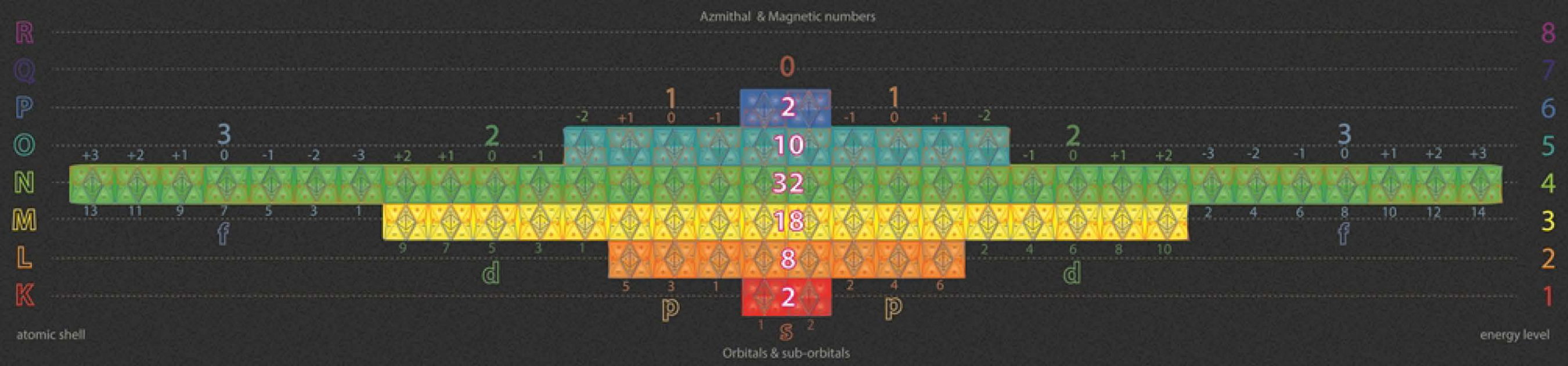
Hafnium

72

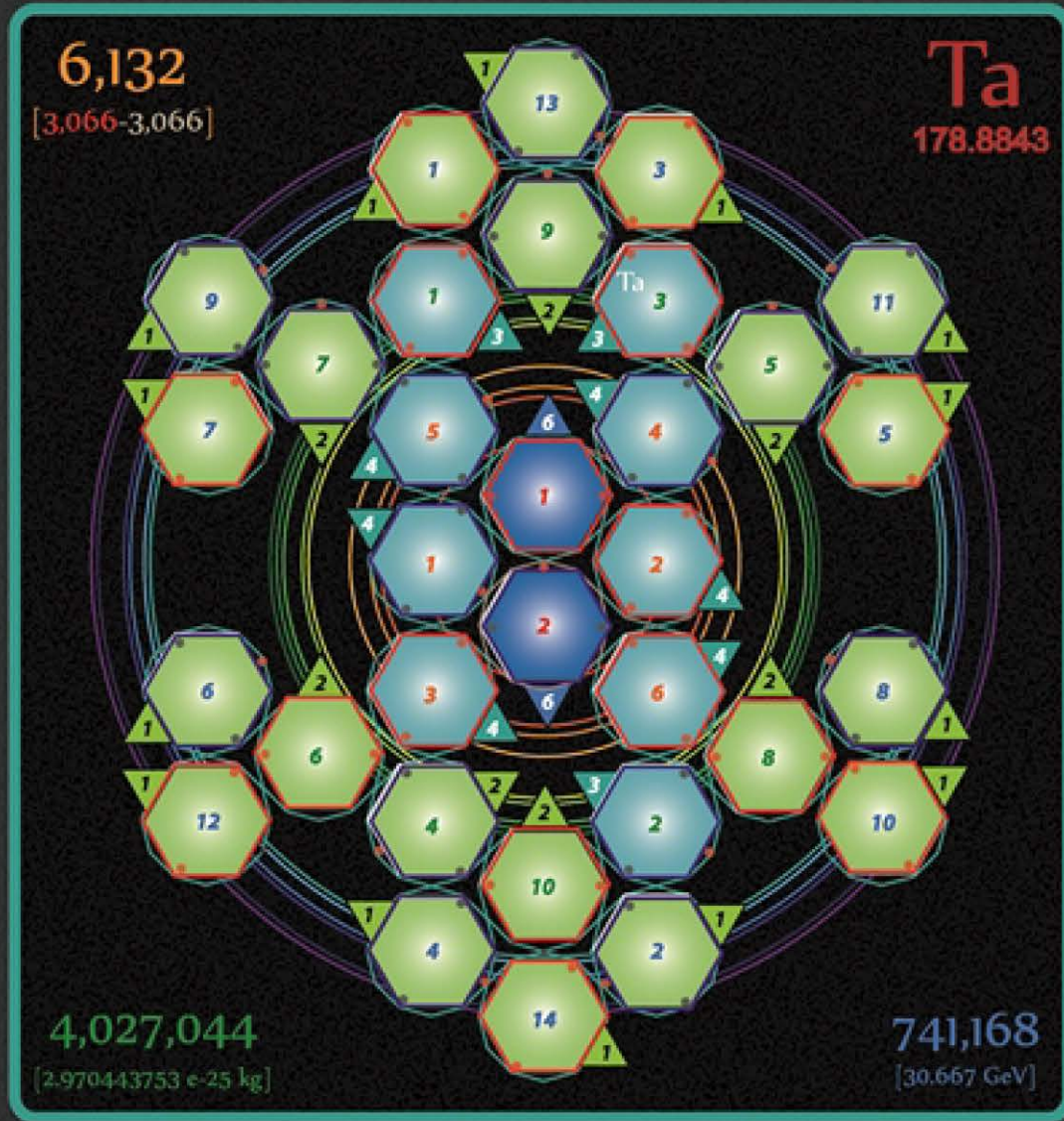


72 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6 Transition Metal

Aufbau

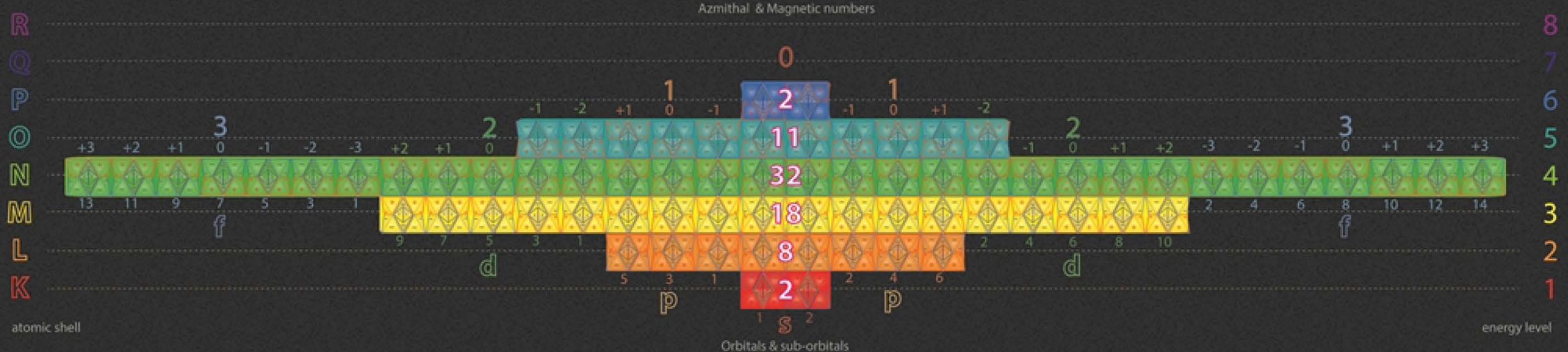


Tetryonics 51.72 - Hafnium atom



electron configuration
 $[Xe] 4f^{14} 5d^3 6s^2$
 54

Aufbau



Tantalum

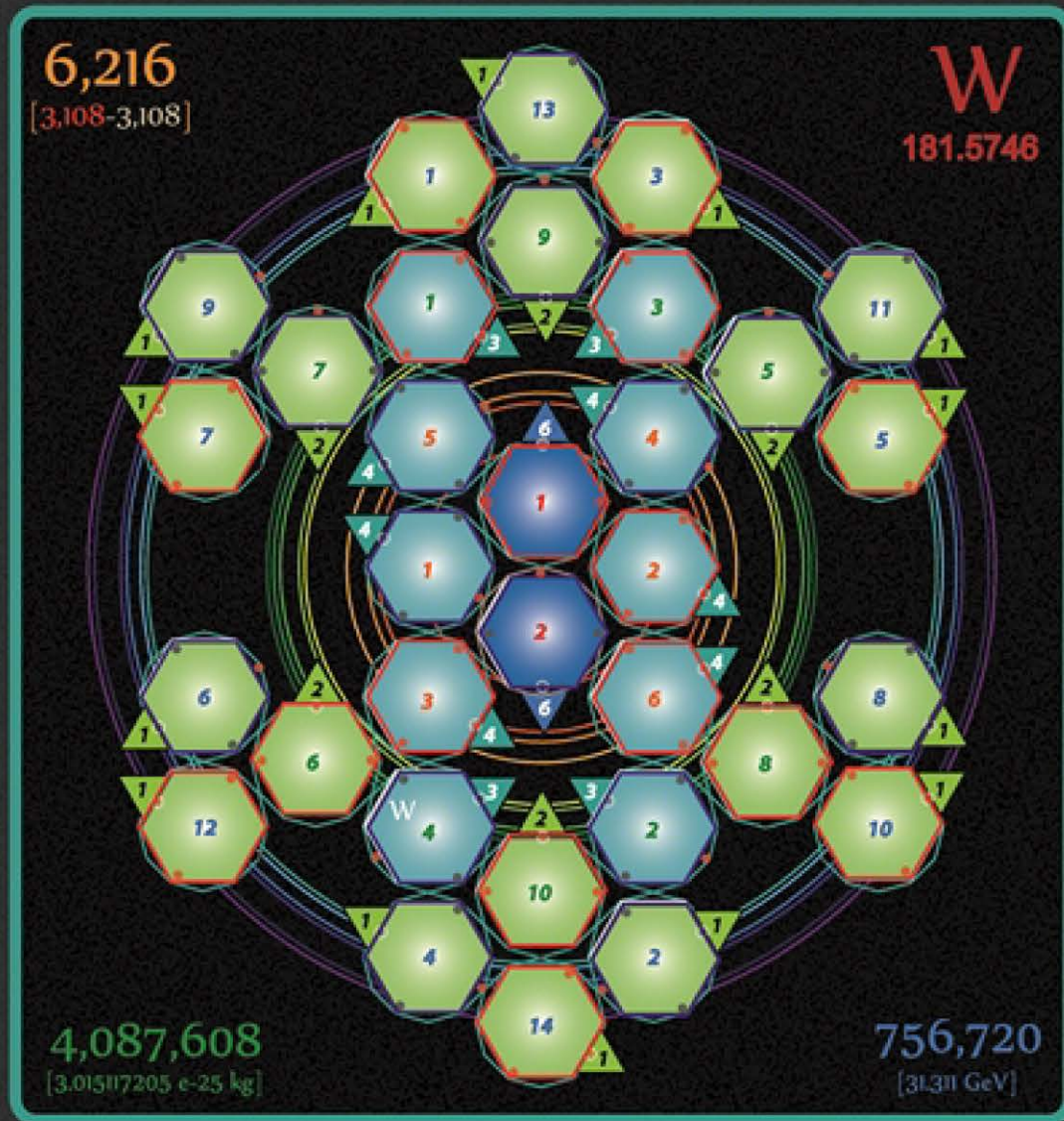
73



73 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6

Transition Metal

Tetryonics 51.73 - Tantalum atom

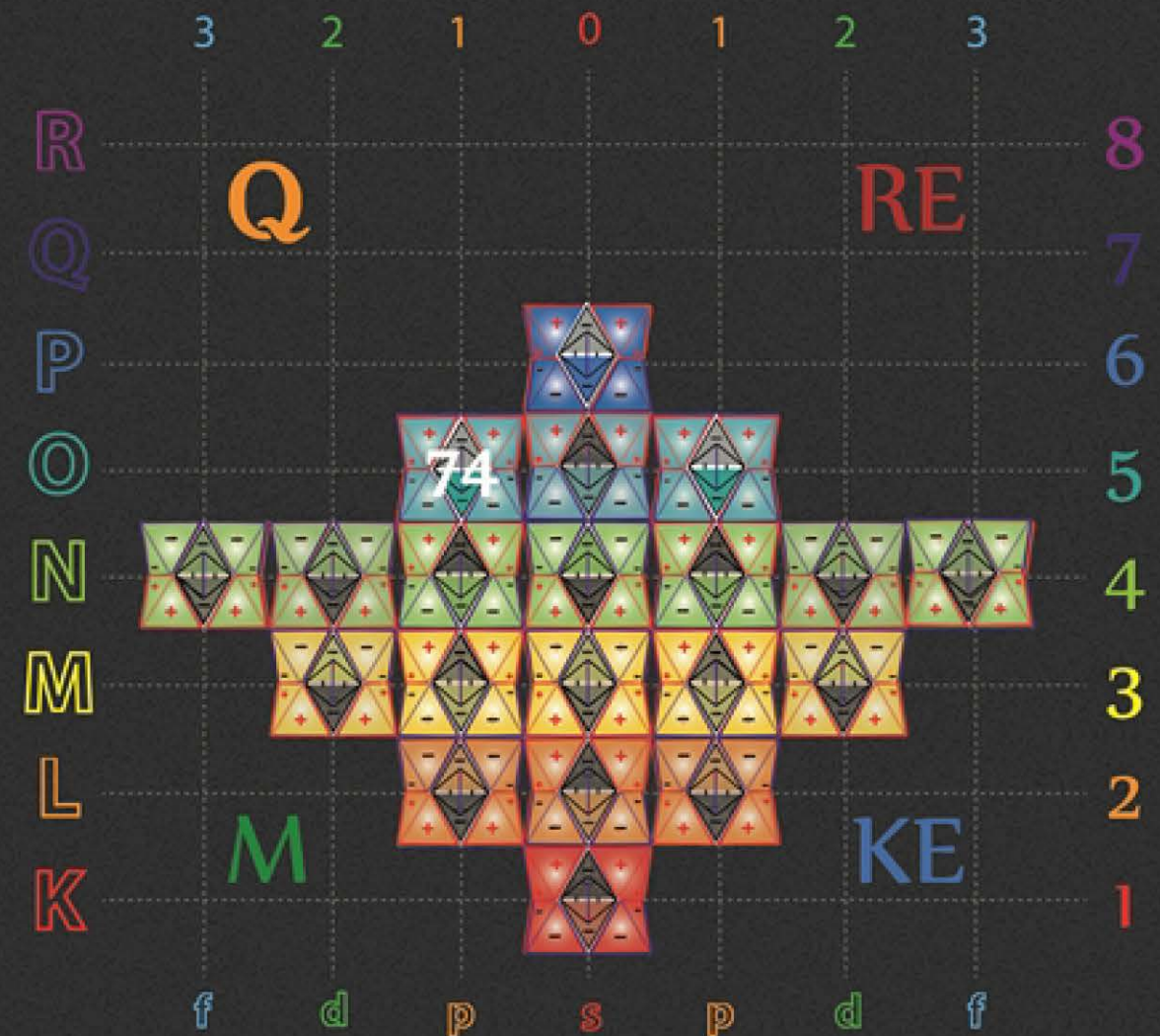


electron configuration
 $[Xe] 4f^{14} 5d^4 6s^2$
 54

Aufbau

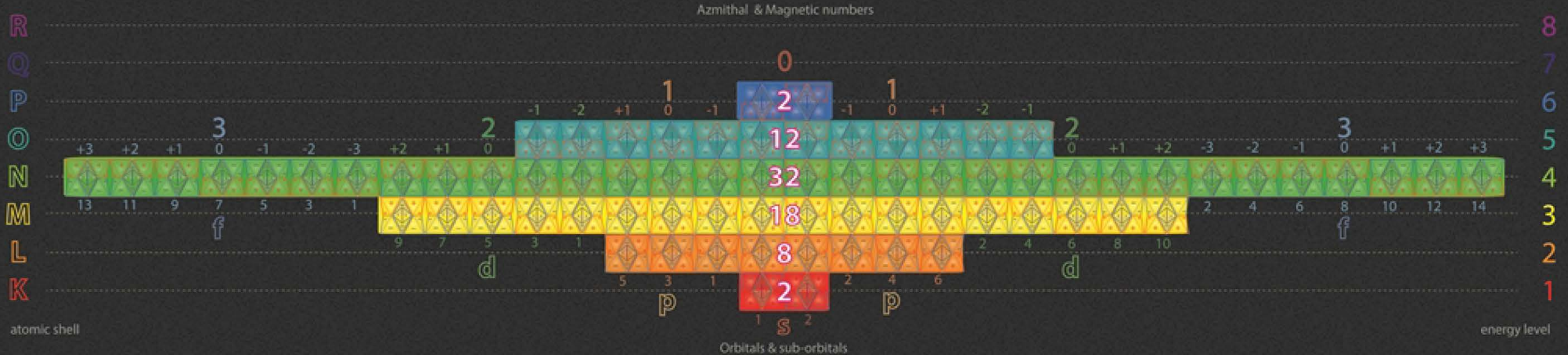
Tungsten

74

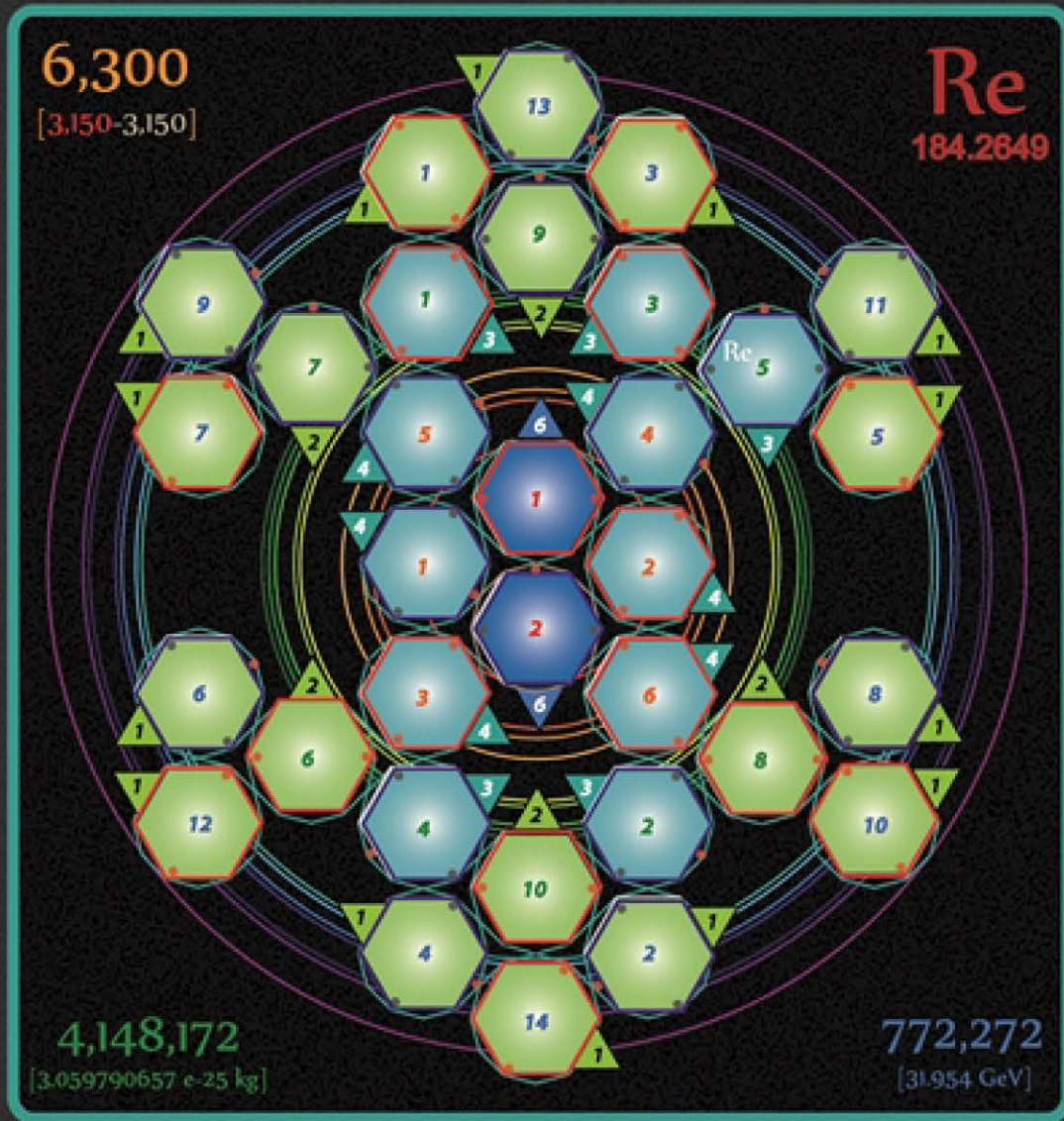


74 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6

Transition Metal



Tetryonics 51.74 - Tungsten atom



electron configuration
 $[Xe] 4f^{14} 5d^5 6s^2$
 54

Aufbau

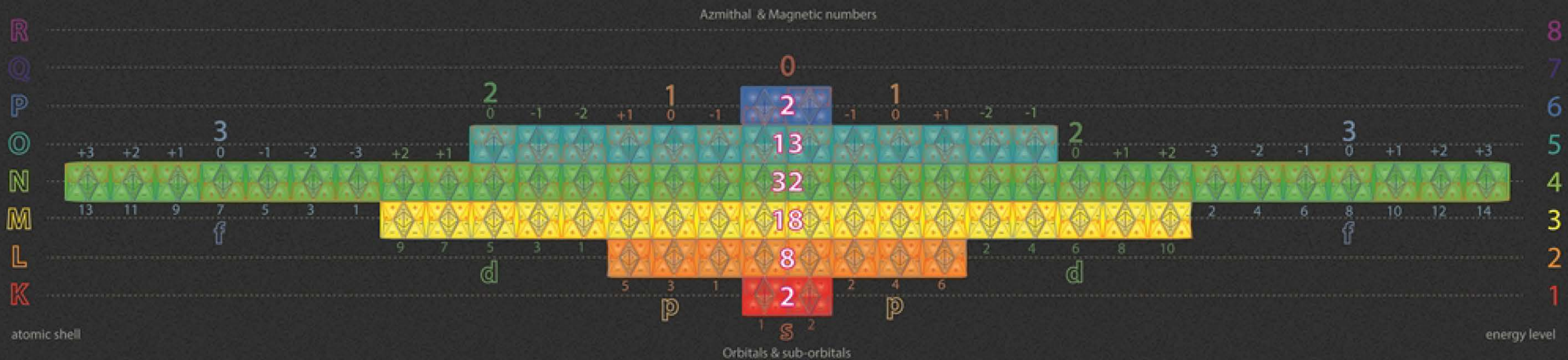
Rhenium

75

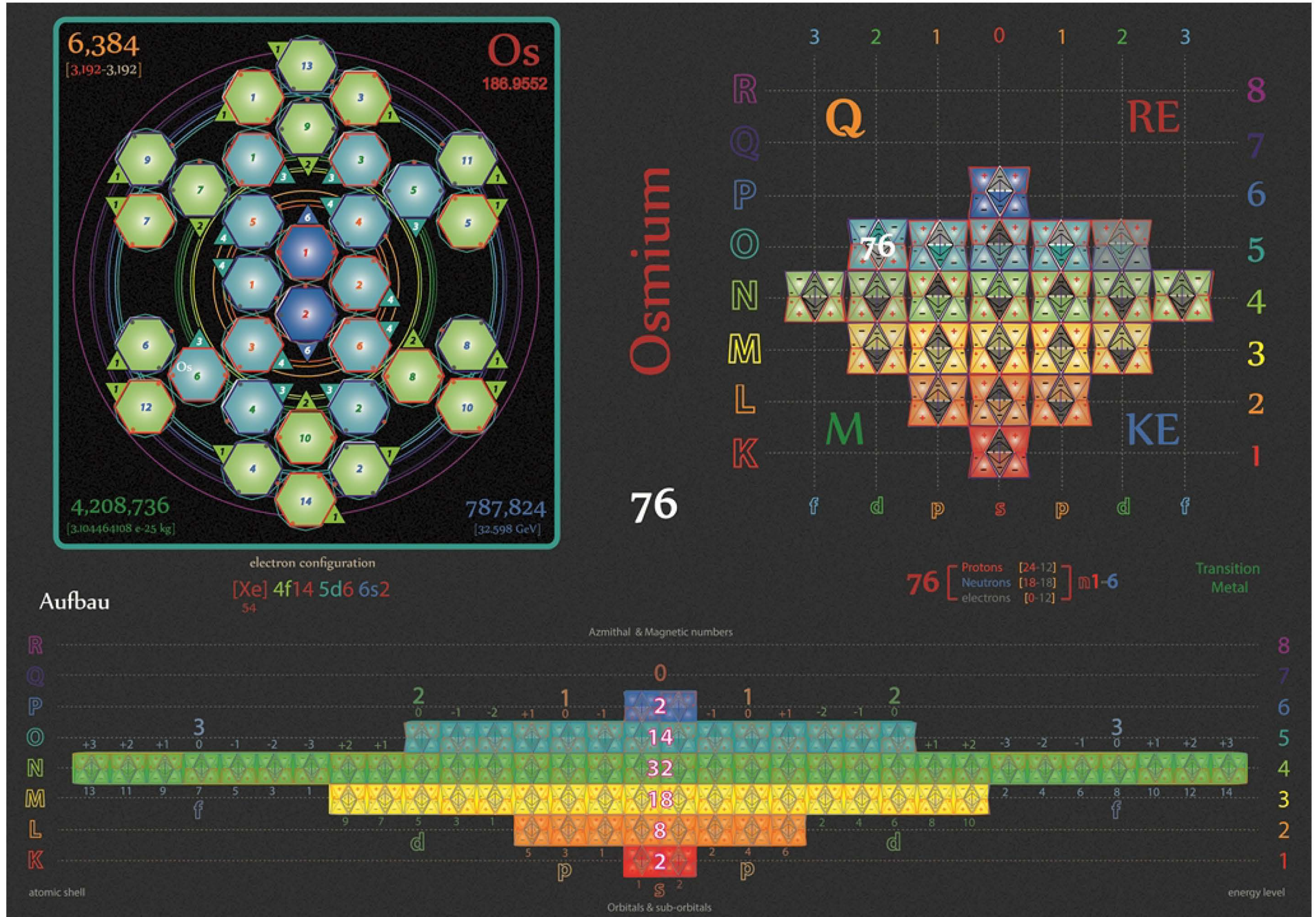


75 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6

Transition Metal



Tetryonics 51.75 - Rhenium atom



Tetryonics 51.76 - Osmium atom



Iridium

77

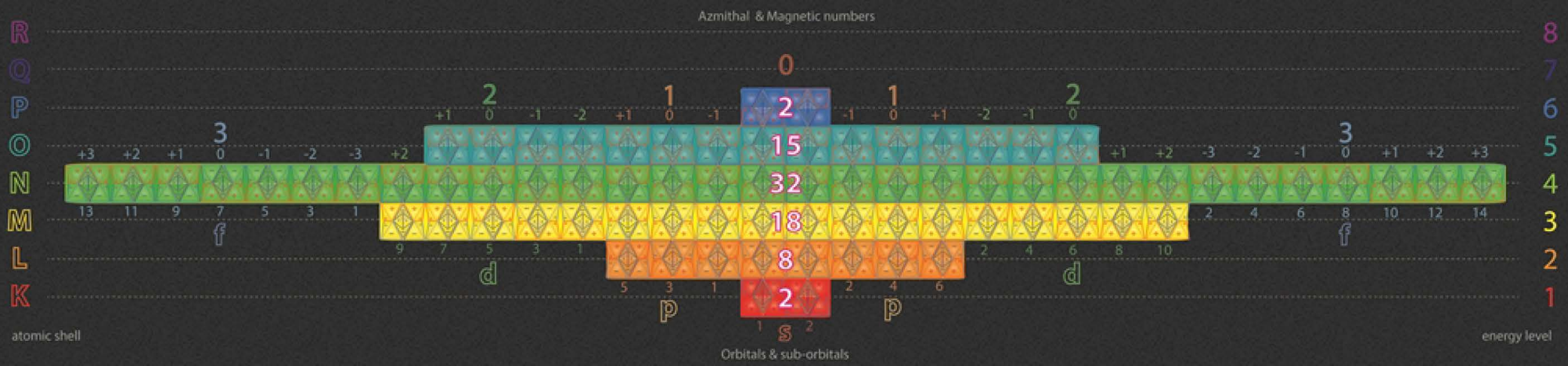


electron configuration
 $[Xe] 4f^{14} 5d^7 6s^2$
 54

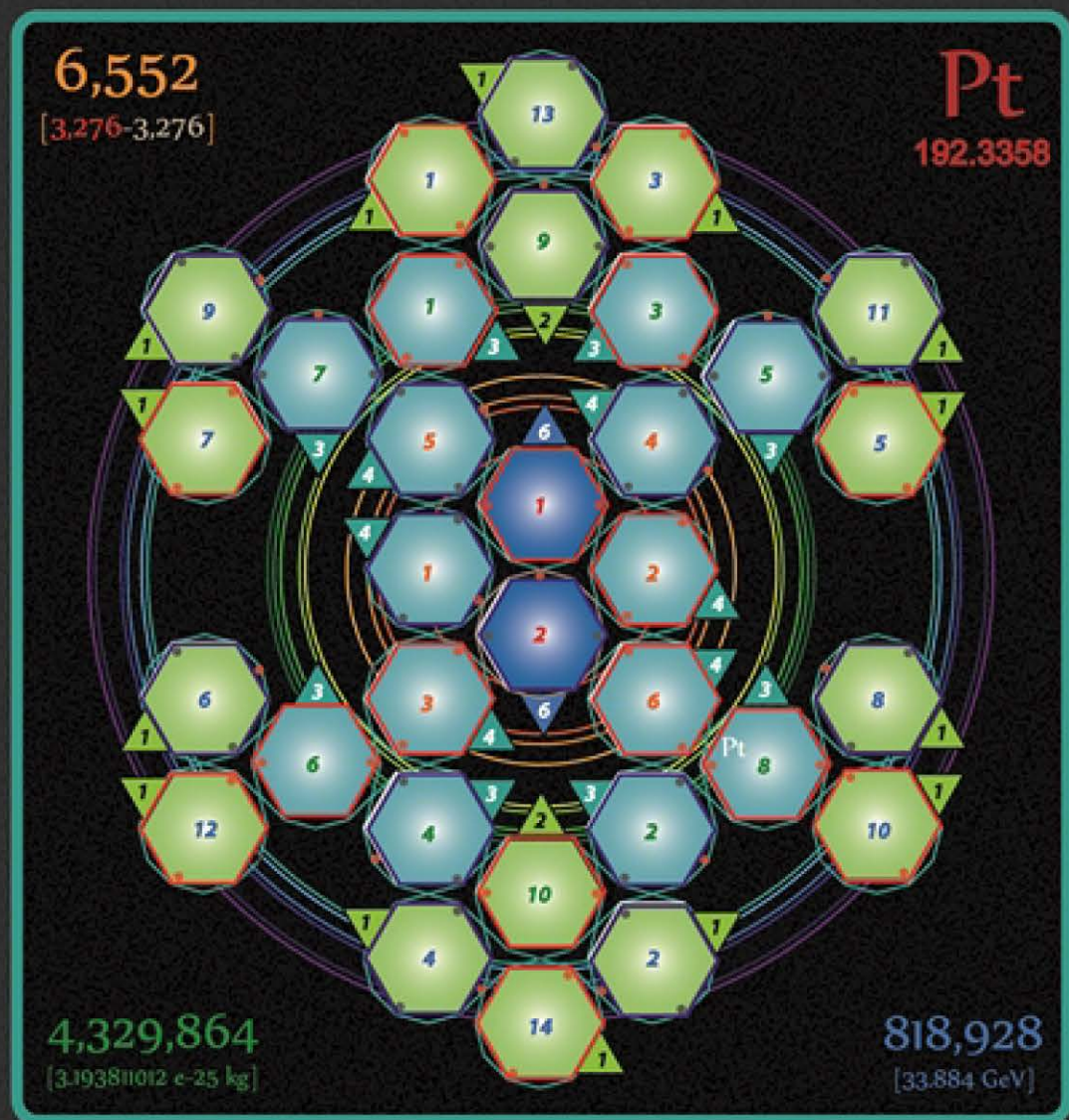
77 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6

Transition Metal

Aufbau



Tetryonics 51.77 - Iridium atom



electron configuration
 $[Xe] 4f^{14} 5d^8 6s^2$
 54

Aufbau

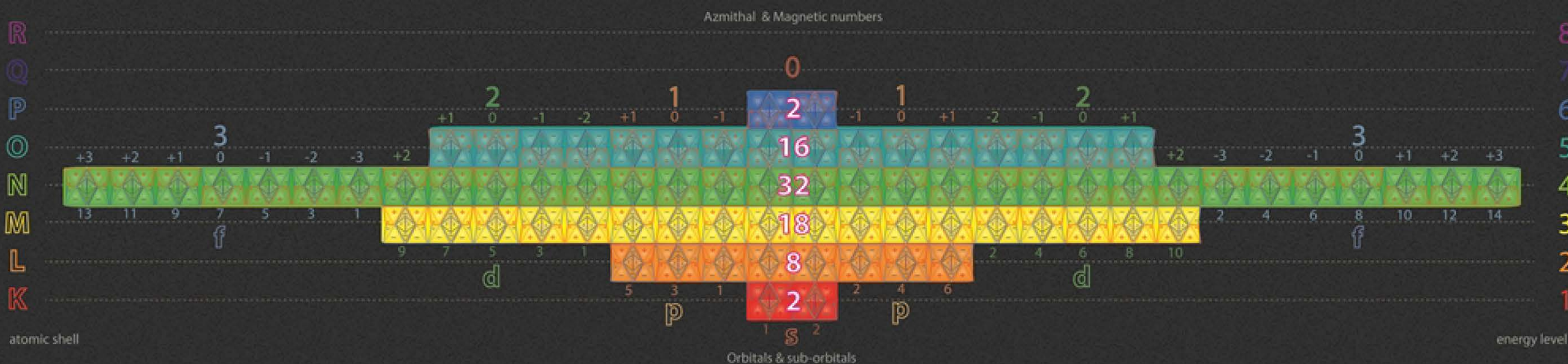
Platinum

78

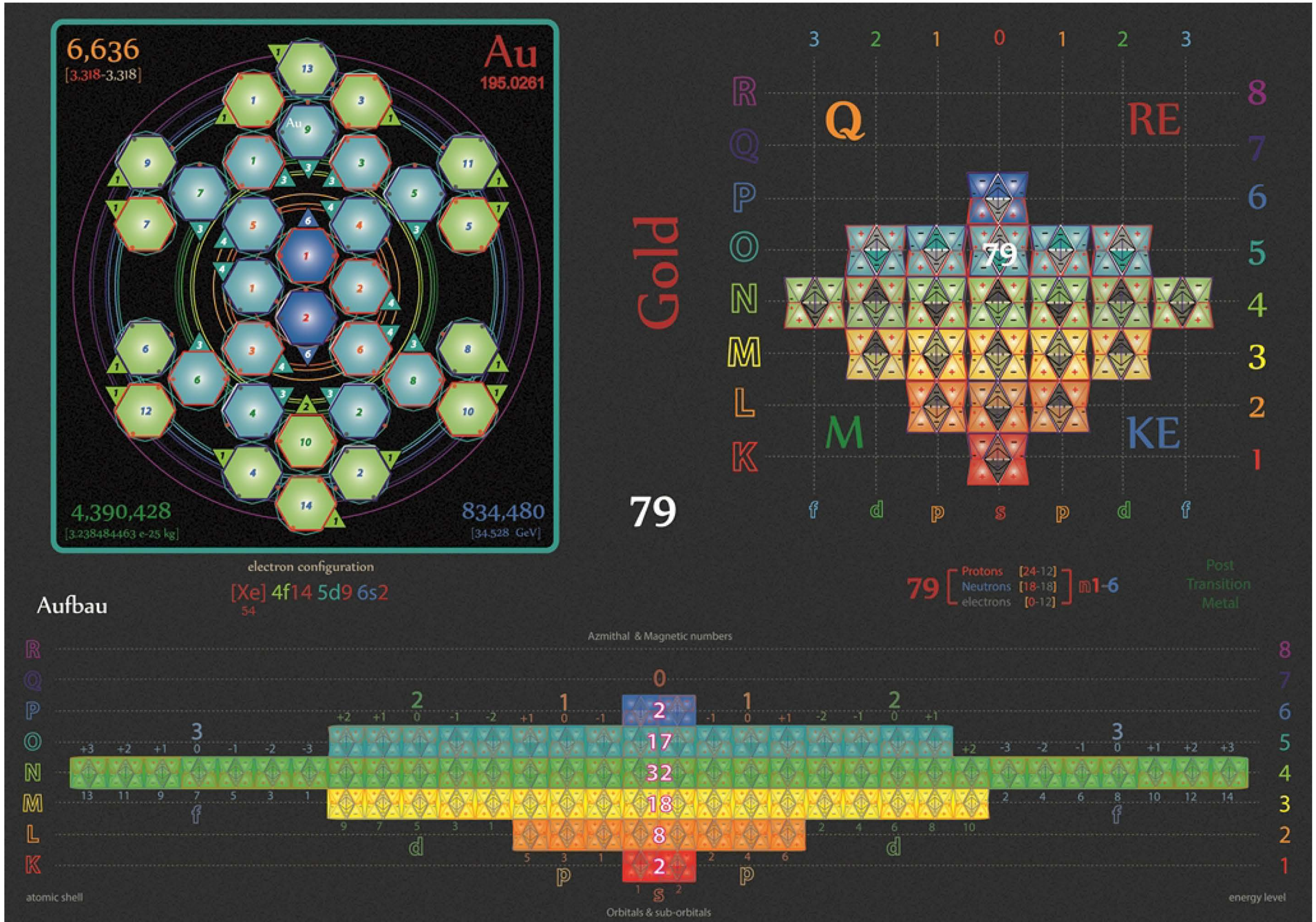


78 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6

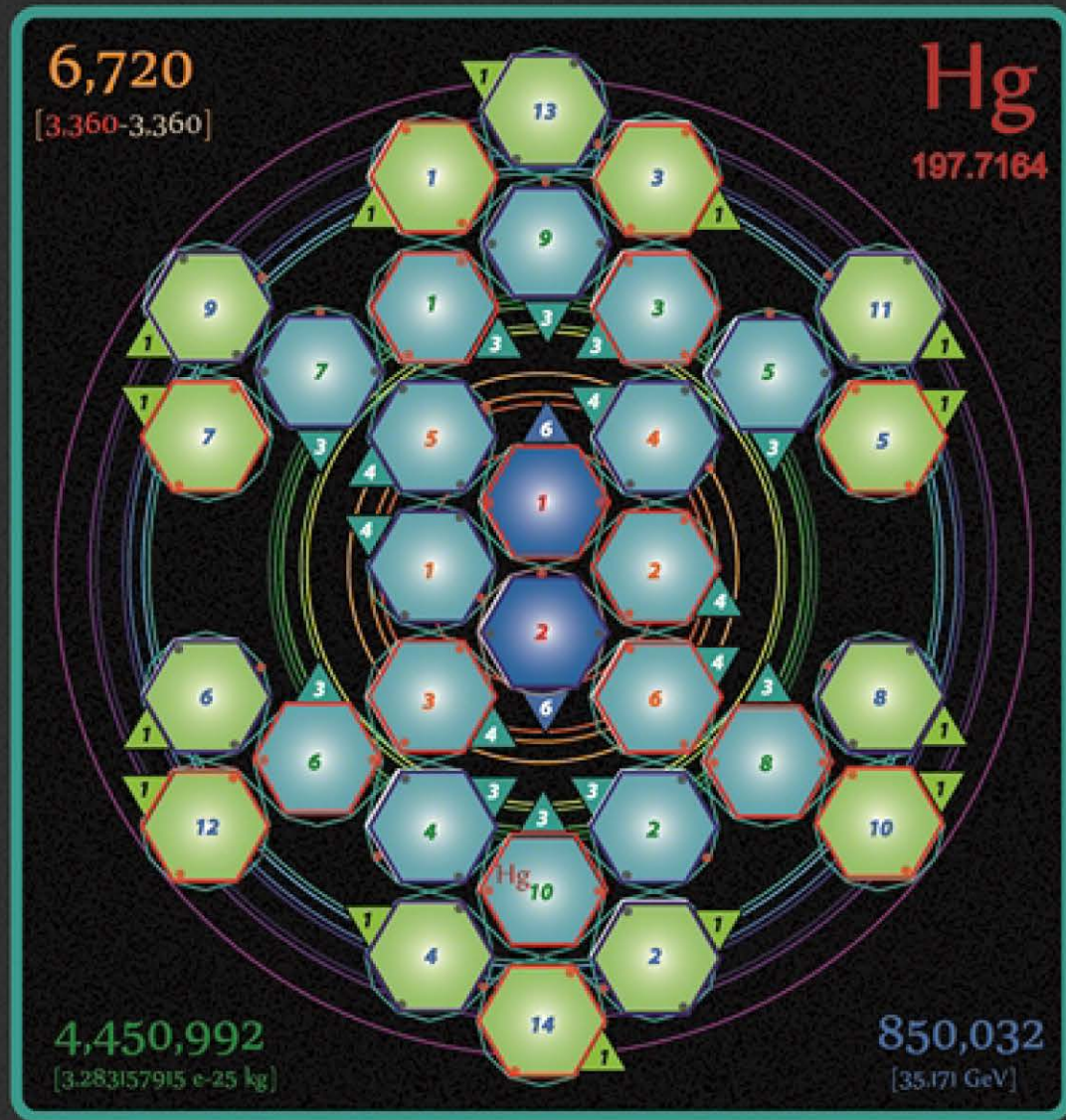
Transition Metal



Tetryonics 51.78 - Platinum atom



Tetryonics 51.79 - Gold atom



electron configuration
 $[Xe] 4f^{14} 5d^{10} 6s^2$
 54

Mercury
 80

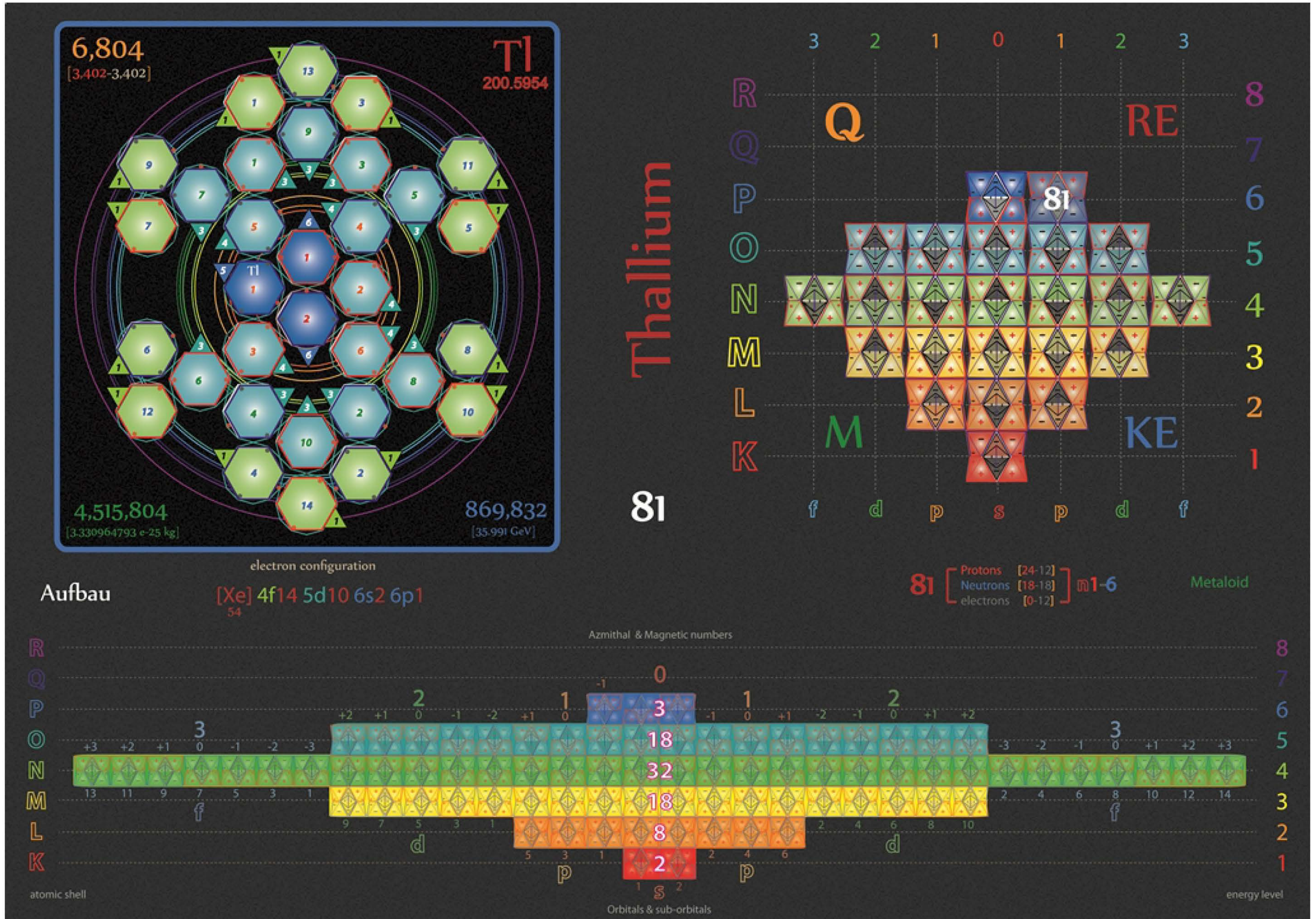


80 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-6
 Post Transition Metal

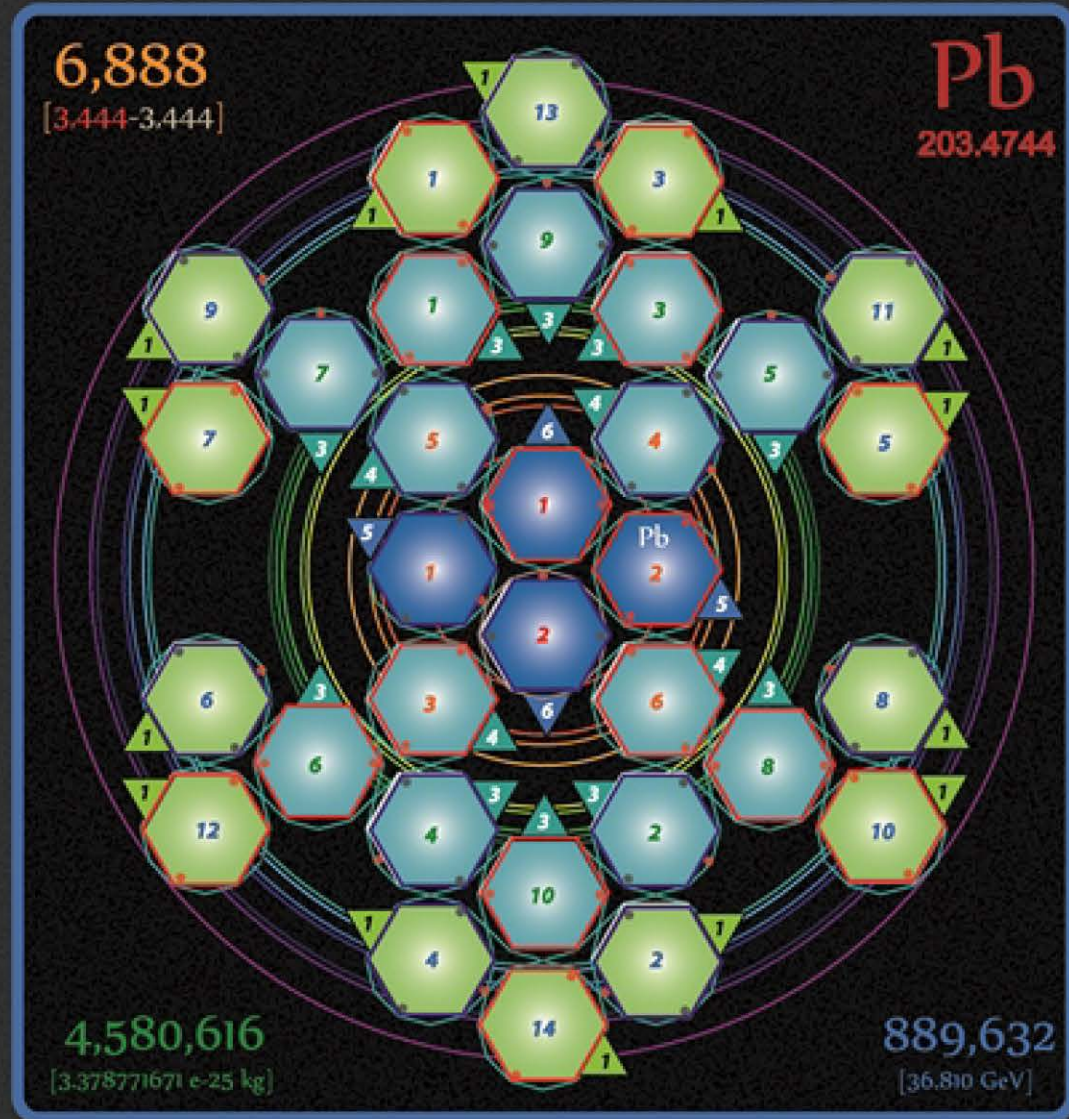
Aufbau



Tetryonics 51.80 - Mercury atom



Tetryonics 51.81 - Thallium atom



electron configuration

Aufbau



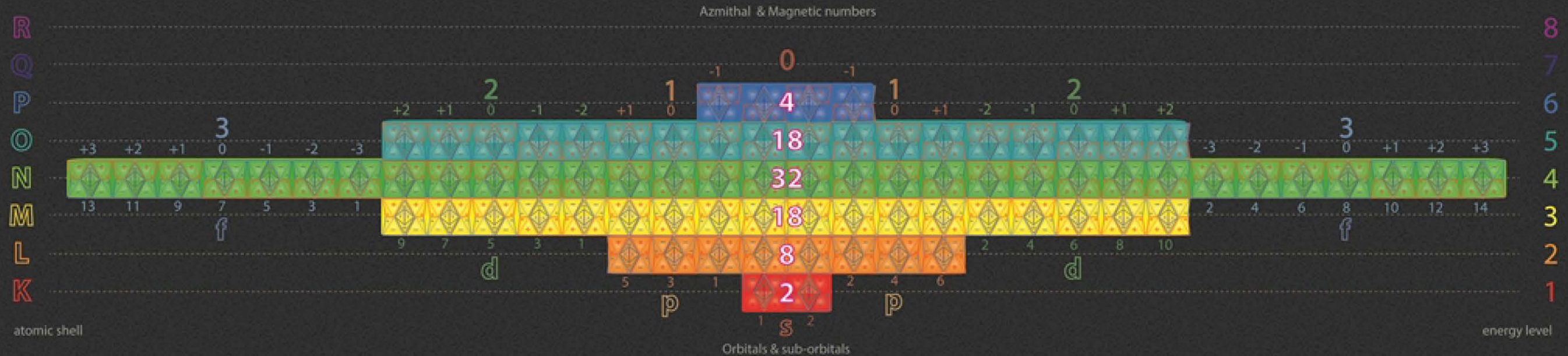
Lead

82

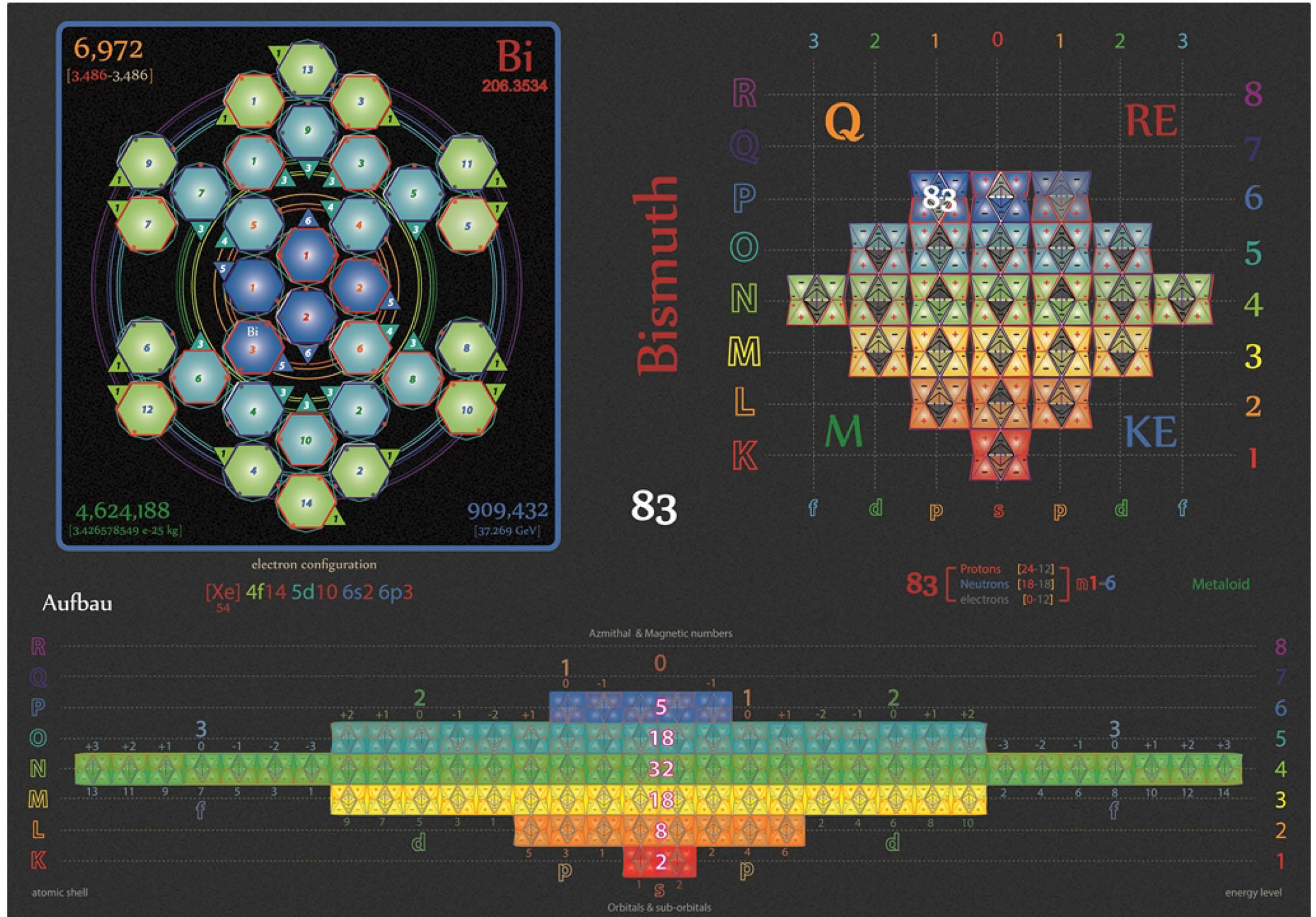


82 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n1-6$

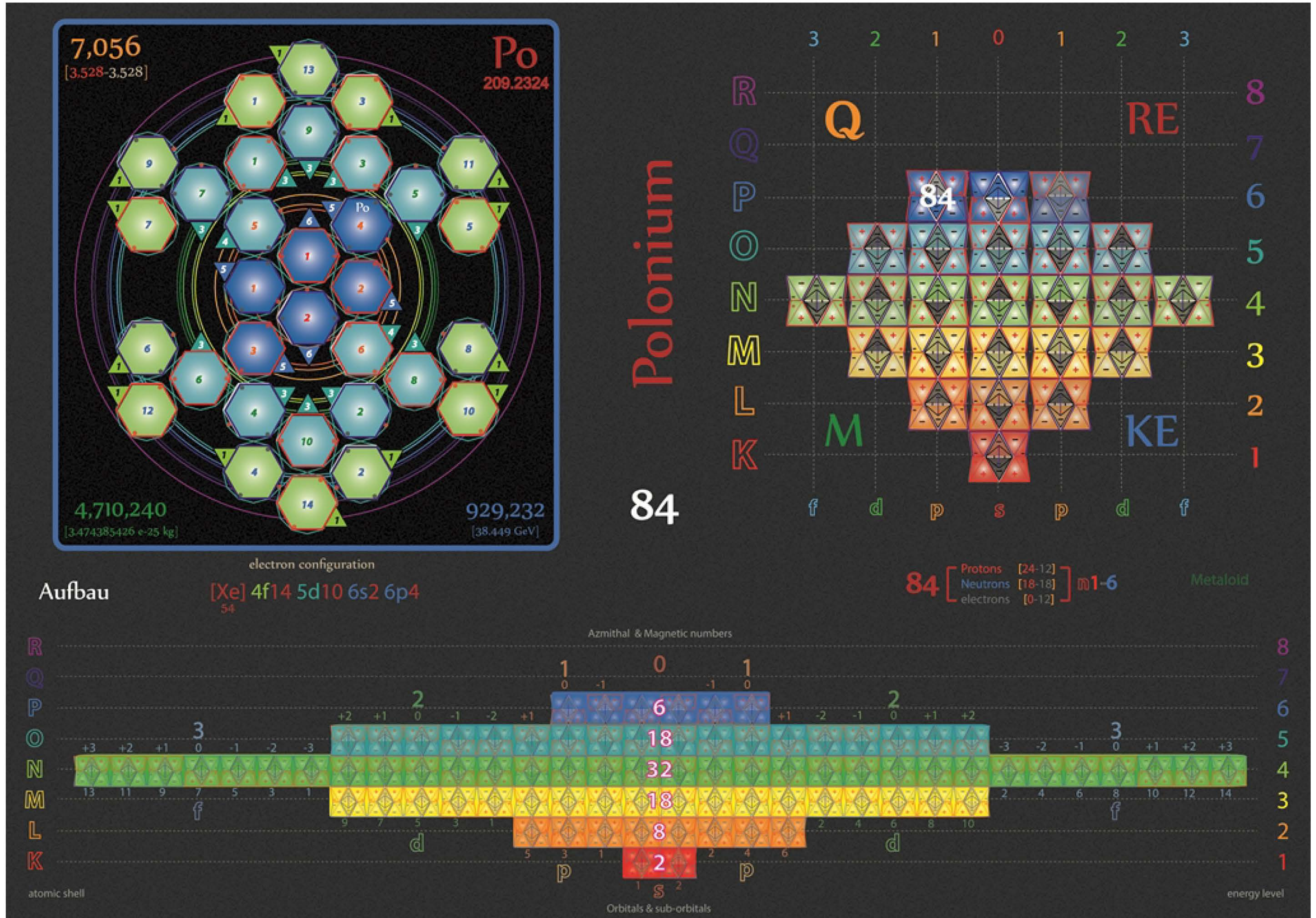
Metalloid



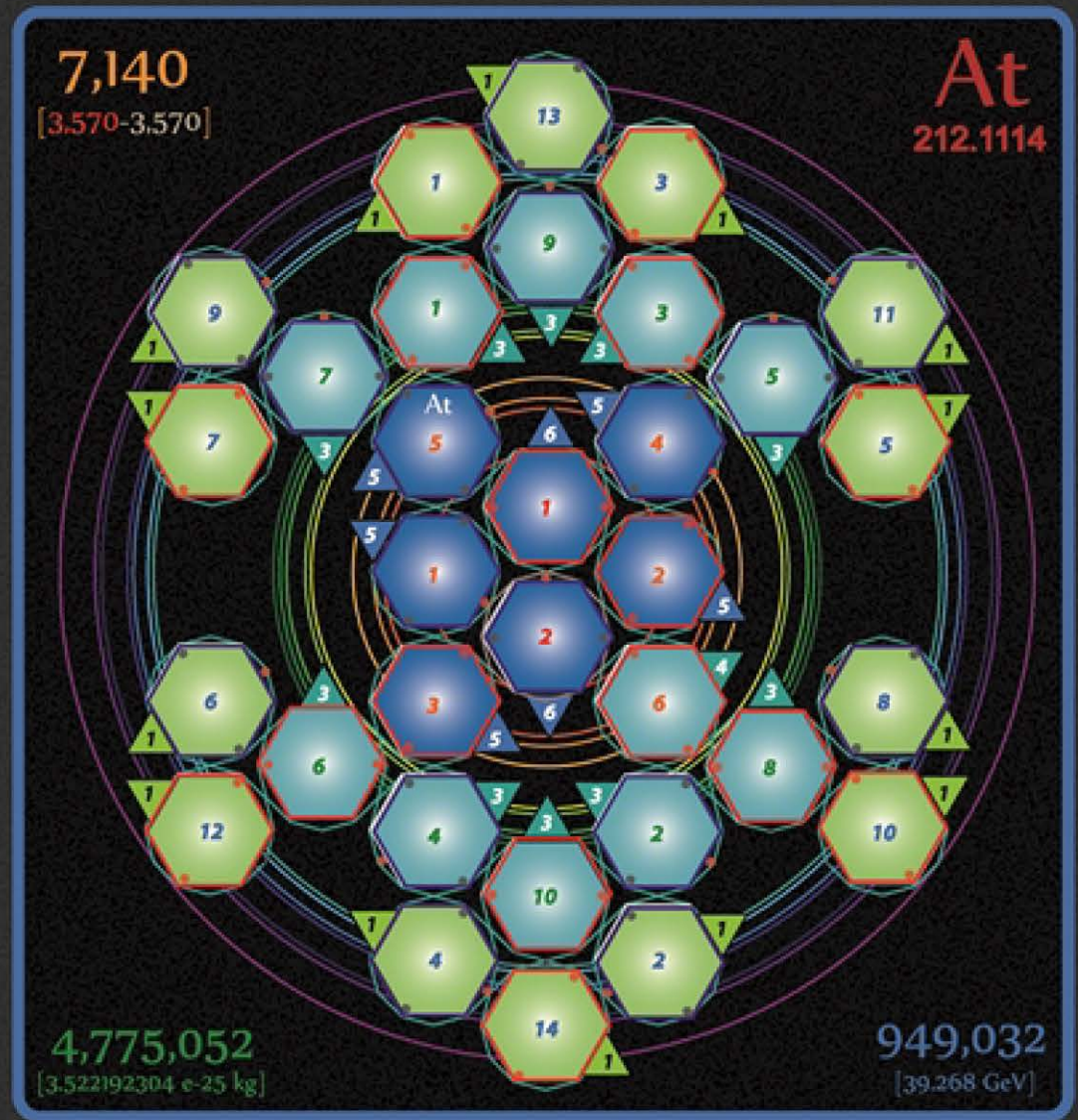
Tetryonics 51.82 - Lead atom



Tetryonics 51.83 - Bismuth atom



Tetryonics 51.84 - Polonium atom



Astatine

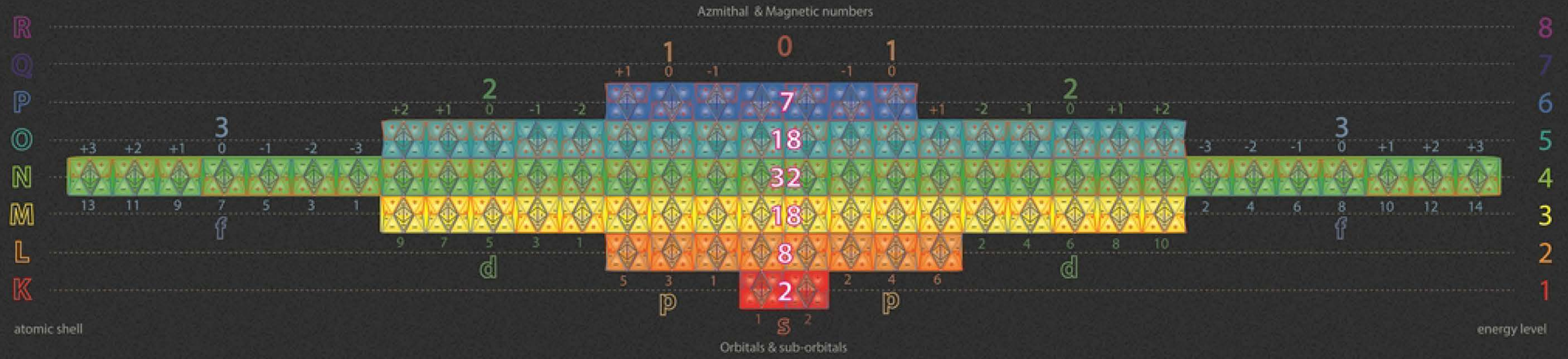
85



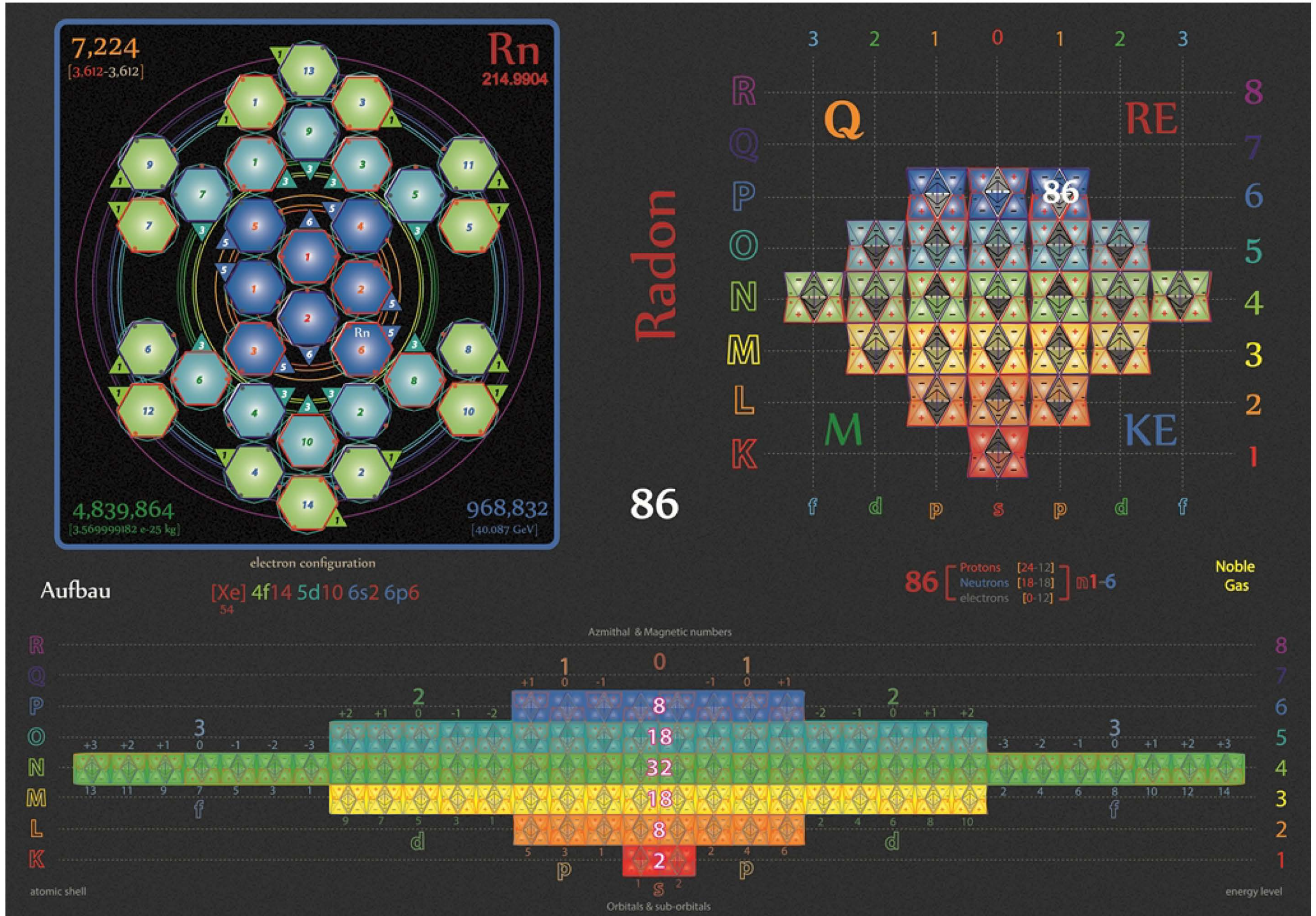
Aufbau

electron configuration
 $[Xe]_{54} 4f^{14} 5d^{10} 6s^2 6p^5$

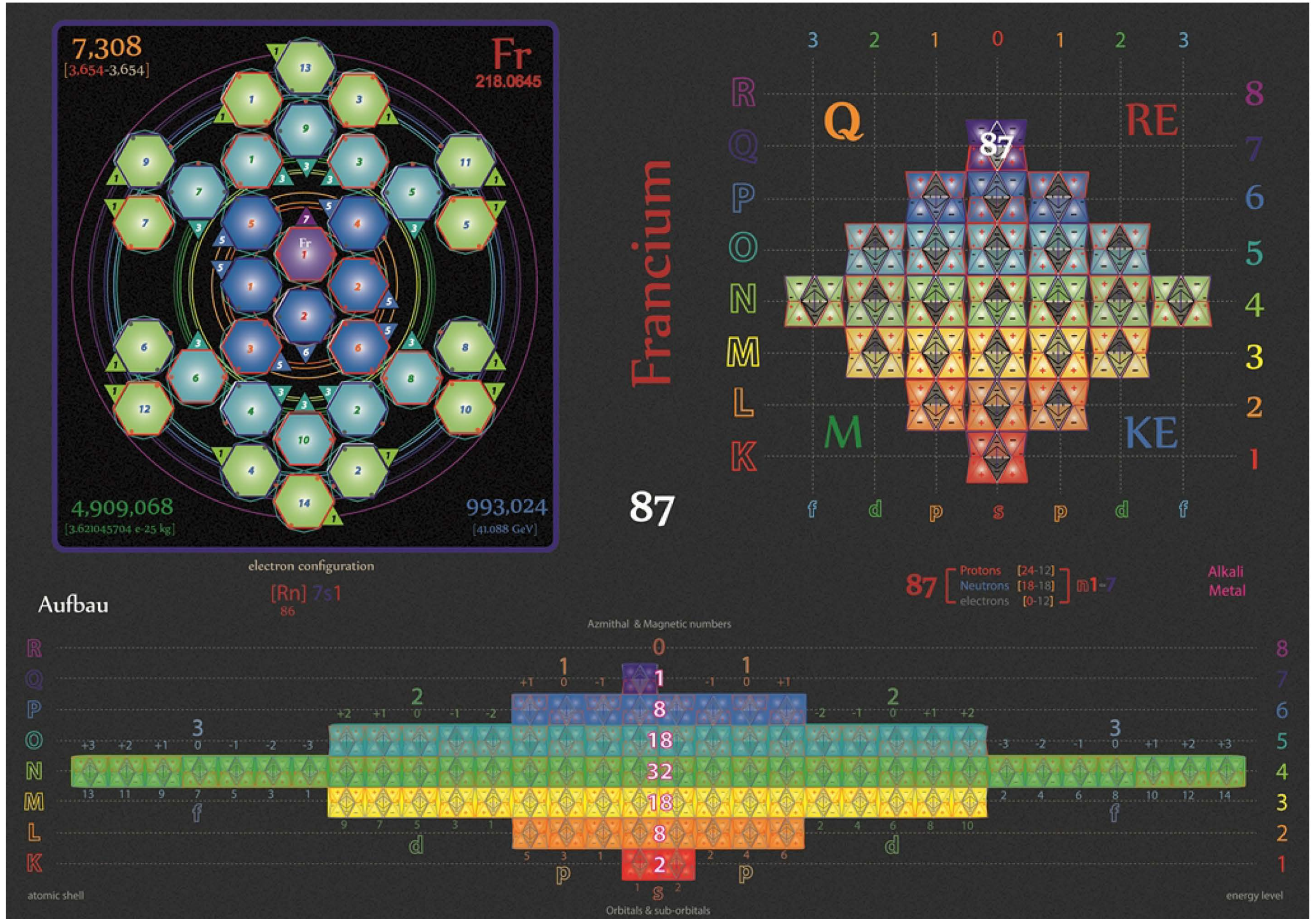
85 $\left[\begin{array}{l} \text{Protons} [24-12] \\ \text{Neutrons} [18-18] \\ \text{electrons} [0-12] \end{array} \right] n1-6$ Halogen



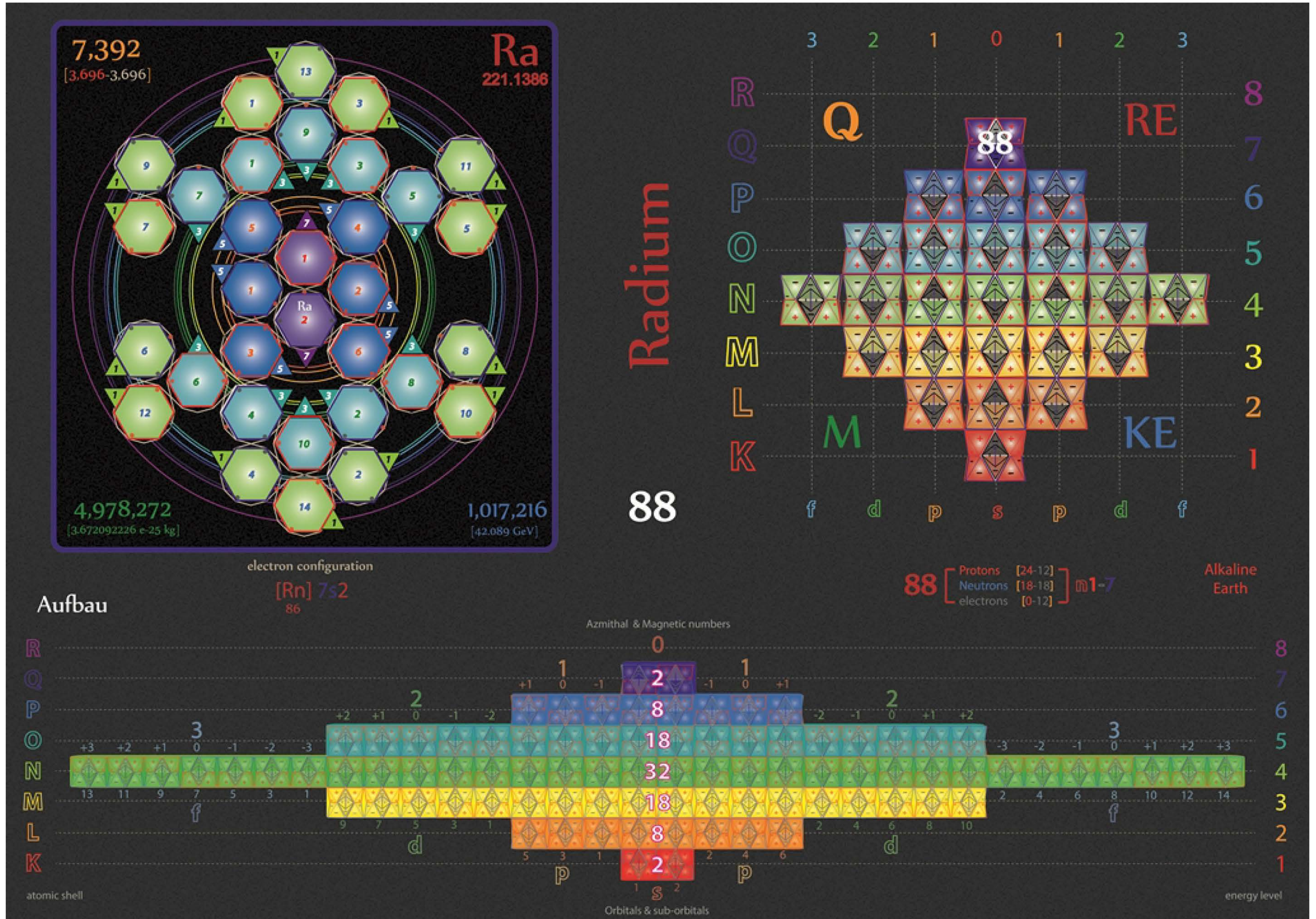
Tetryonics 51.85 - Astatine atom



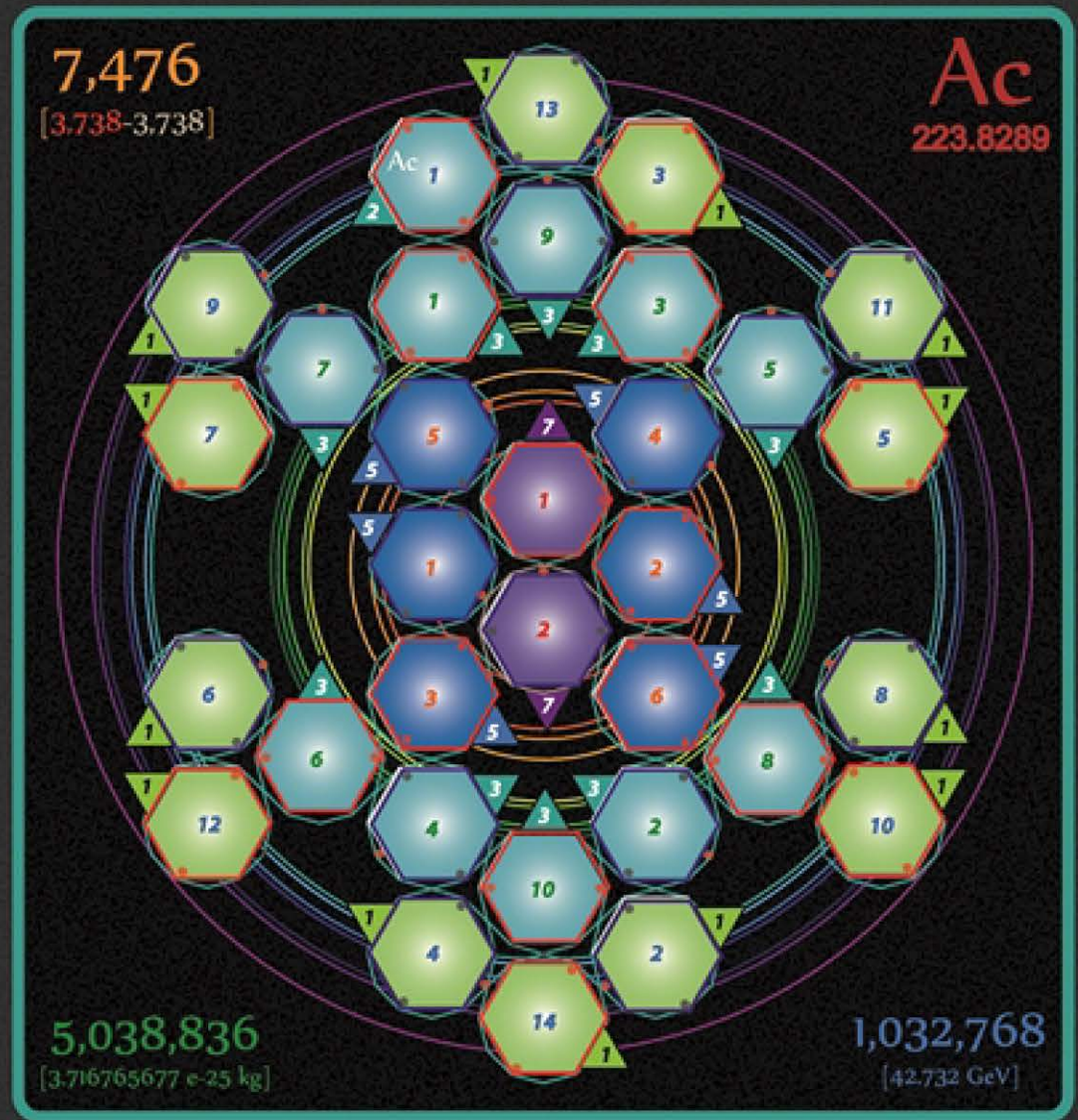
Tetryonics 51.86 - Radon atom



Tetryonics 51.87 - Francium atom



Tetryonics 51.88 - Radium atom



7,476
[3.738-3.738]

Ac
223.8289

5,038,836
[3.716765677 e-25 kg]

1,032,768
[42.732 GeV]

electron configuration

[Rn] 5f¹ 7s²
86

Actinium

89



89 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻⁷

Actinoid

Aufbau

Amzithal & Magnetic numbers

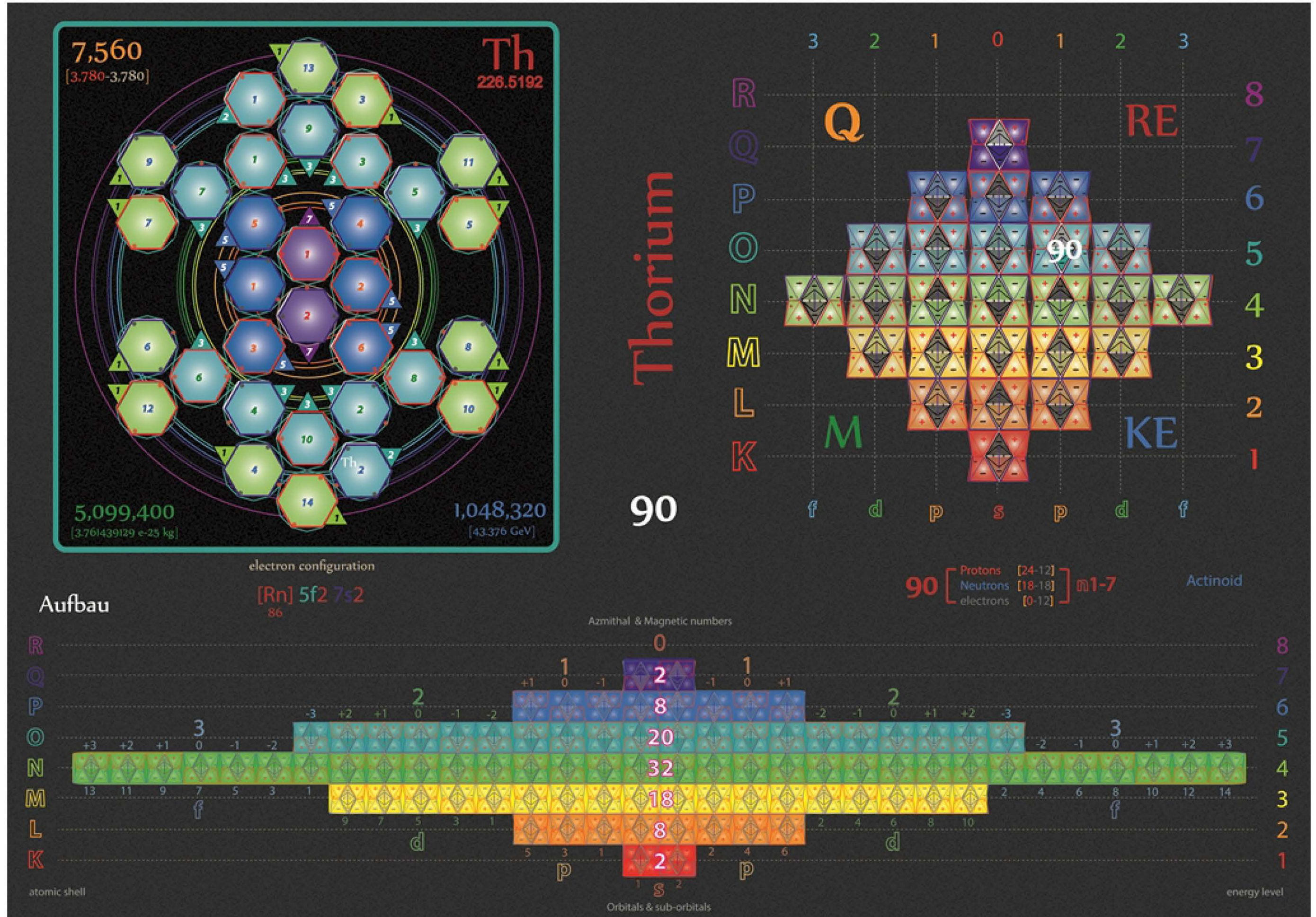


atomic shell

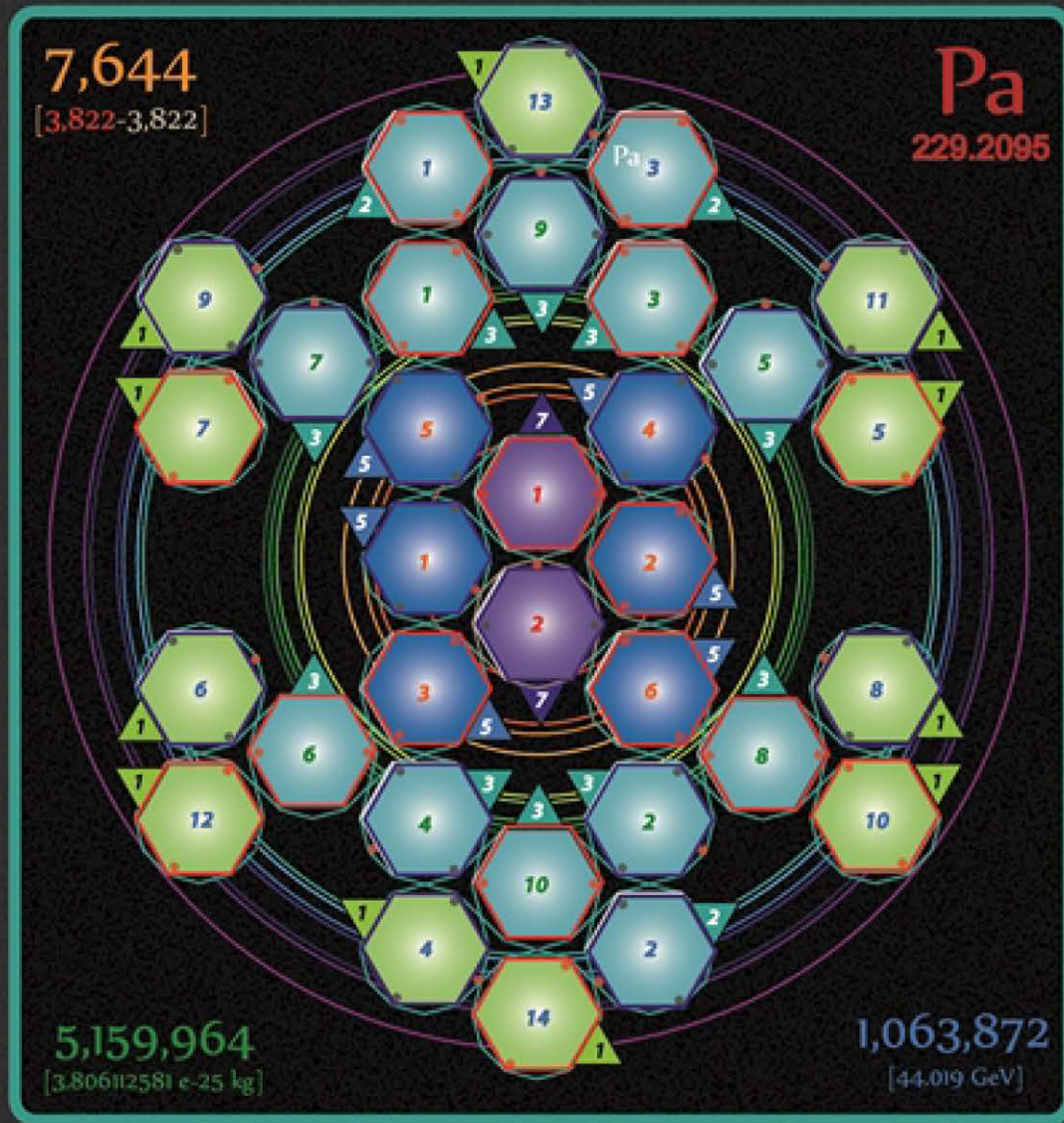
Orbitals & sub-orbitals

energy level

Tetryonics 51.89 - Actinium atom

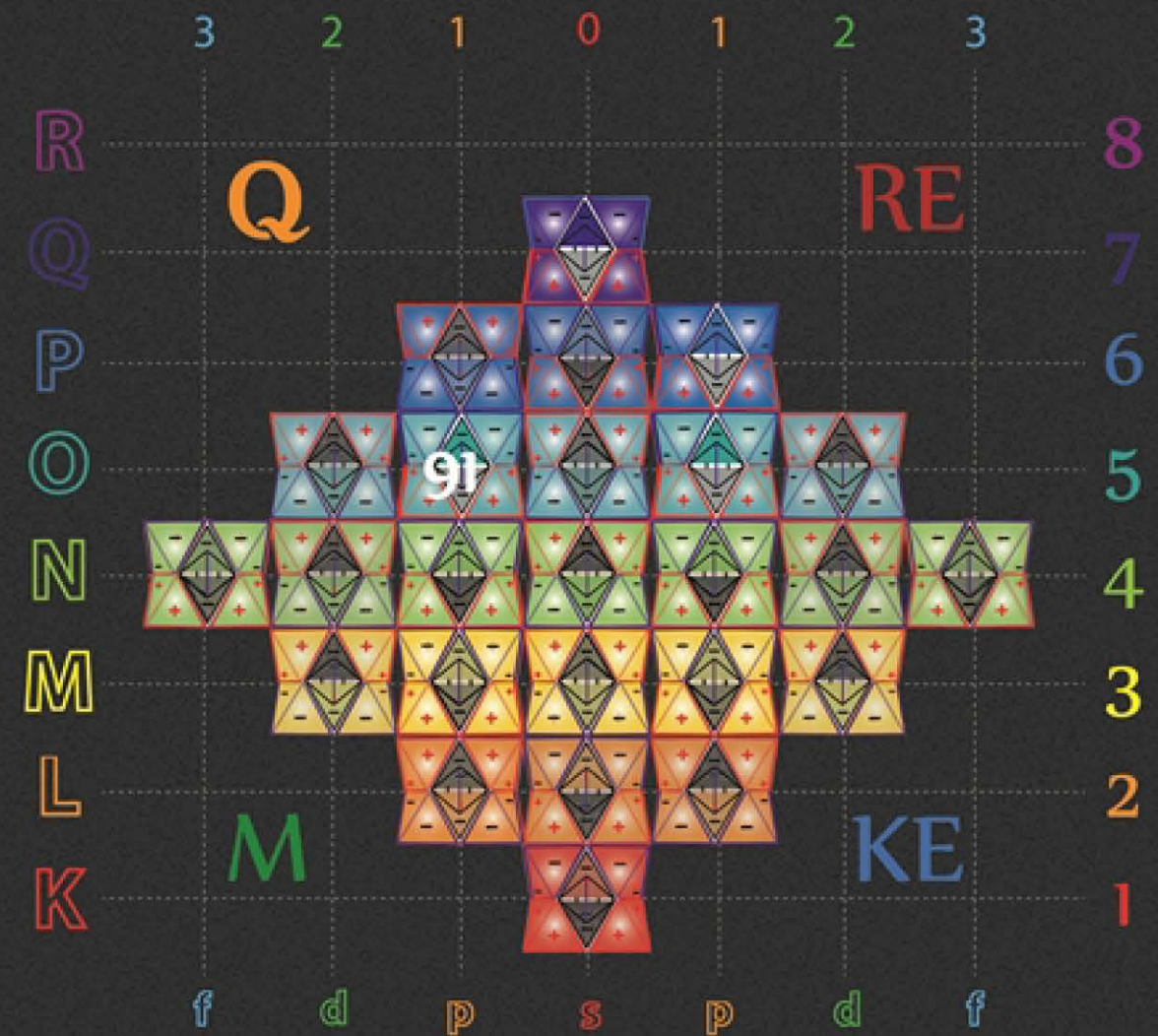


Tetryonics 51.90 - Thorium atom



Protactinium

91



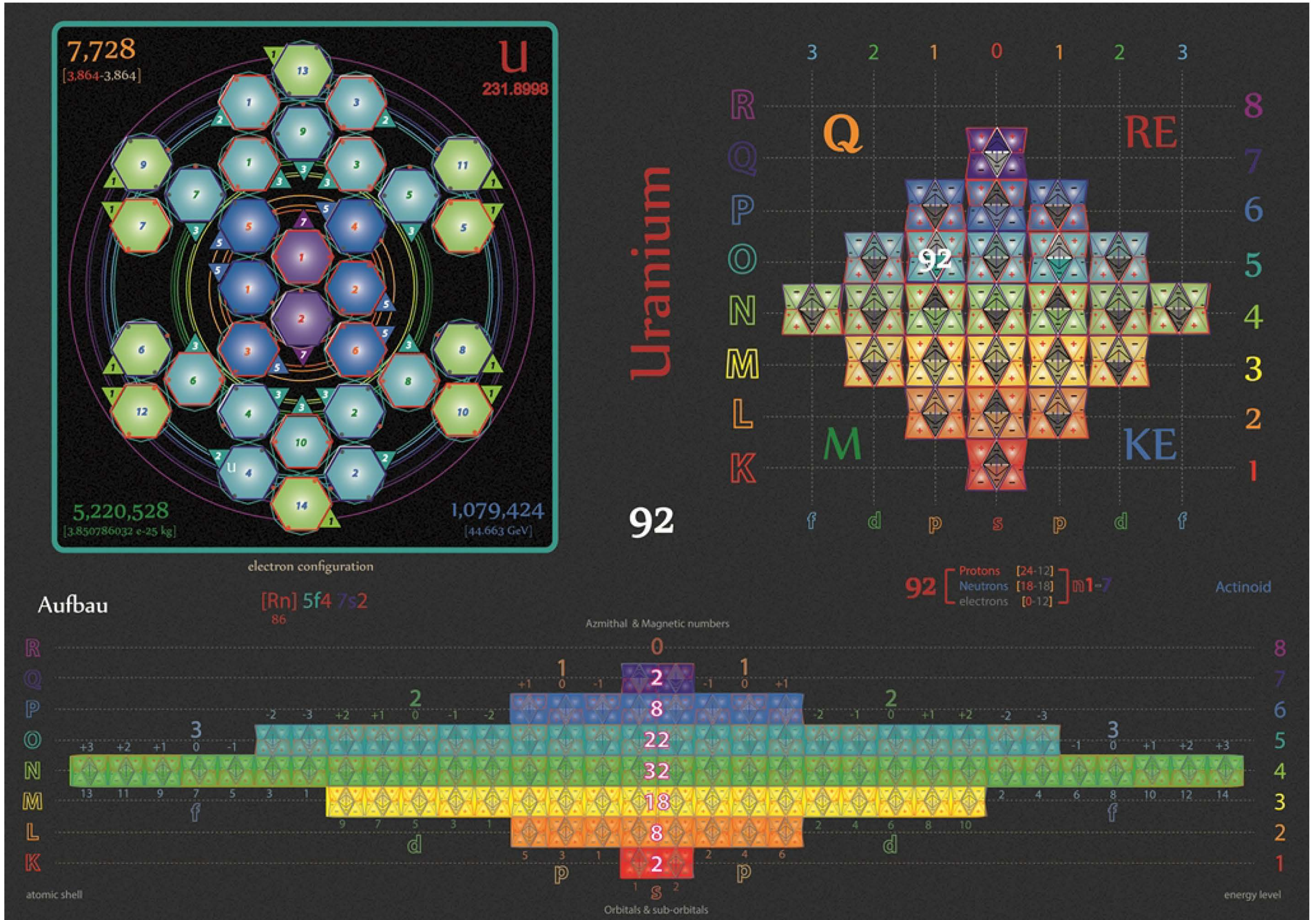
91 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-7$ Actinoid

Aufbau

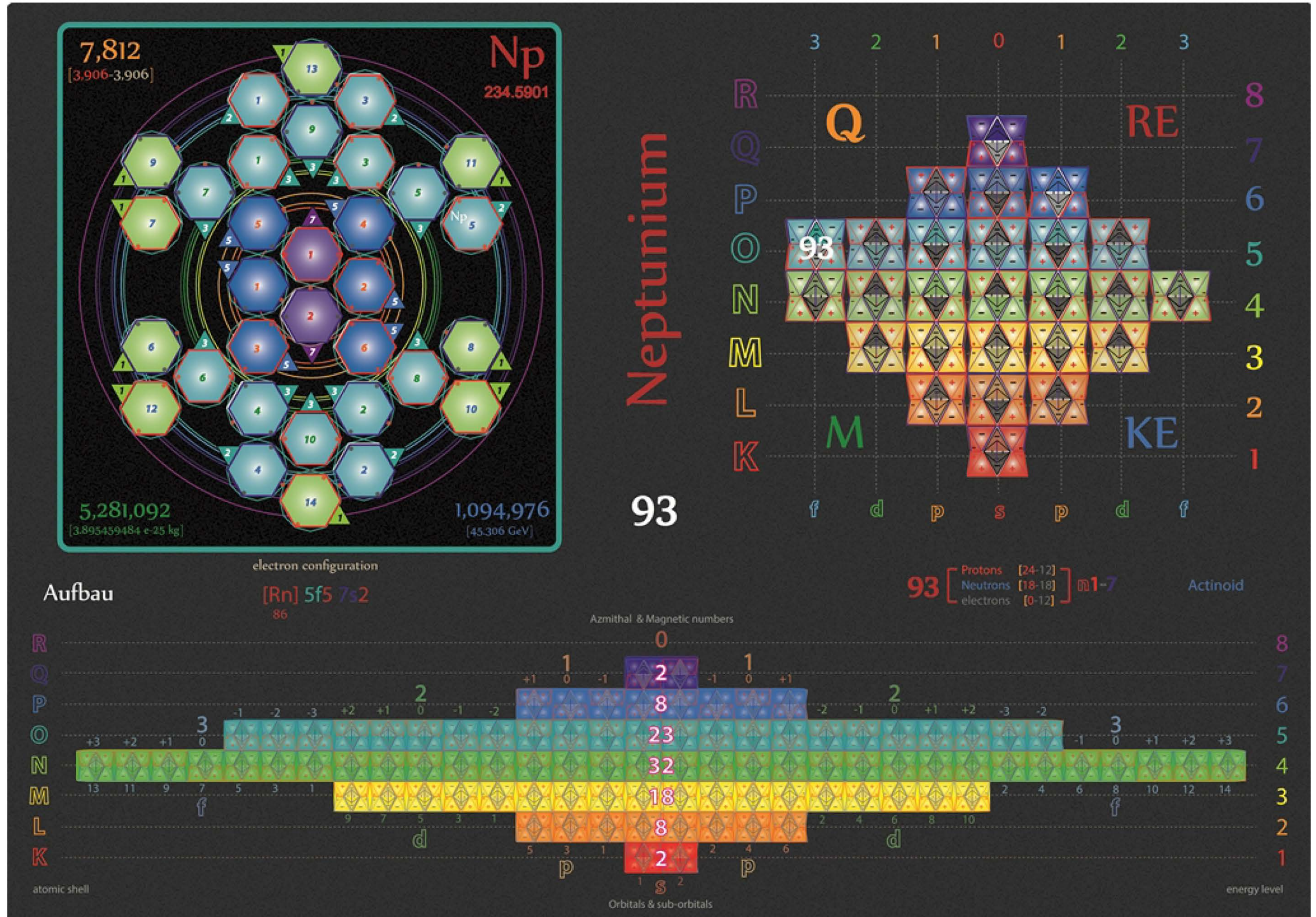
electron configuration
 $[Rn] 5f3 7s2$
 86



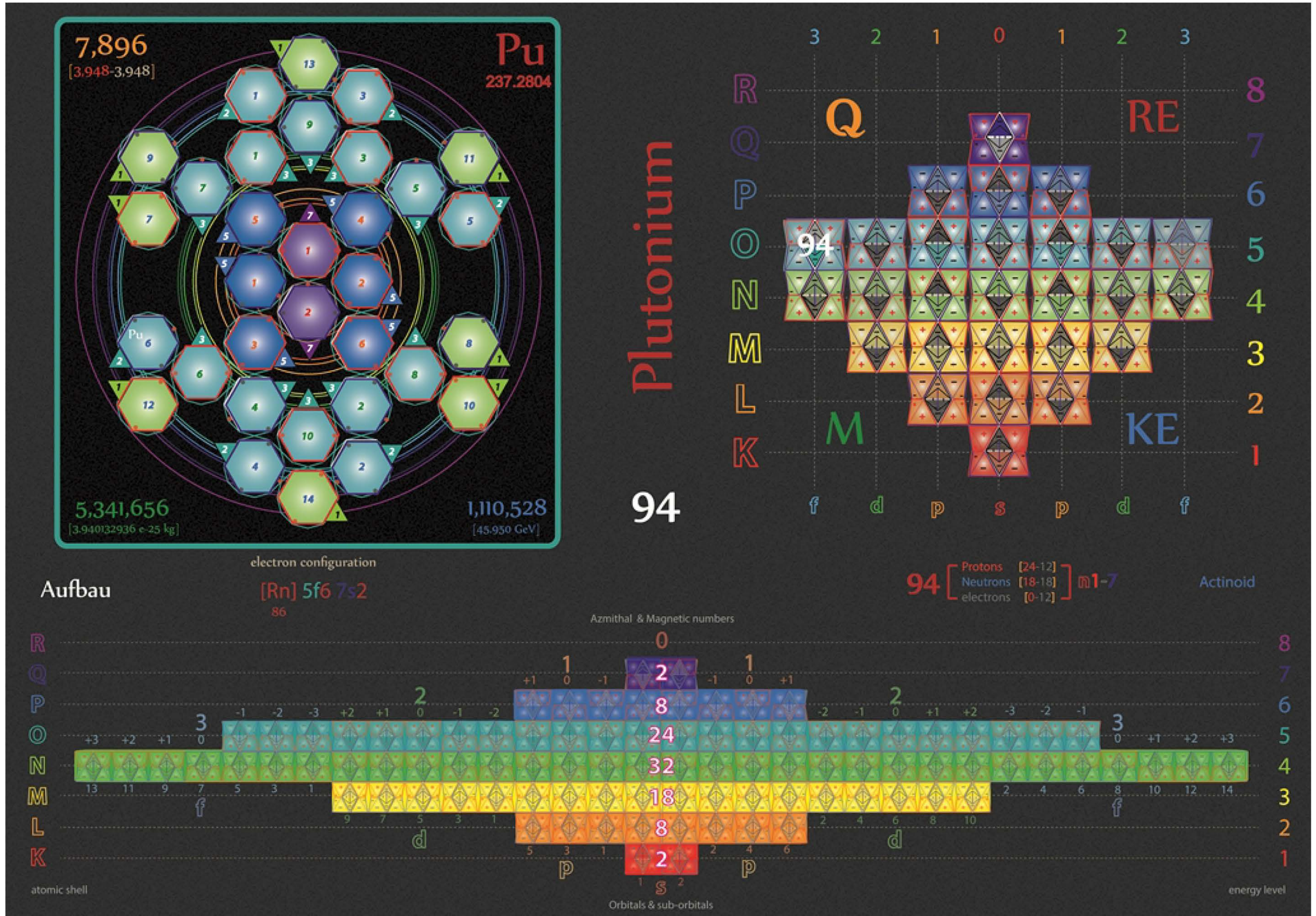
Tetryonics 51.91 - Protactinium atom



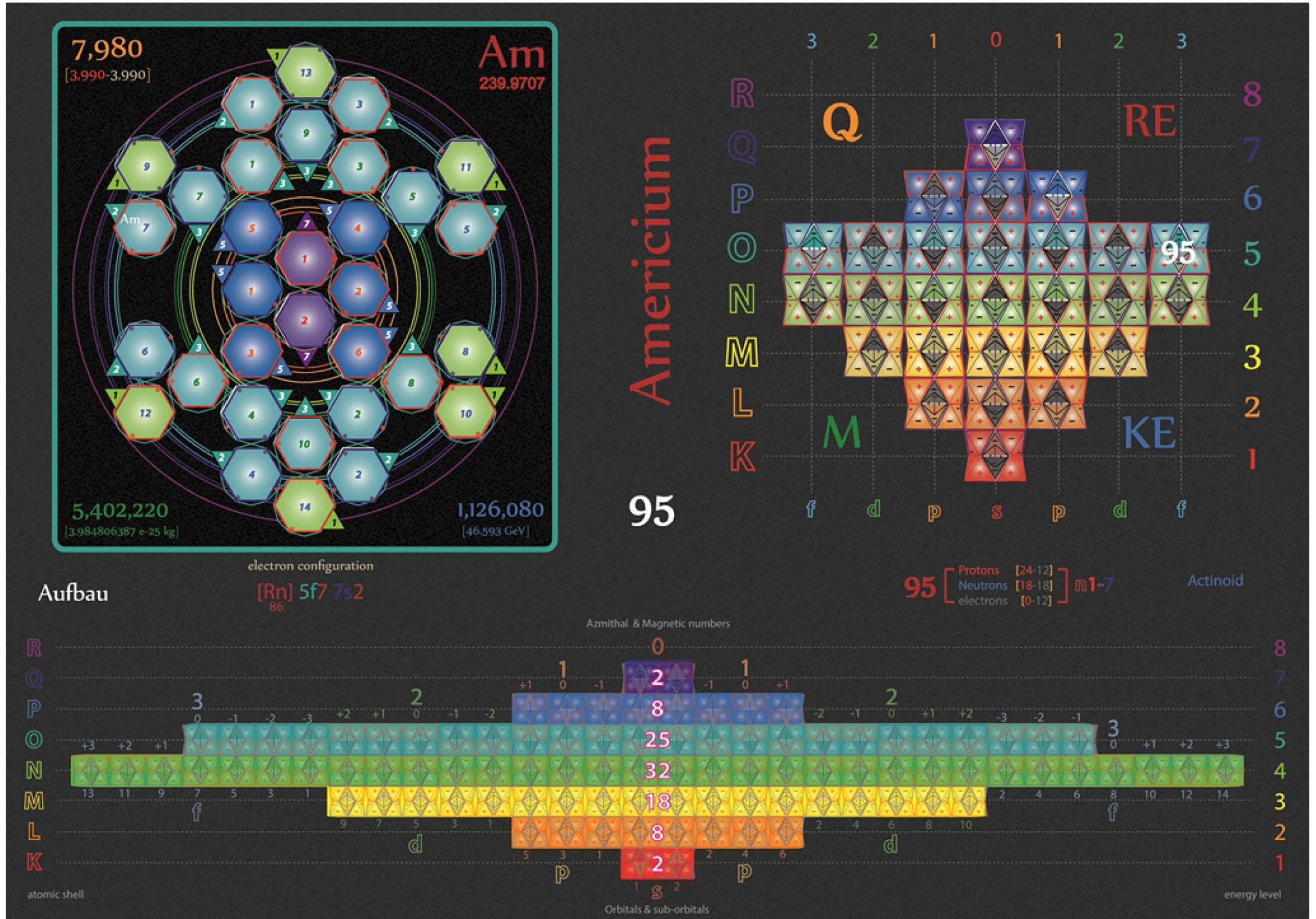
Tetryonics 51.92 - Uranium atom



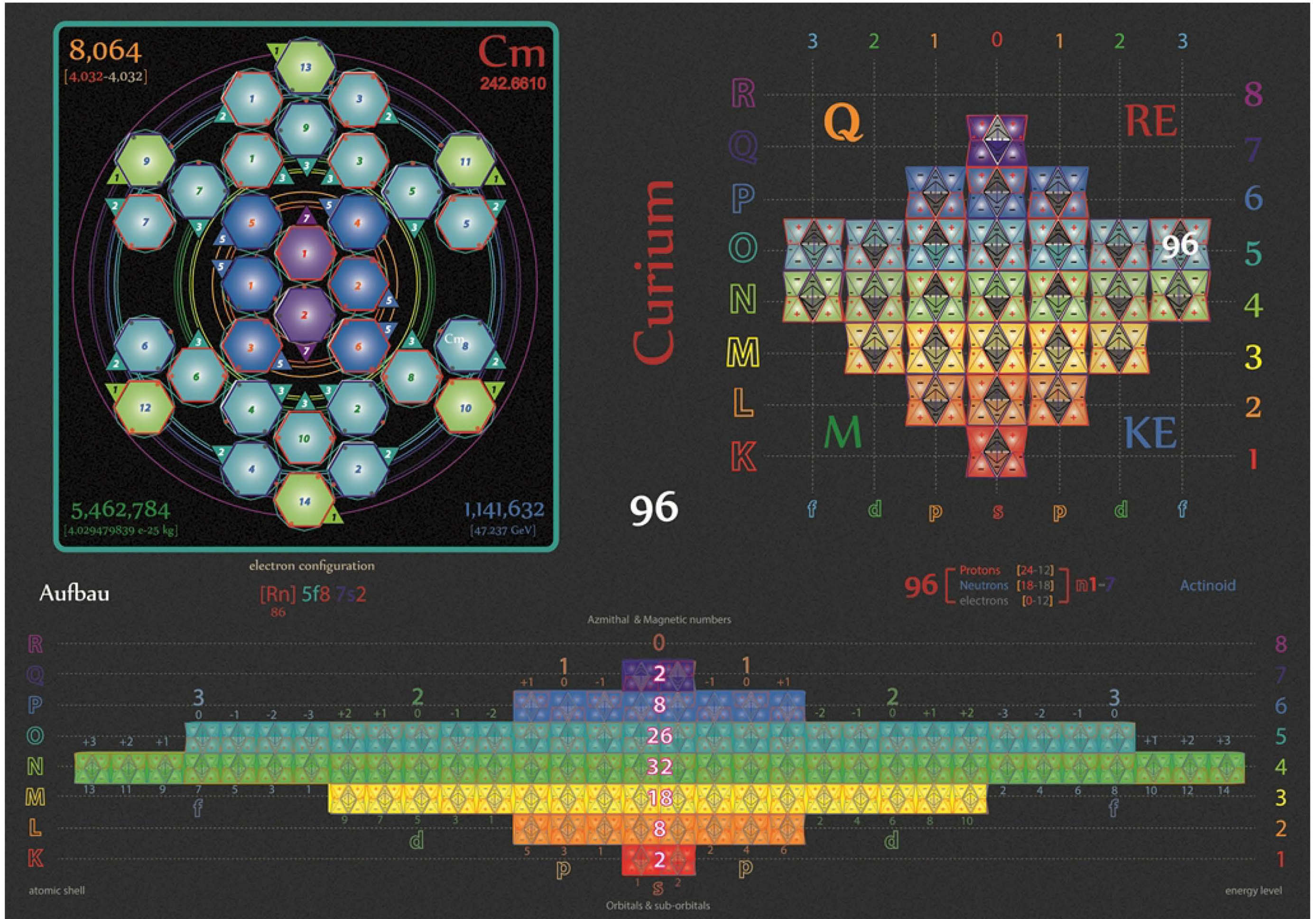
Tetryonics 51.93 - Neptunium atom



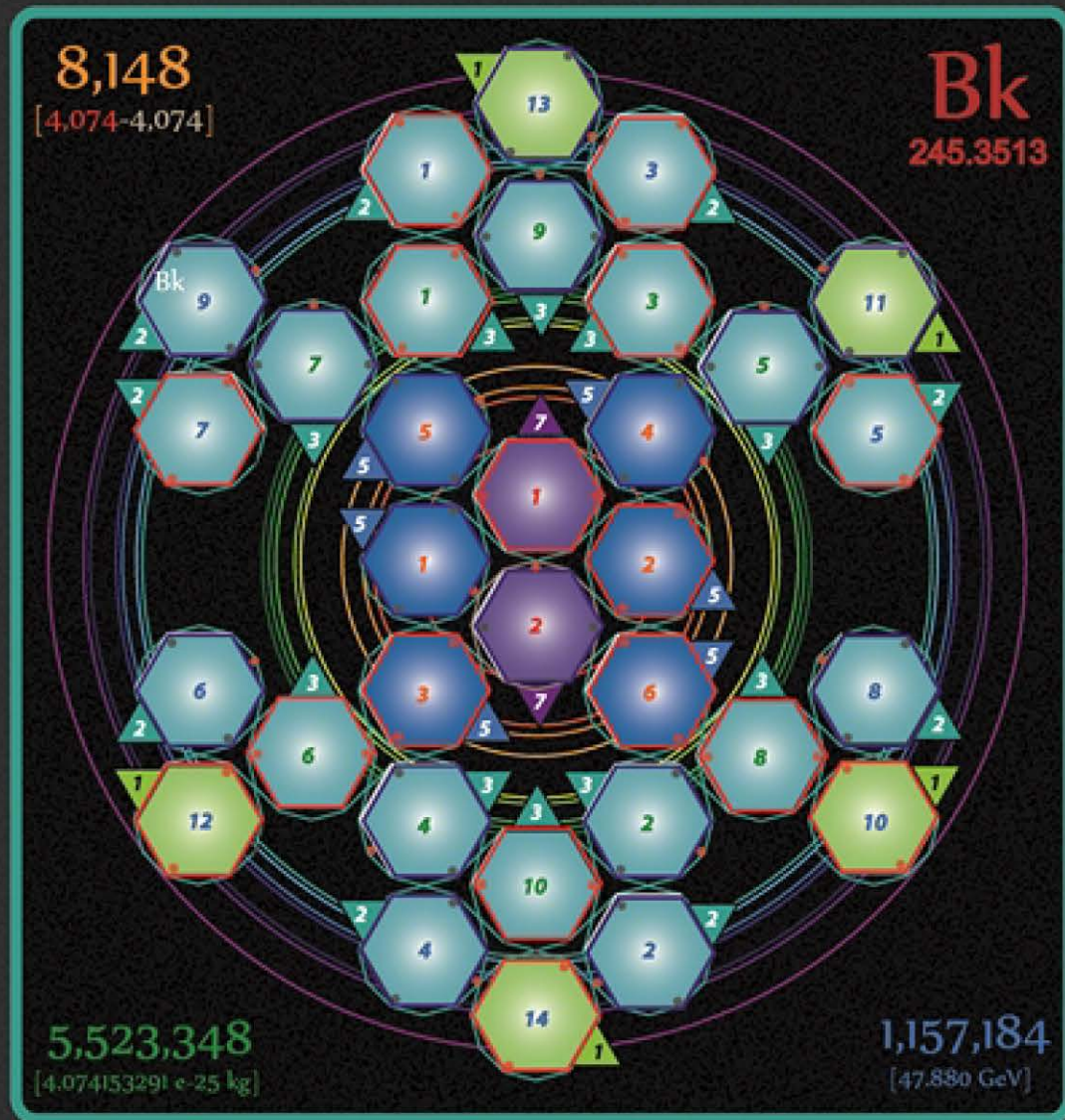
Tetryonics 51.94 - Plutonium atom



Tetryonics 51.95 - Americium atom



Tetryonics 51.96 - Curium atom

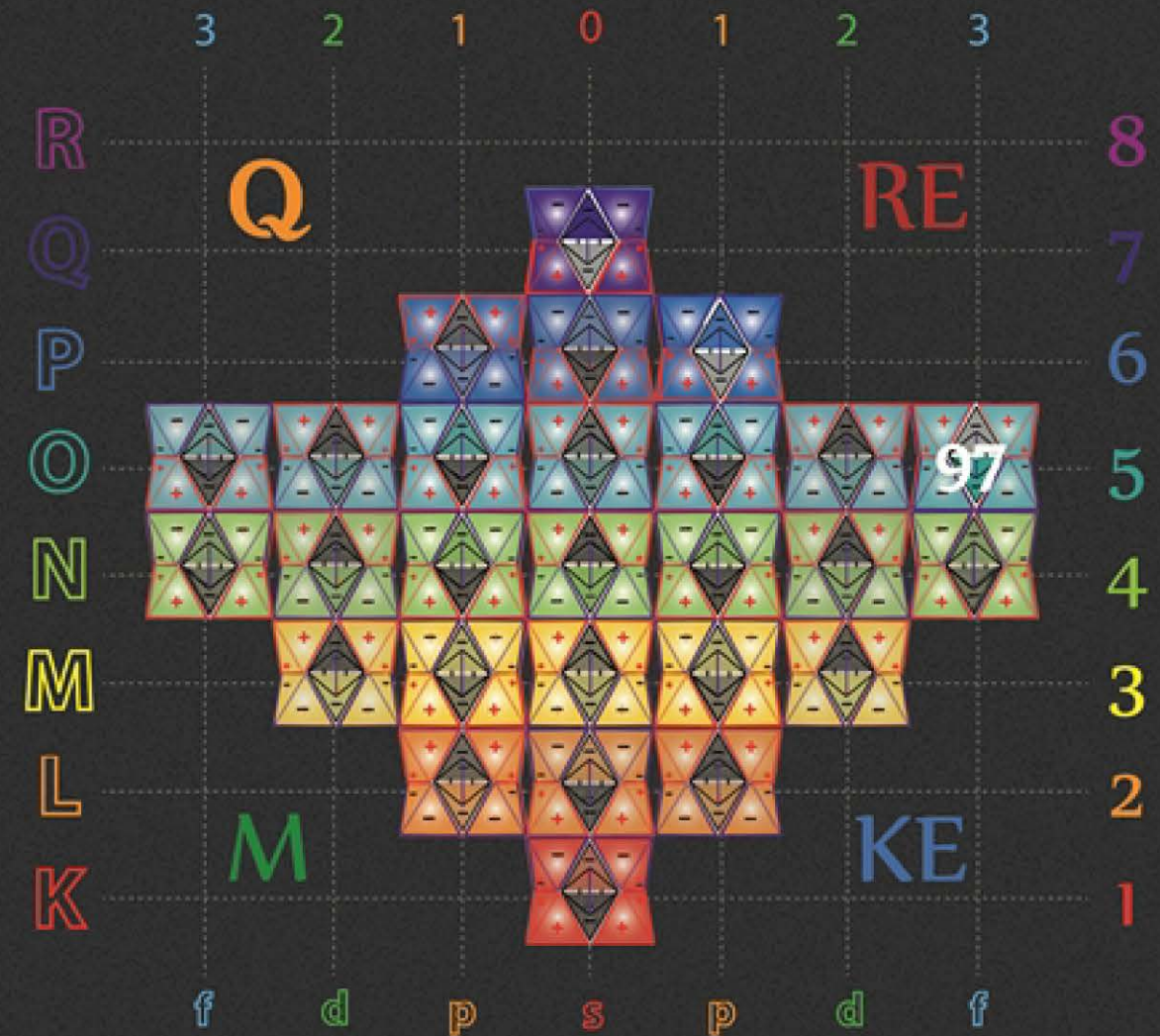


electron configuration

$[Rn] 5f^9 7s^2$
86

Berkelium

97



97 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n1-7$

Actinoid

Aufbau



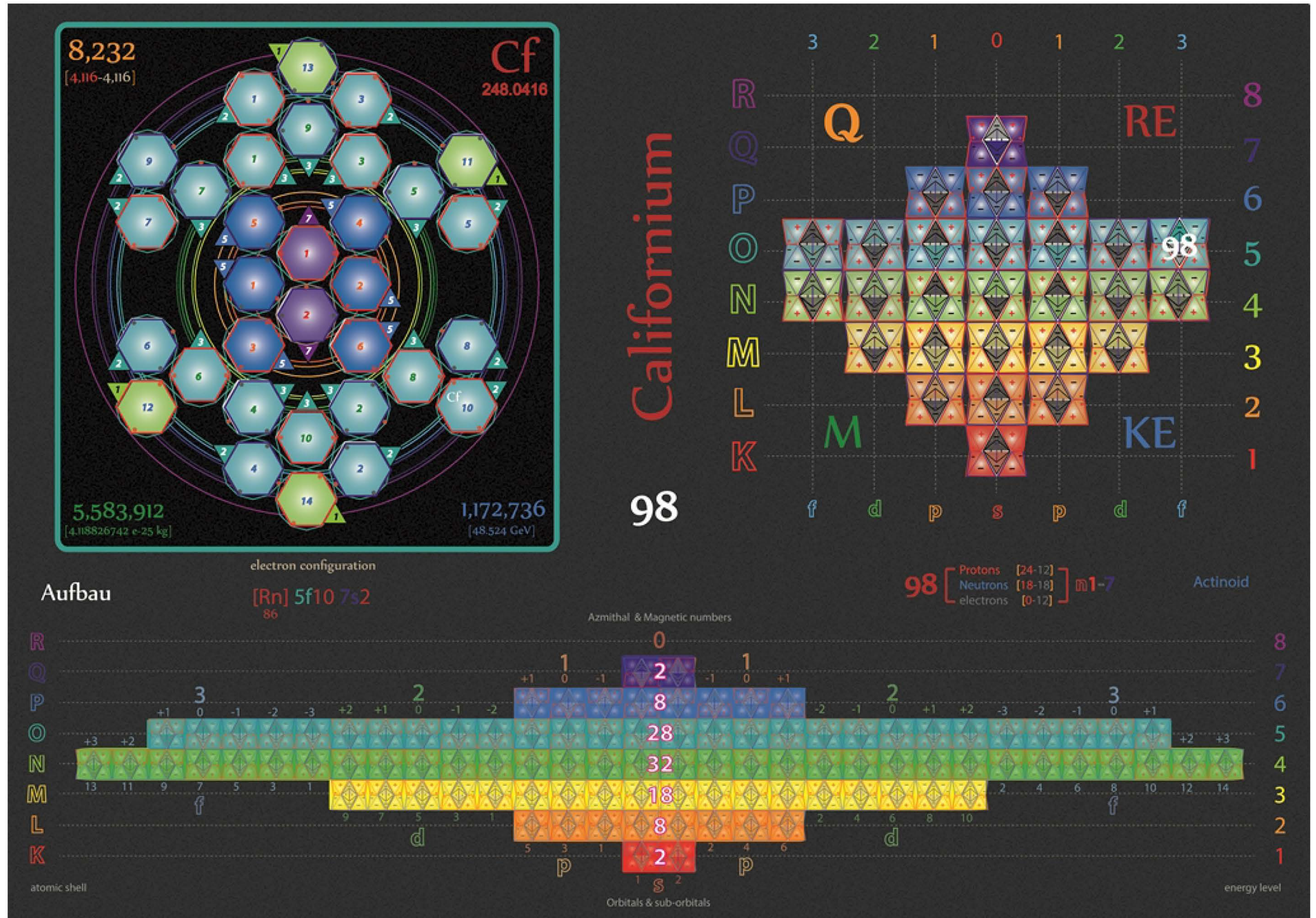
Azimuthal & Magnetic numbers

atomic shell

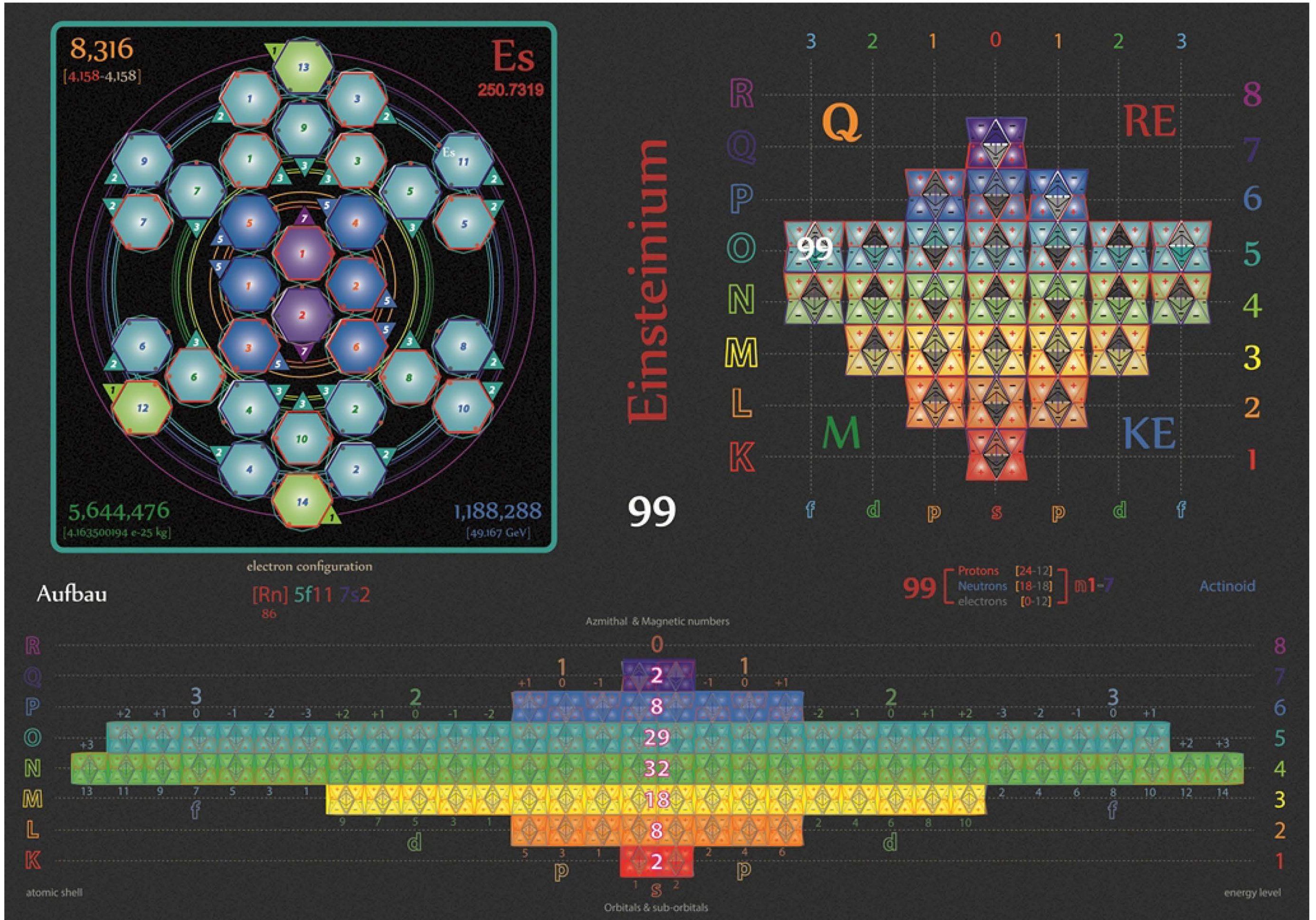
Orbitals & sub-orbitals

energy level

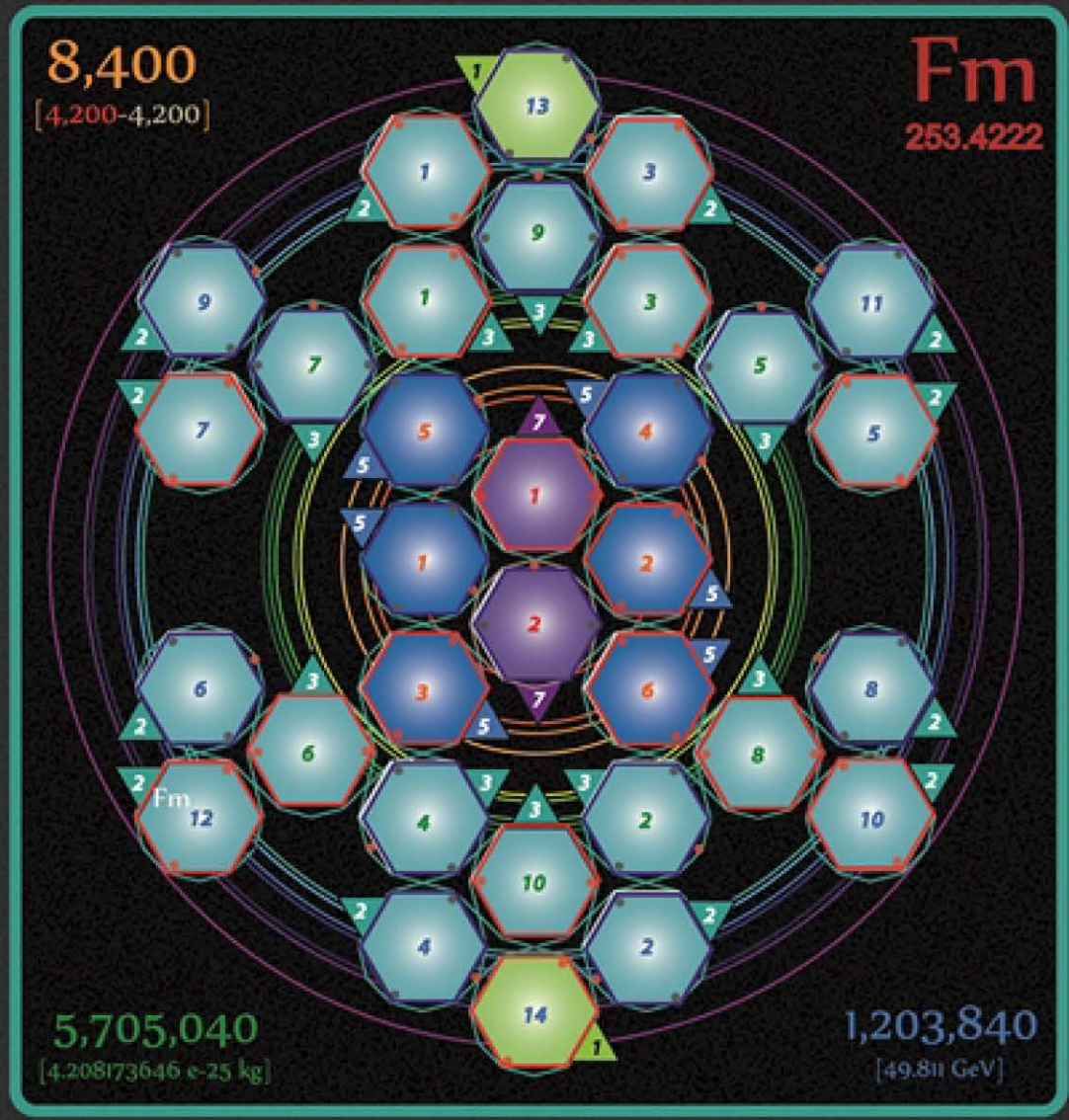
Tetryonics 51.97 - Berkelium atom



Tetryonics 51.98 - Californium atom



Tetryonics 51.99 - Einsteinium atom



electron configuration
 $[Rn] 5f^{12} 7s^2$
 86

Aufbau

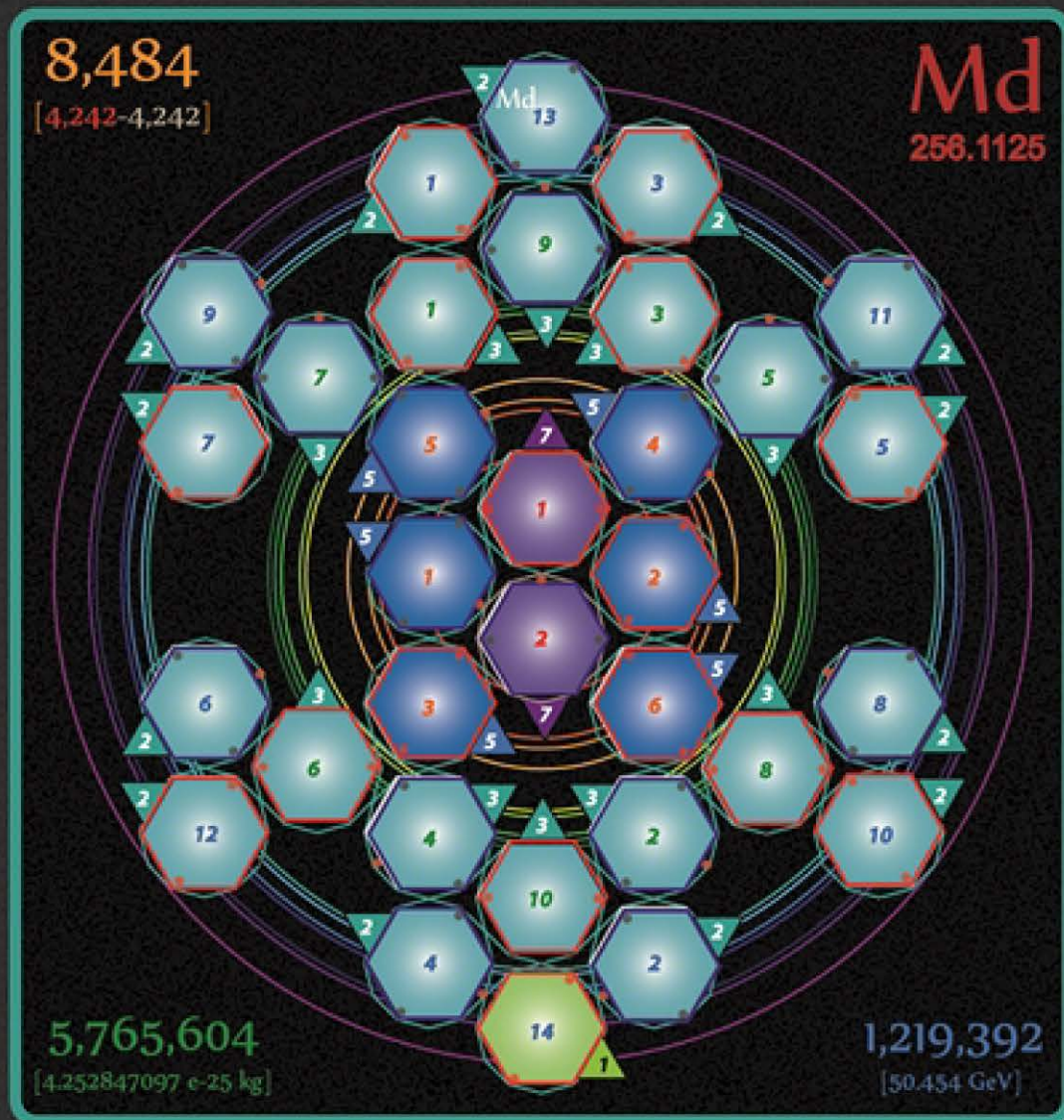
Fermium
100



100 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] m^{1-7}$ Actinoid



Tetryonics 51.100 - Fermium atom



electron configuration



Aufbau

Mendelevium

101



101 $\left[\begin{array}{l} \text{Protons} \quad [24-12] \\ \text{Neutrons} \quad [18-18] \\ \text{electrons} \quad [0-12] \end{array} \right] n_{1-7}$

Actinoid

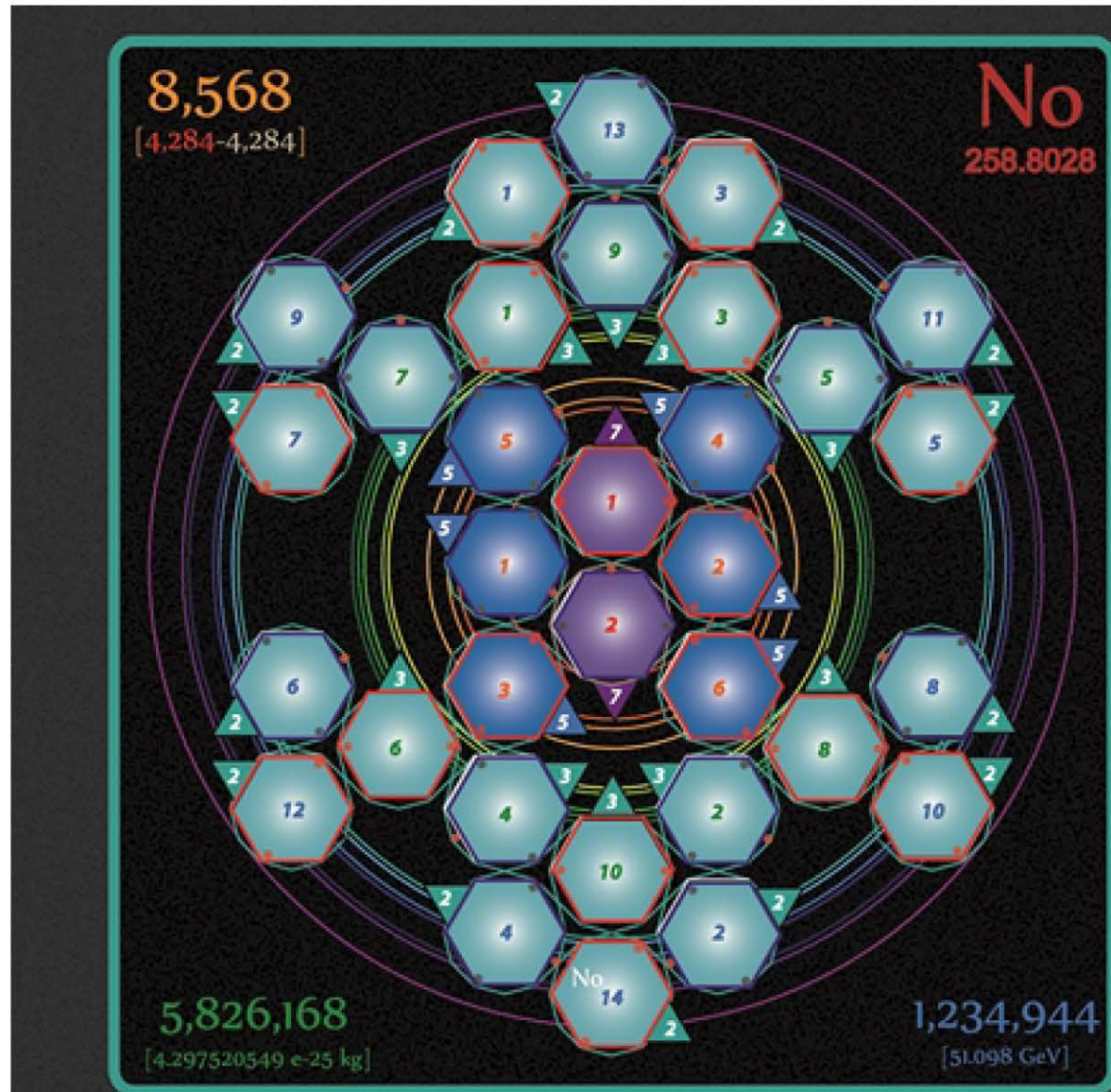


atomic shell

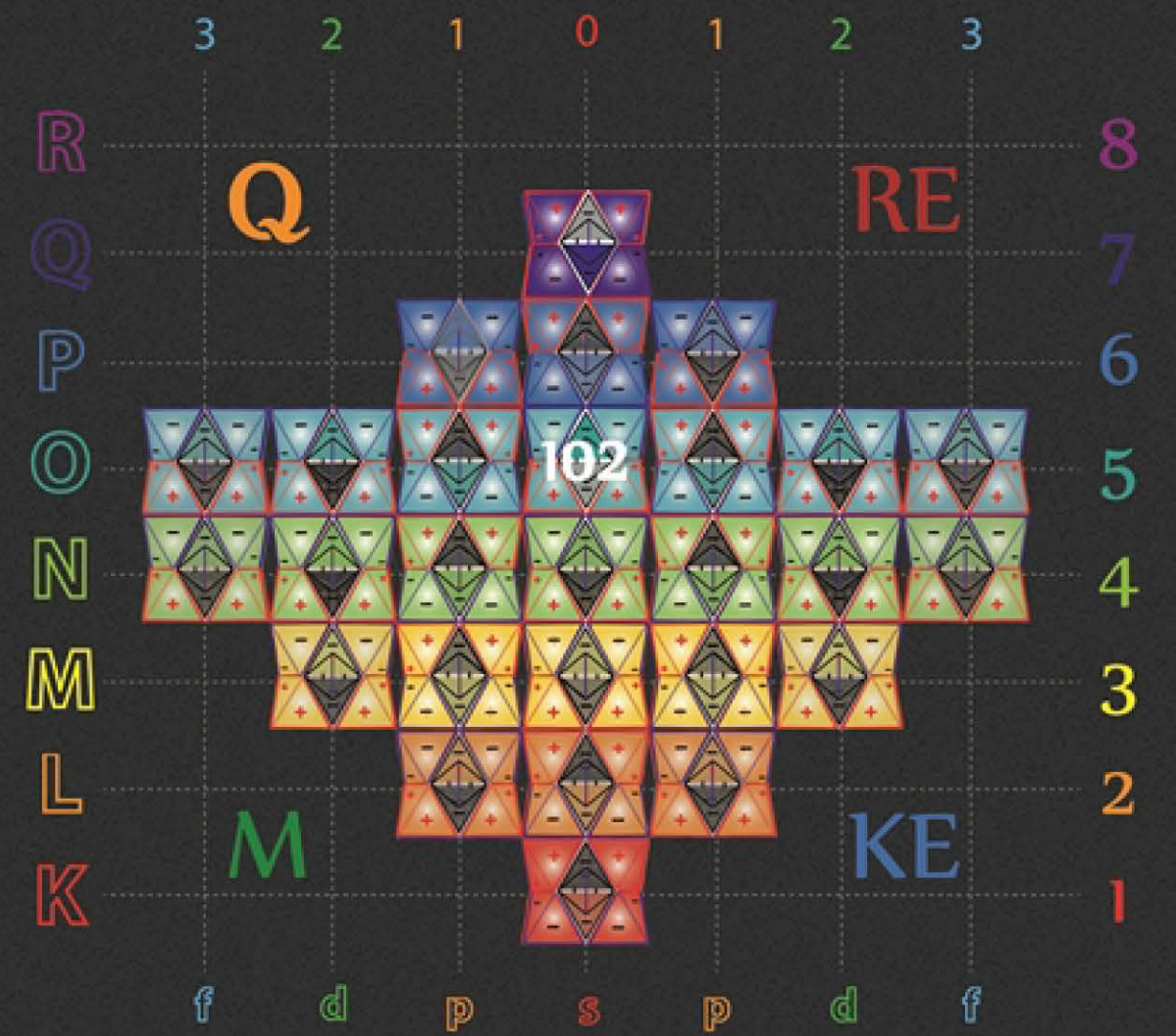
Orbitals & sub-orbitals

energy level

Tetryonics 51.101 - Mendeleevium atom

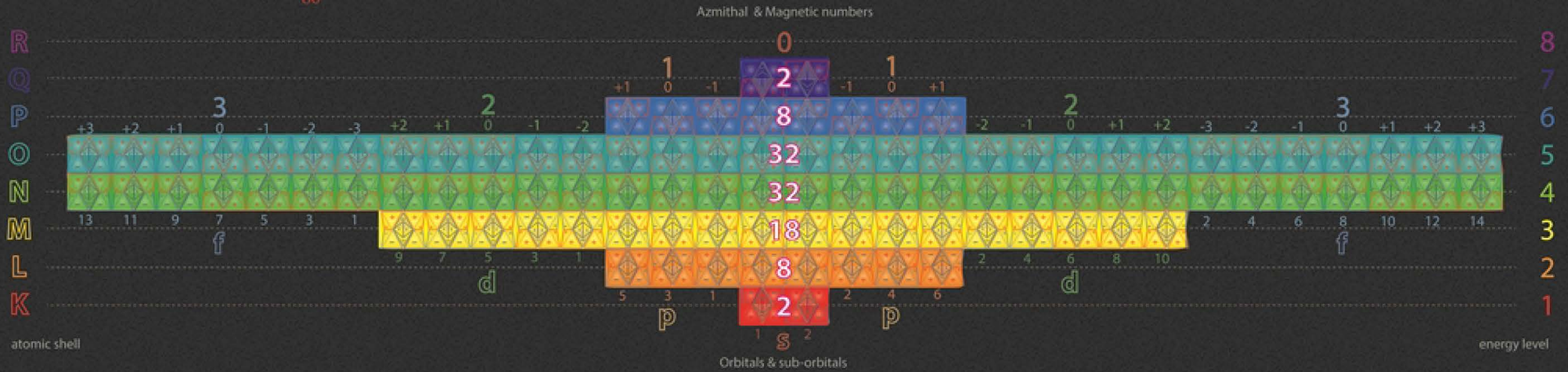


Nobelium
102

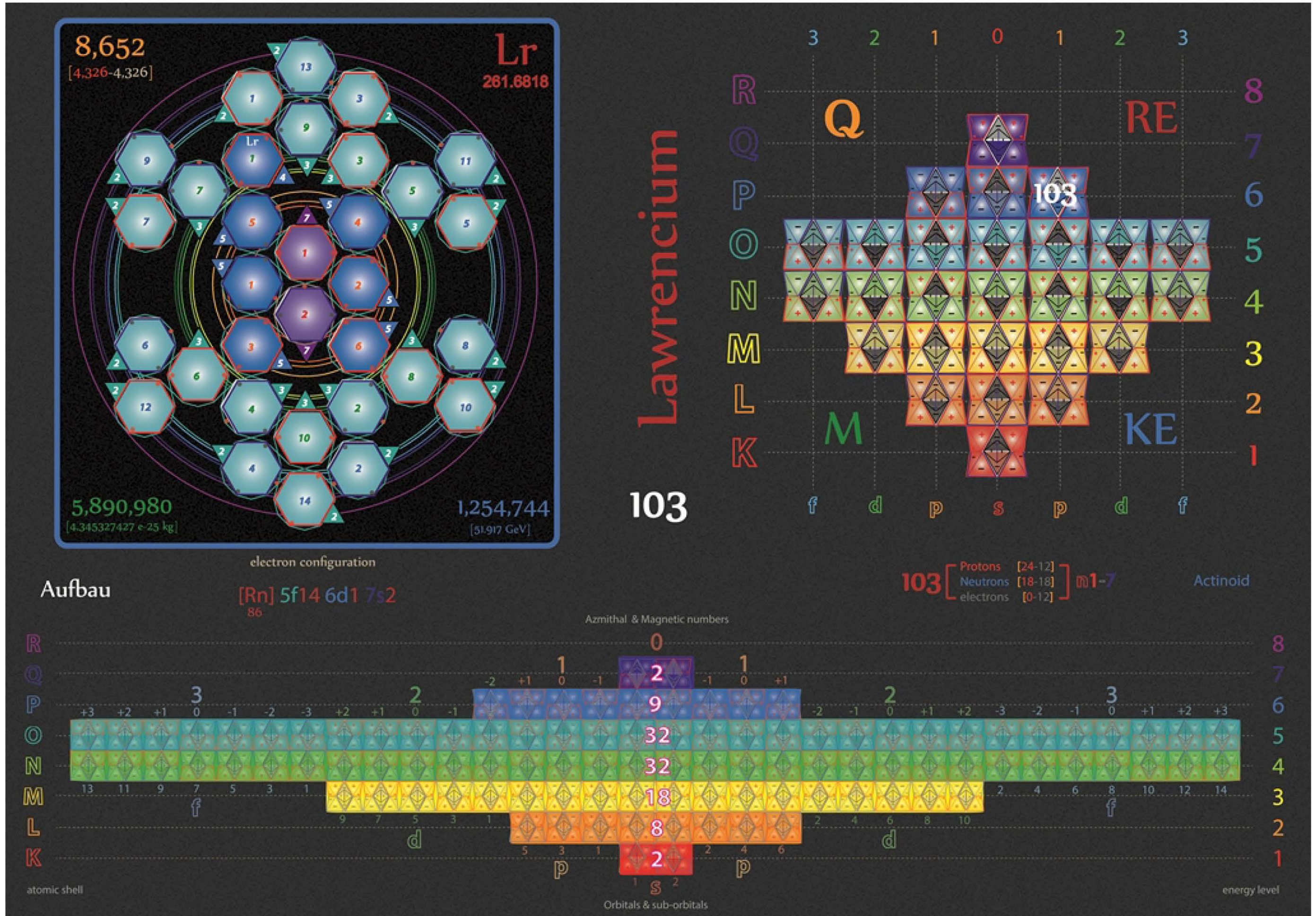


102 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] **n1-7** Actinoid

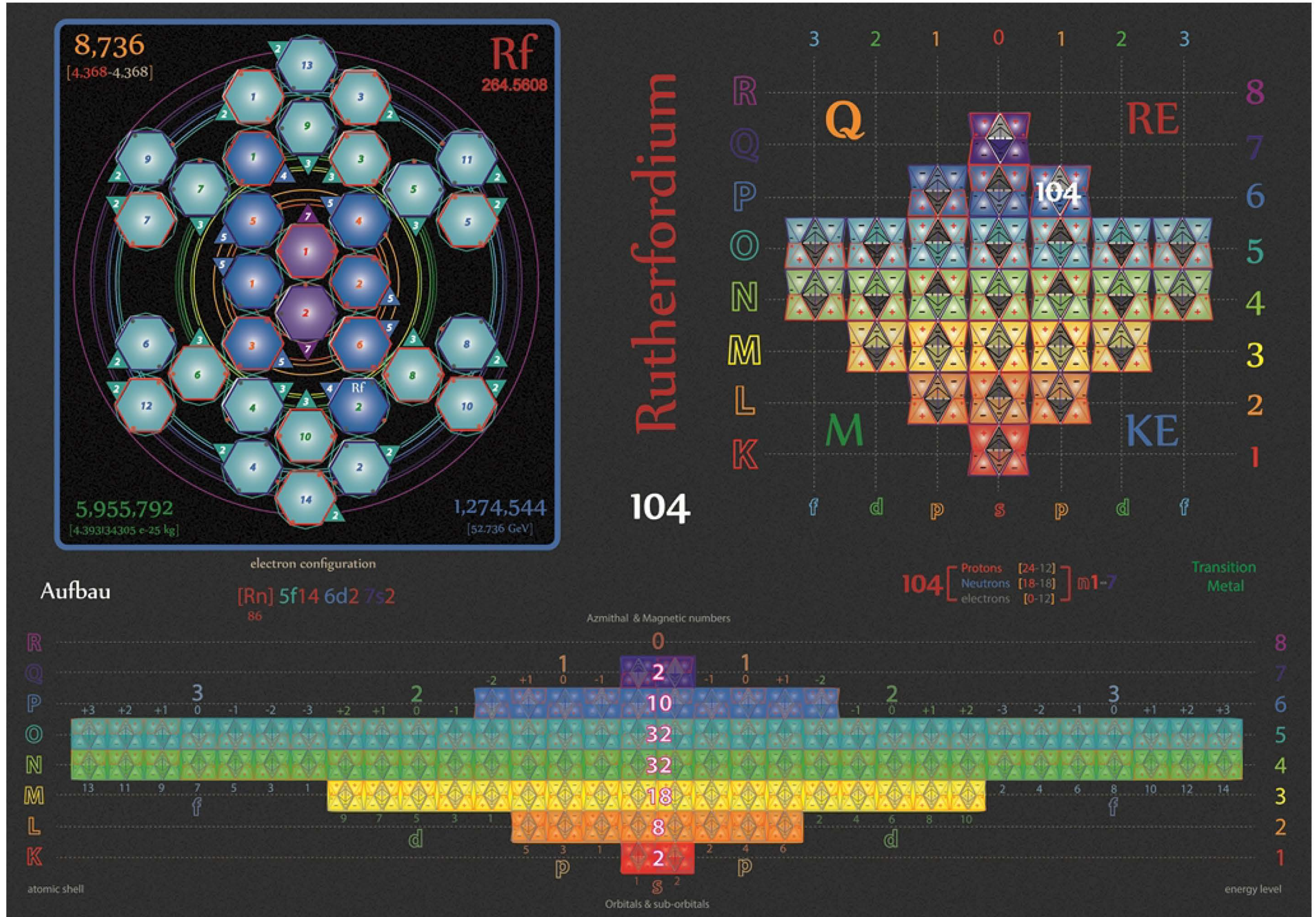
Aufbau



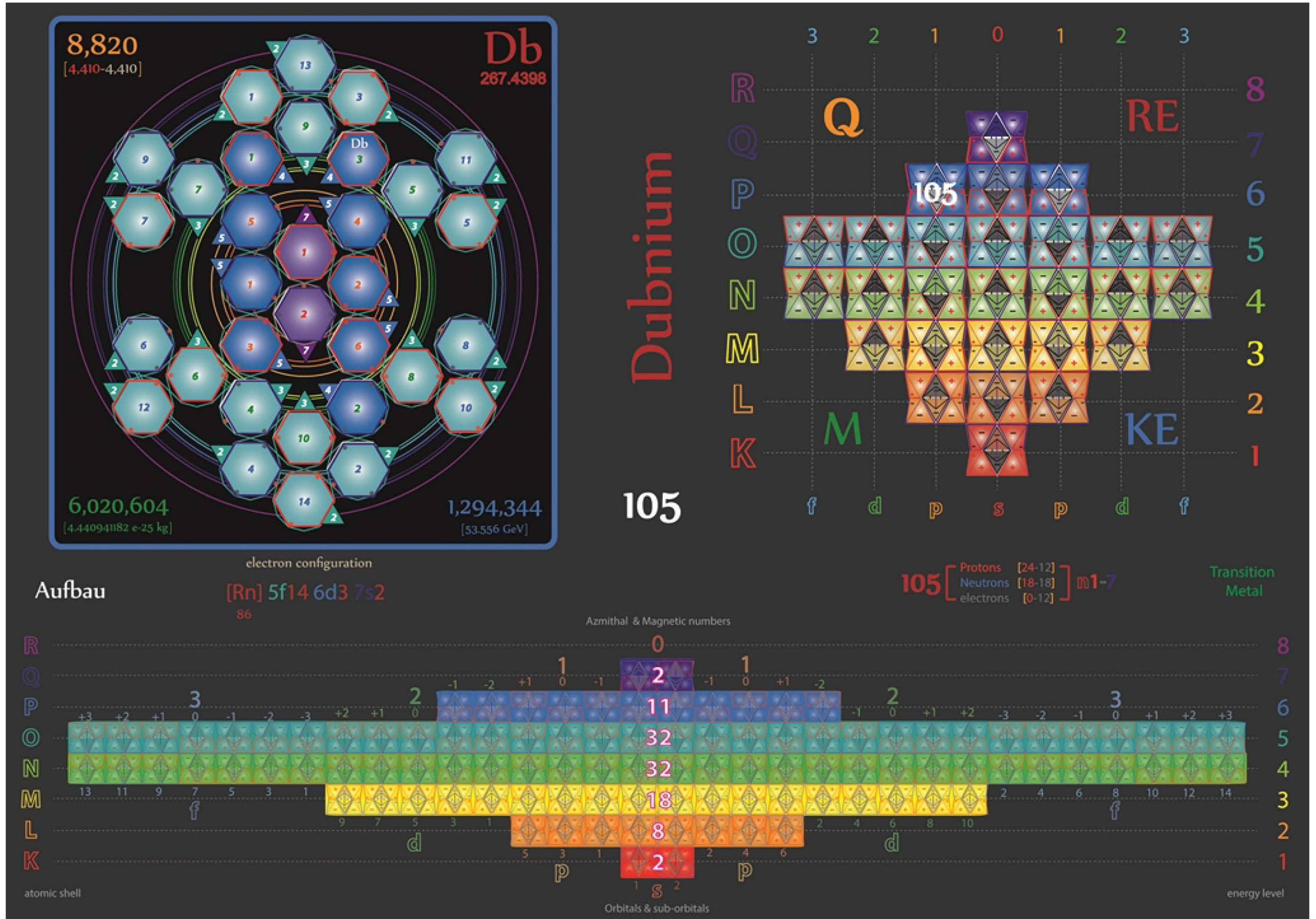
Tetryonics 51.102 - Nobelium atom



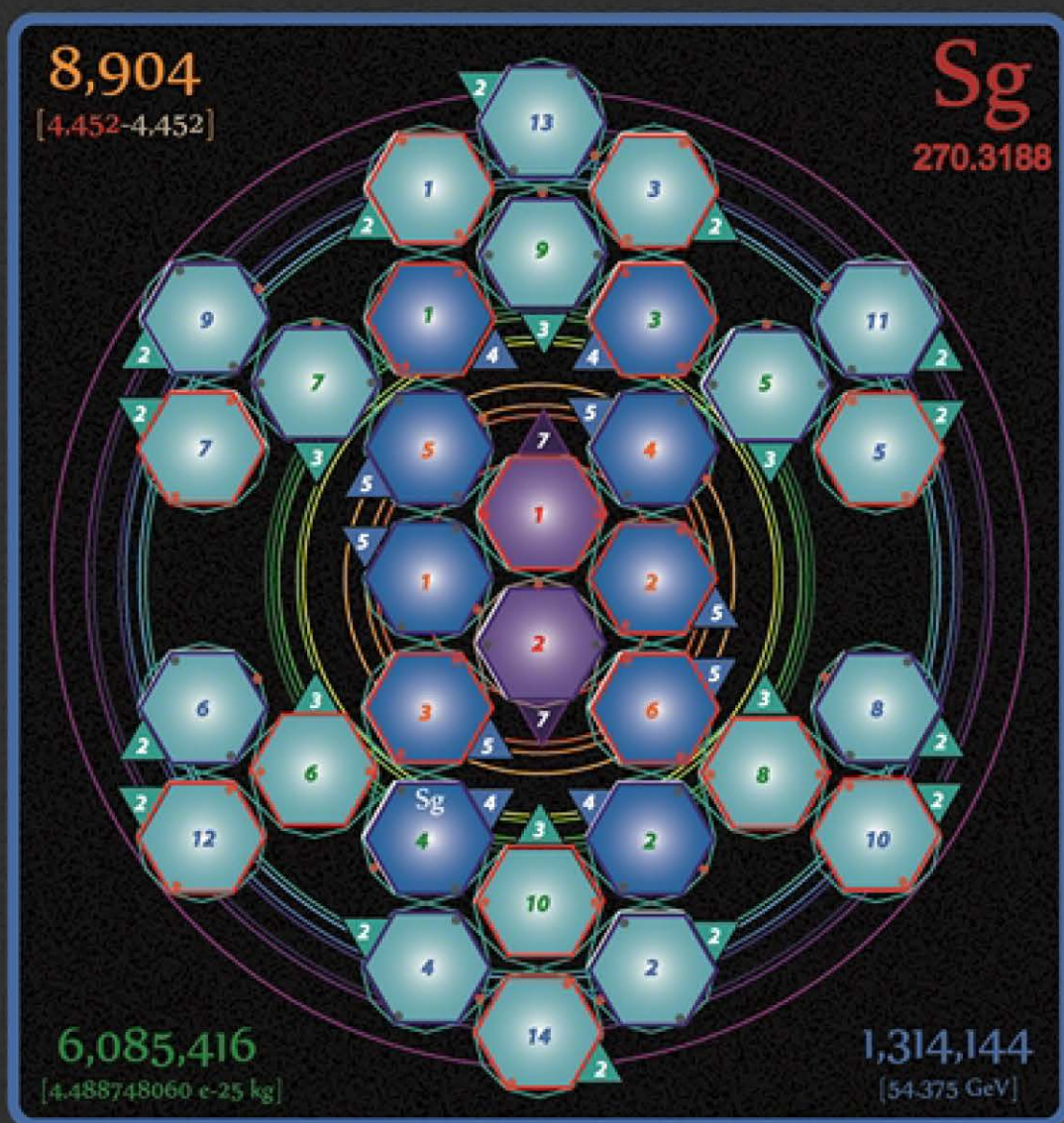
Tetryonics 51.103 - Lawrencium atom



Tetryonics 51.104 - Rutherfordium atom



Tetryonics 51.105 - Dubnium atom



Seaborgium

106

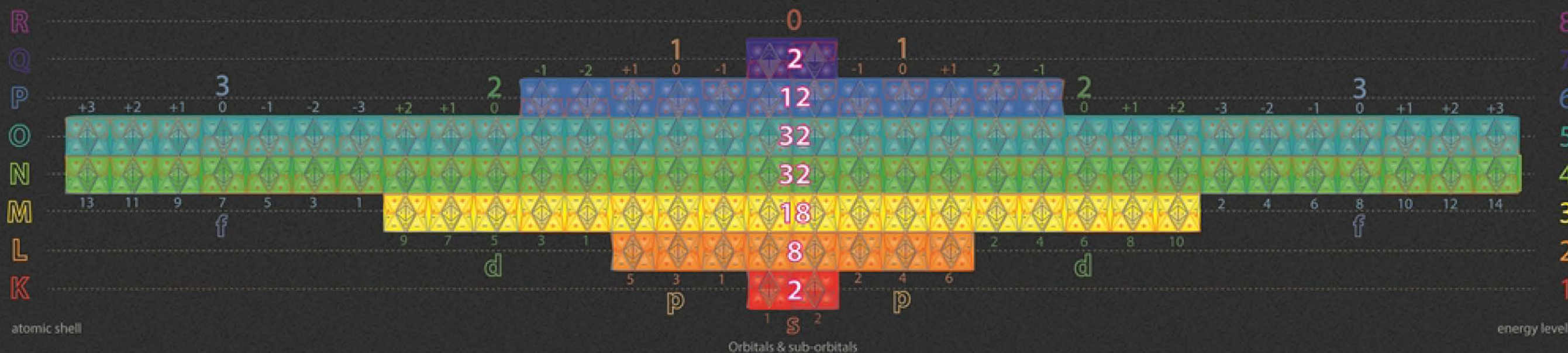


Aufbau

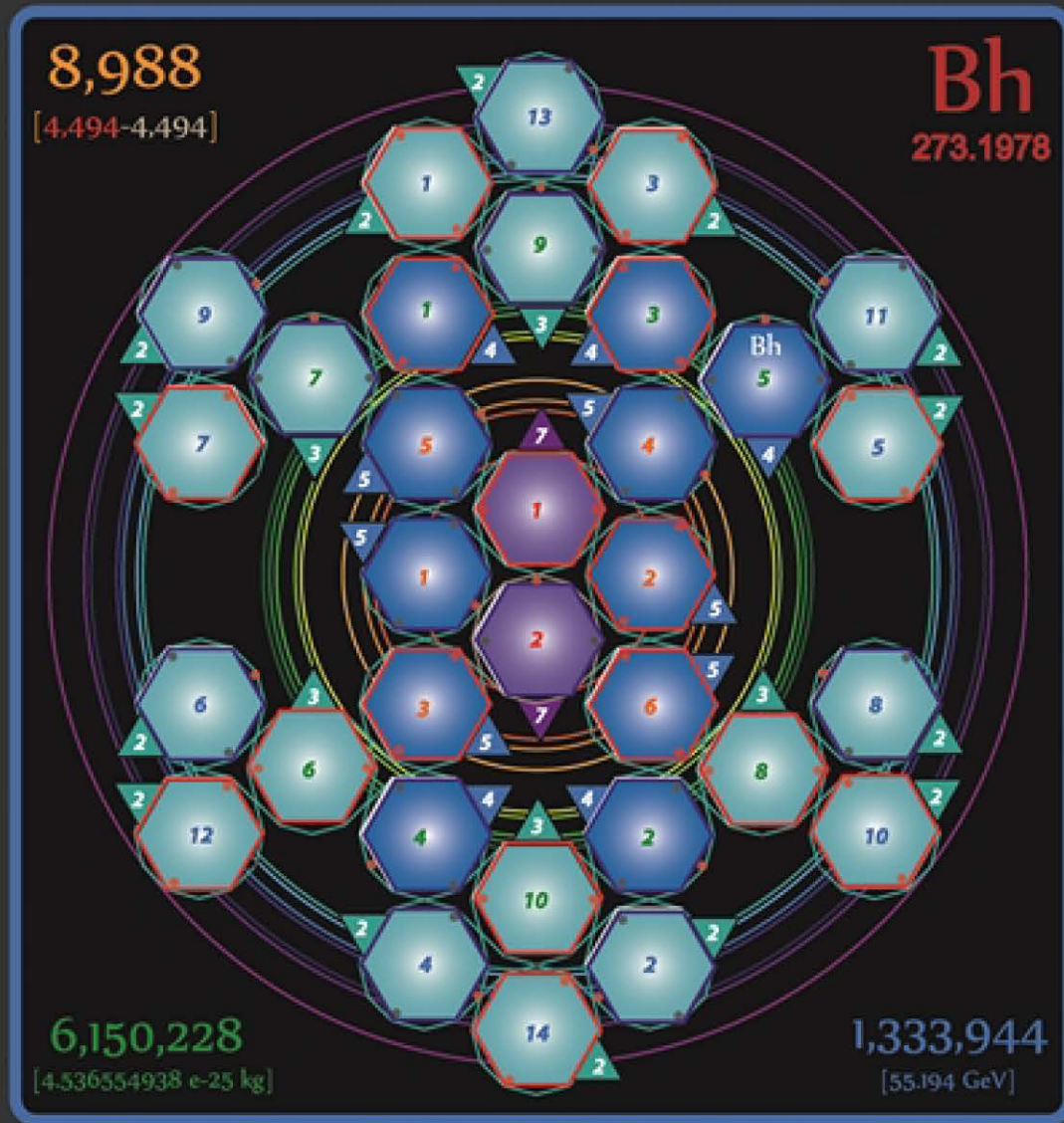
electron configuration
 $[Rn] 5f^{14} 6d^4 7s^2$
 86

106 [Protons [24-12]
 Neutrons [18-18]
 electrons [0-12]] n1-7

Transition Metal



Tetryonics 51.106 - Seaborgium atom



Bohrium

107



electron configuration

[Rn] 5f¹⁴ 6d⁵ 7s²
86

107 [Protons [24-12] Neutrons [18-18] electrons [0-12]] n¹⁻⁷

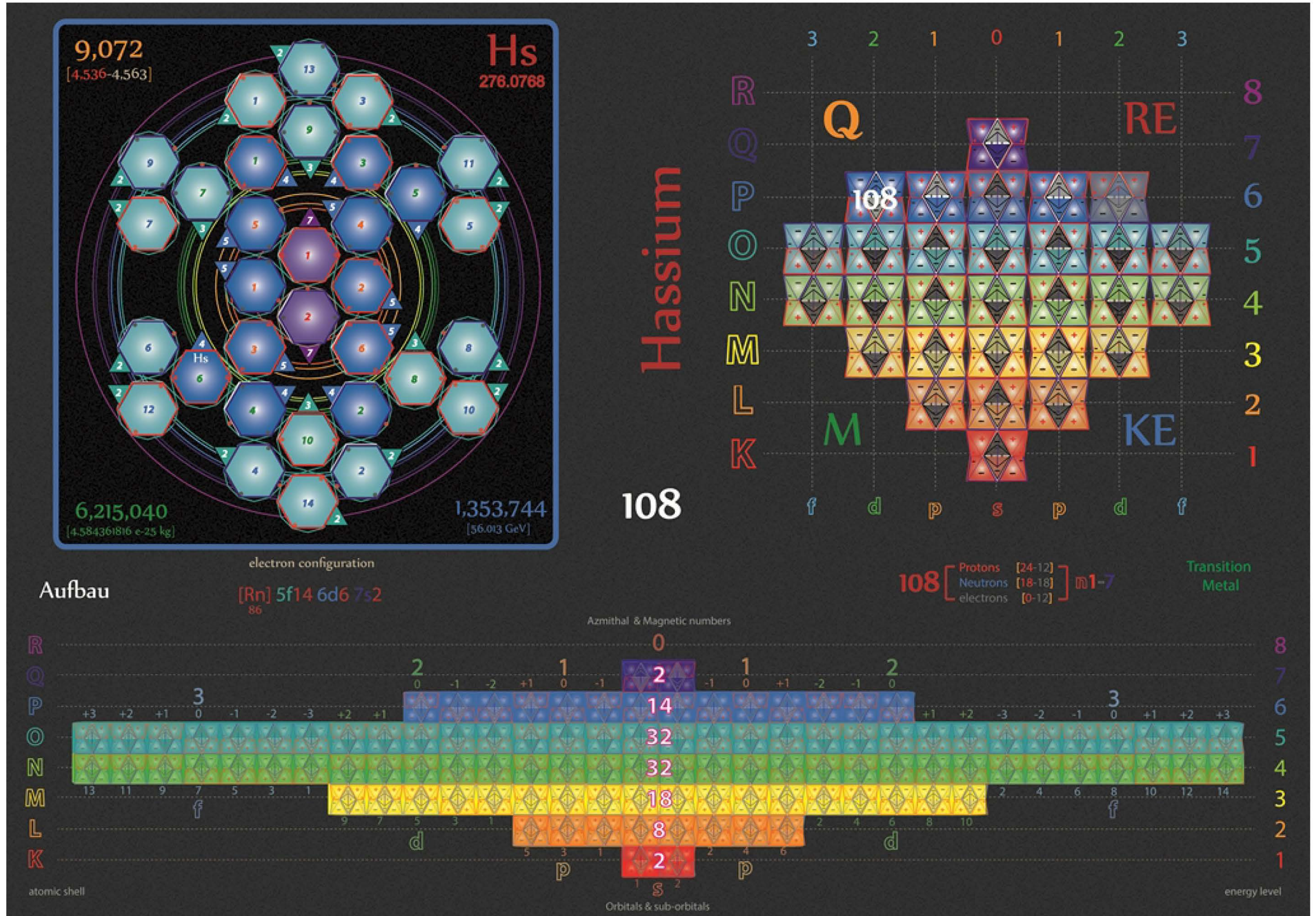
Transition Metal

Aufbau

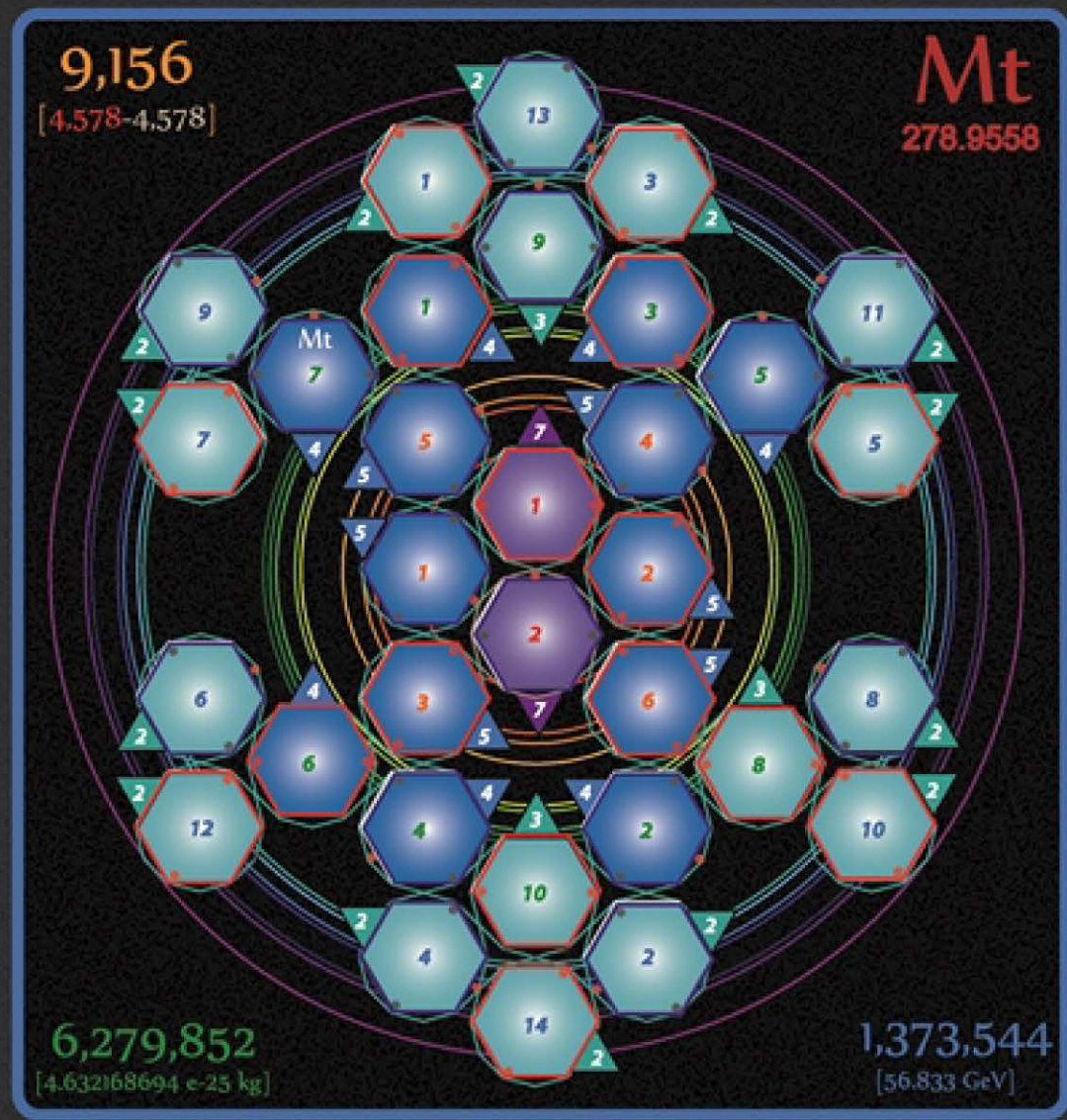
Azimuthal & Magnetic numbers



Tetryonics 51.107 - Bohrium atom



Tetryonics 51.108 - Hassium atom



electron configuration

Aufbau

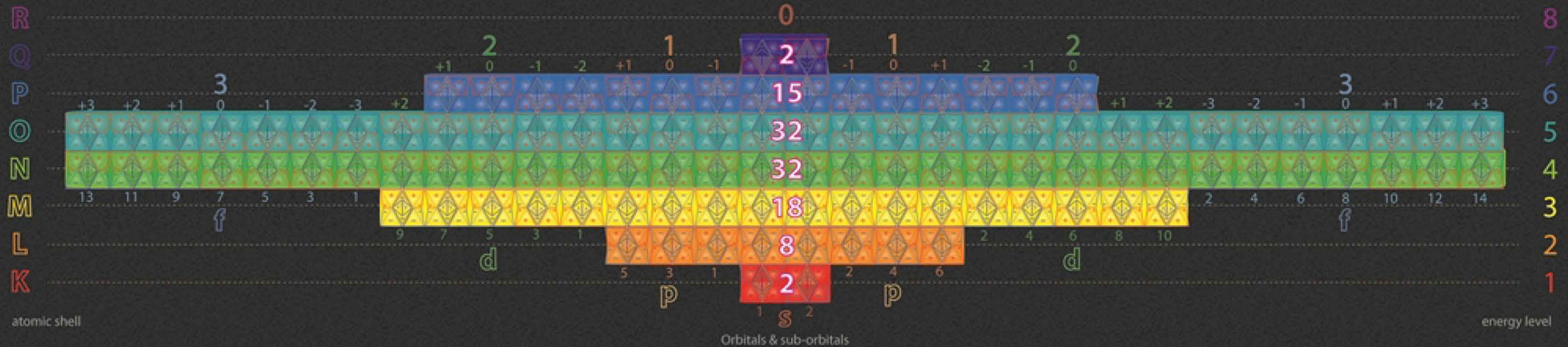
$[Rn] 5f^{14} 6d^7 7s^2$
86

Meitnerium
109

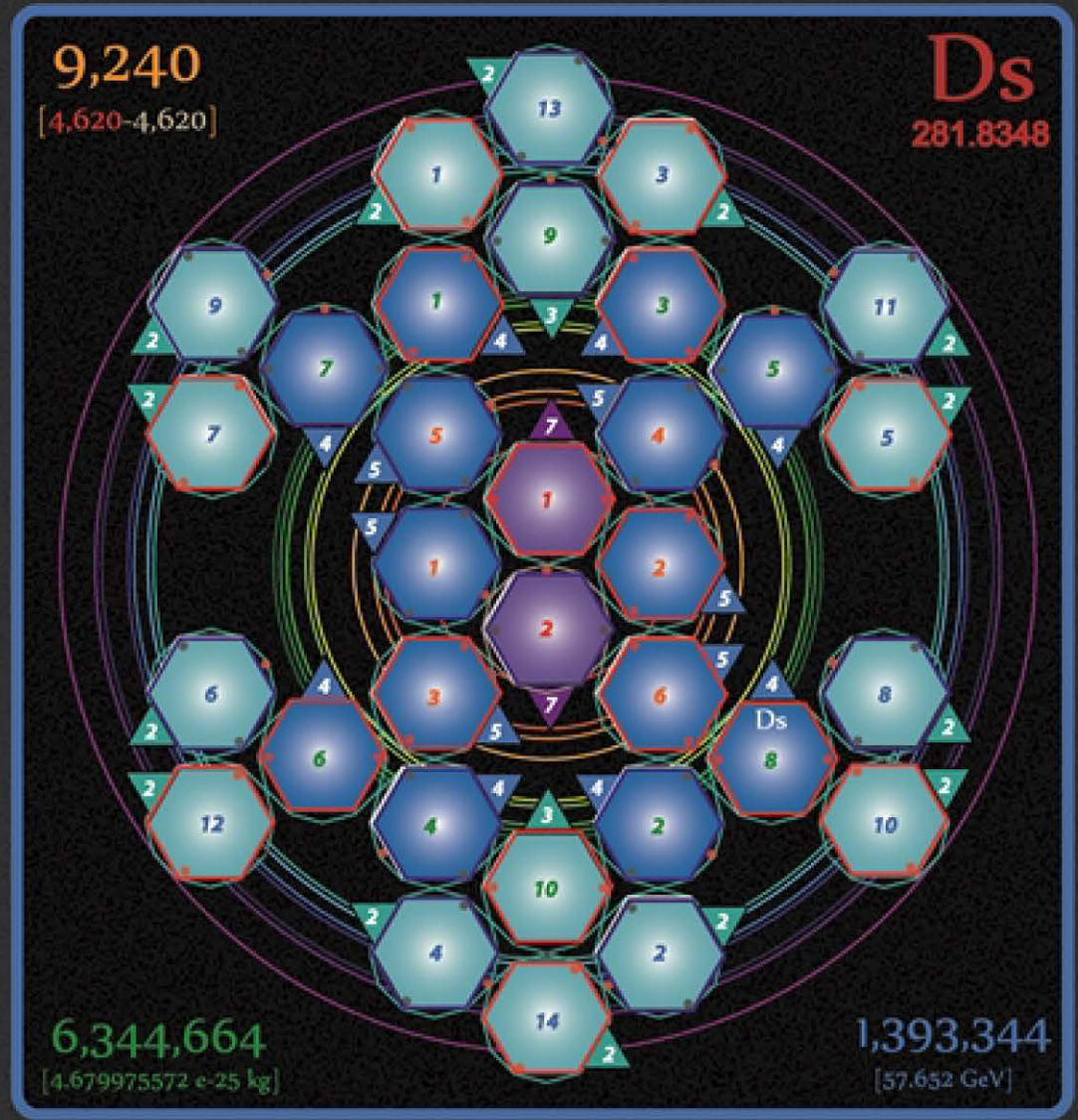


109 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] m^{1-7}$

Transition
Metal



Orbitals & sub-orbitals

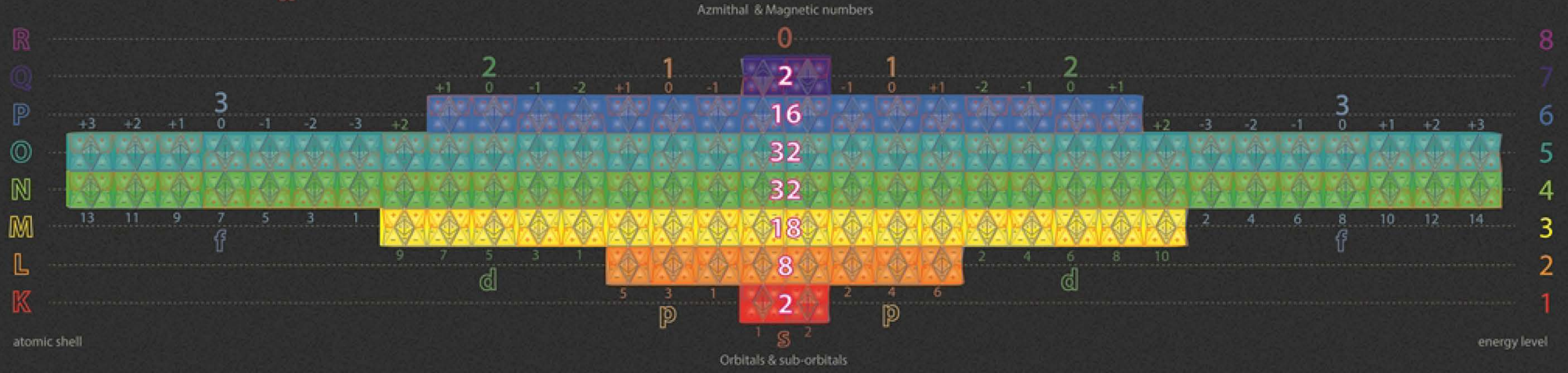


Darmstadtium

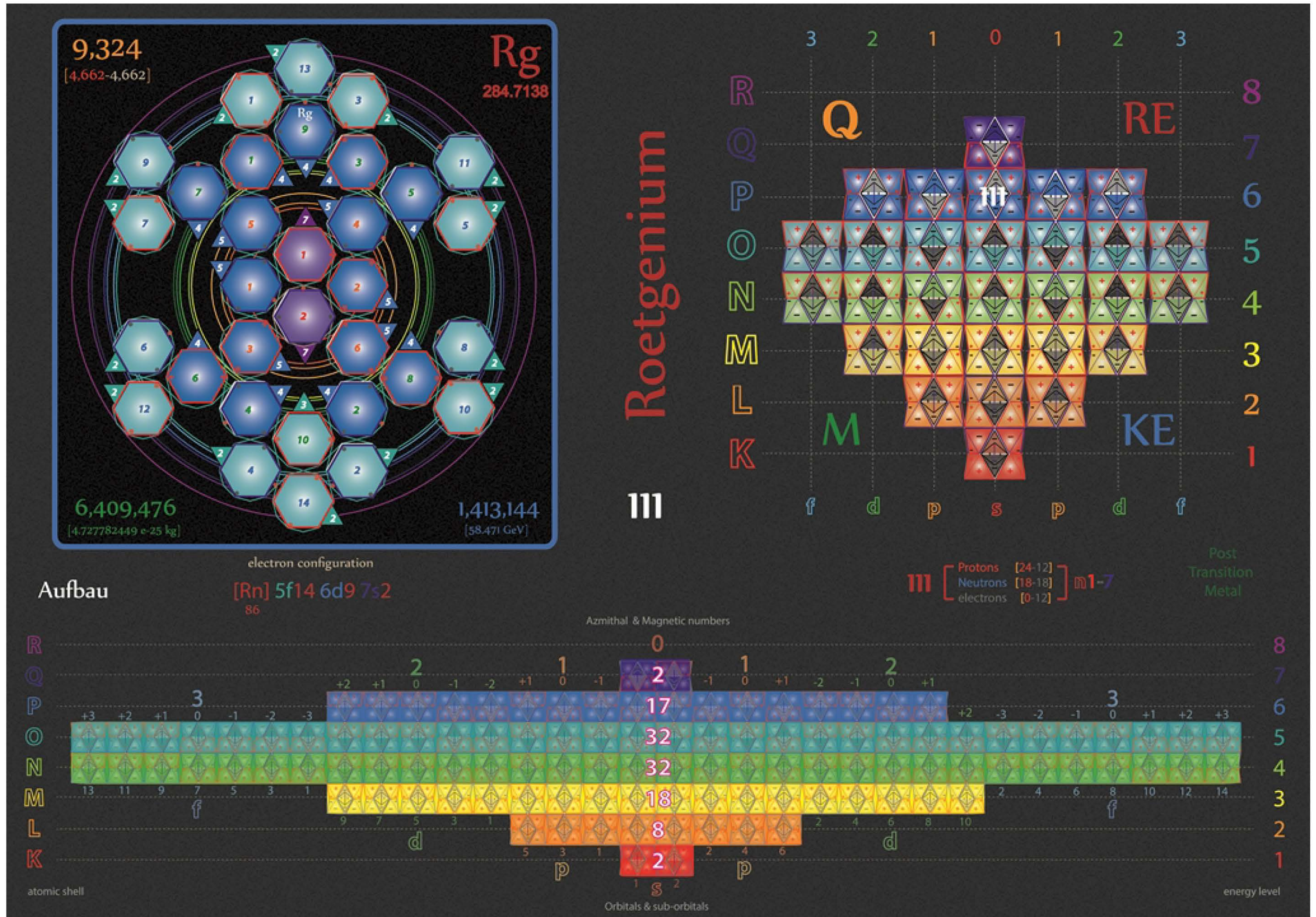


Aufbau $[Rn] 5f^{14} 6d^8 7s^2$
 86

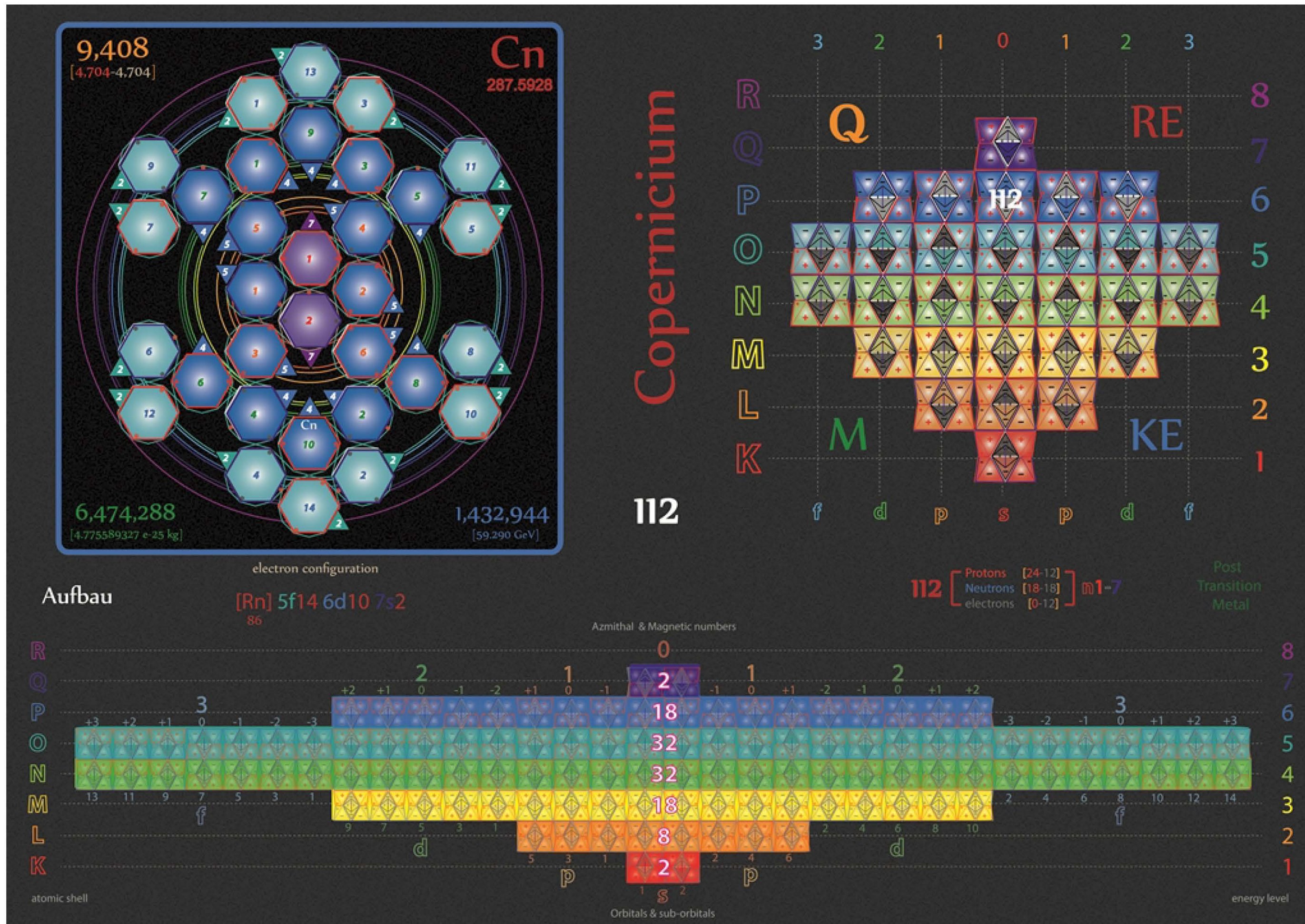
110 $\left[\begin{matrix} \text{Protons} & [24-12] \\ \text{Neutrons} & [18-18] \\ \text{electrons} & [0-12] \end{matrix} \right] n^{1-7}$ Transition Metal



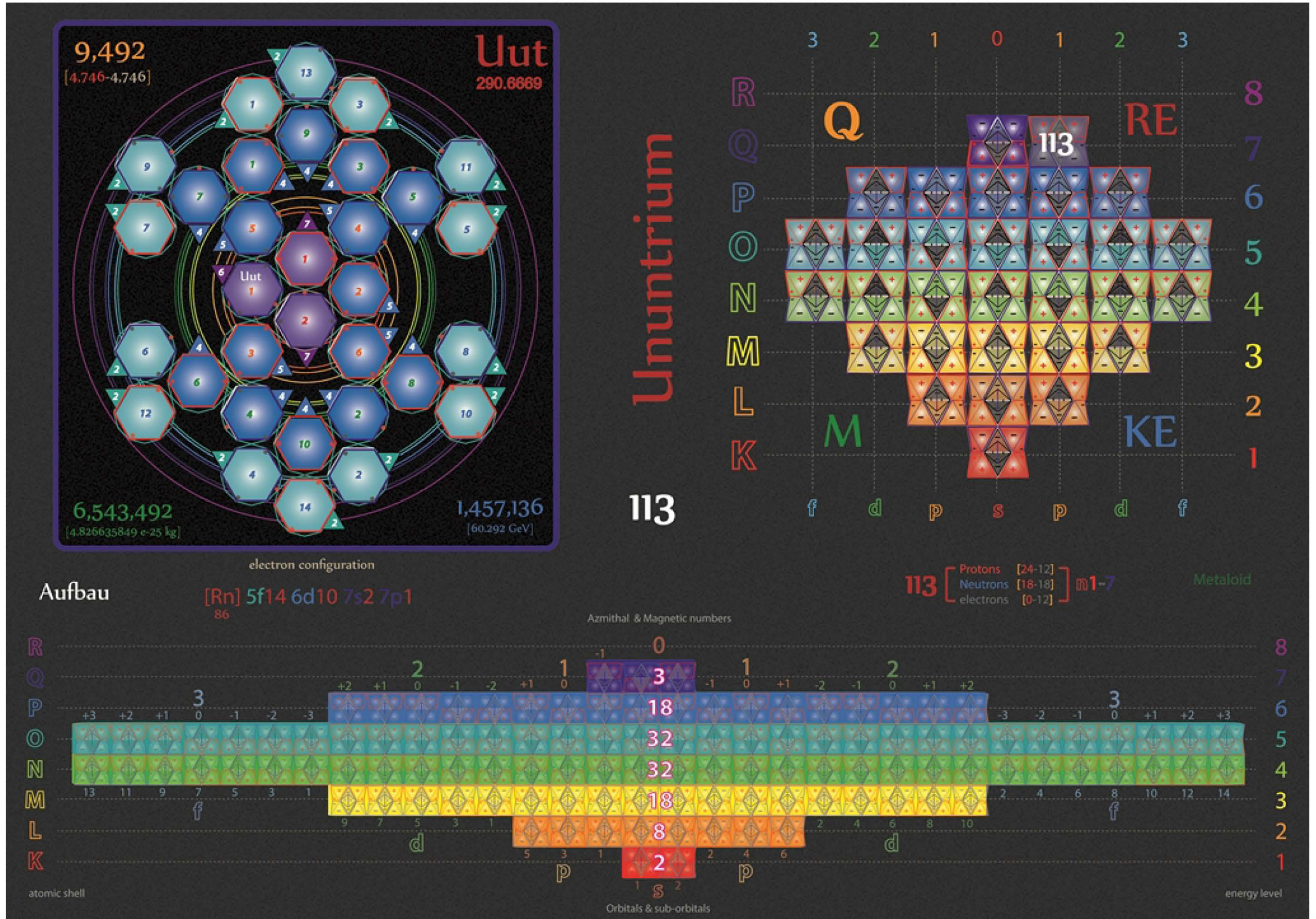
Tetryonics 51.110 - Darmstadtium atom



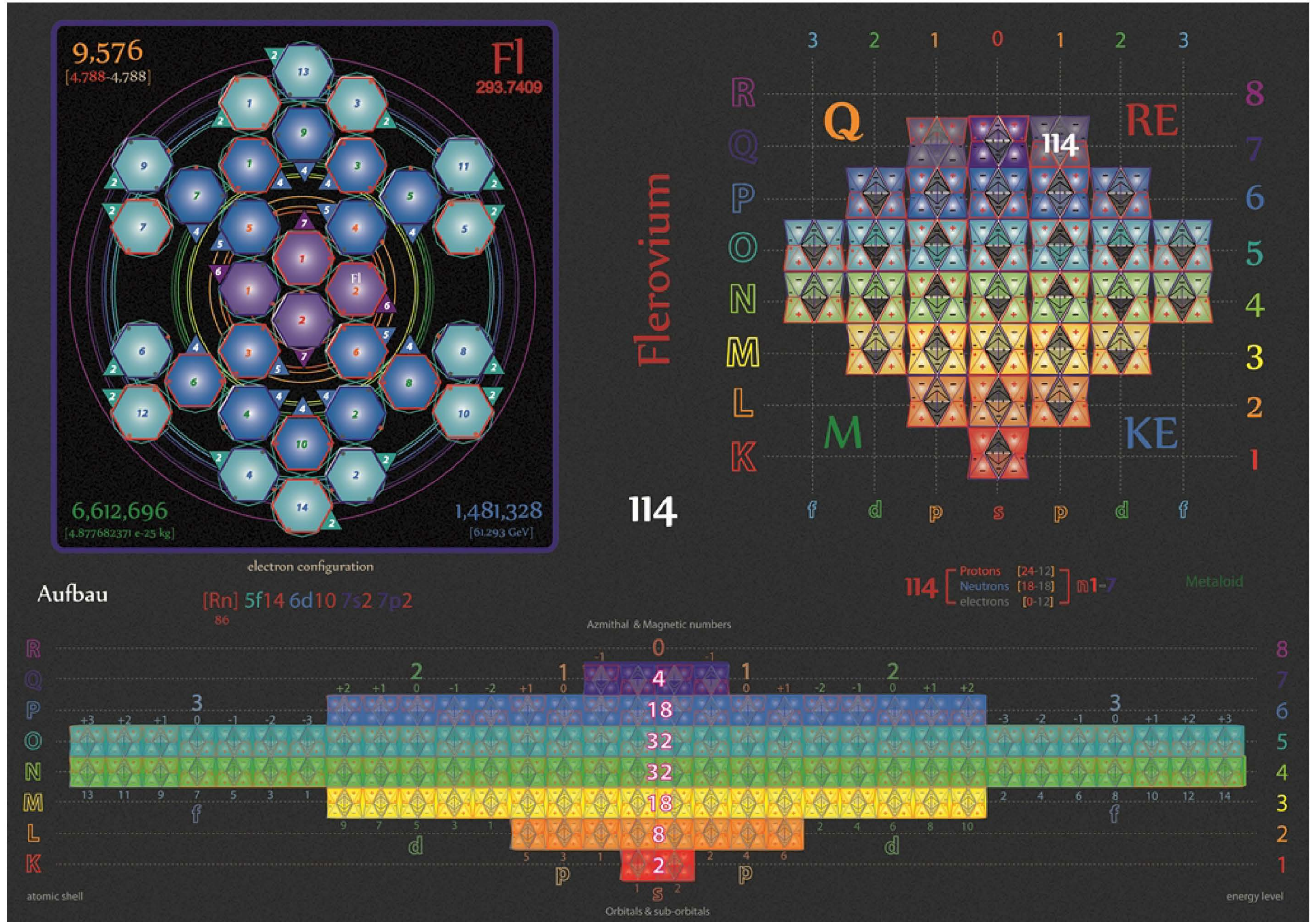
Tetryonics 51.111 - Roetgenium atom



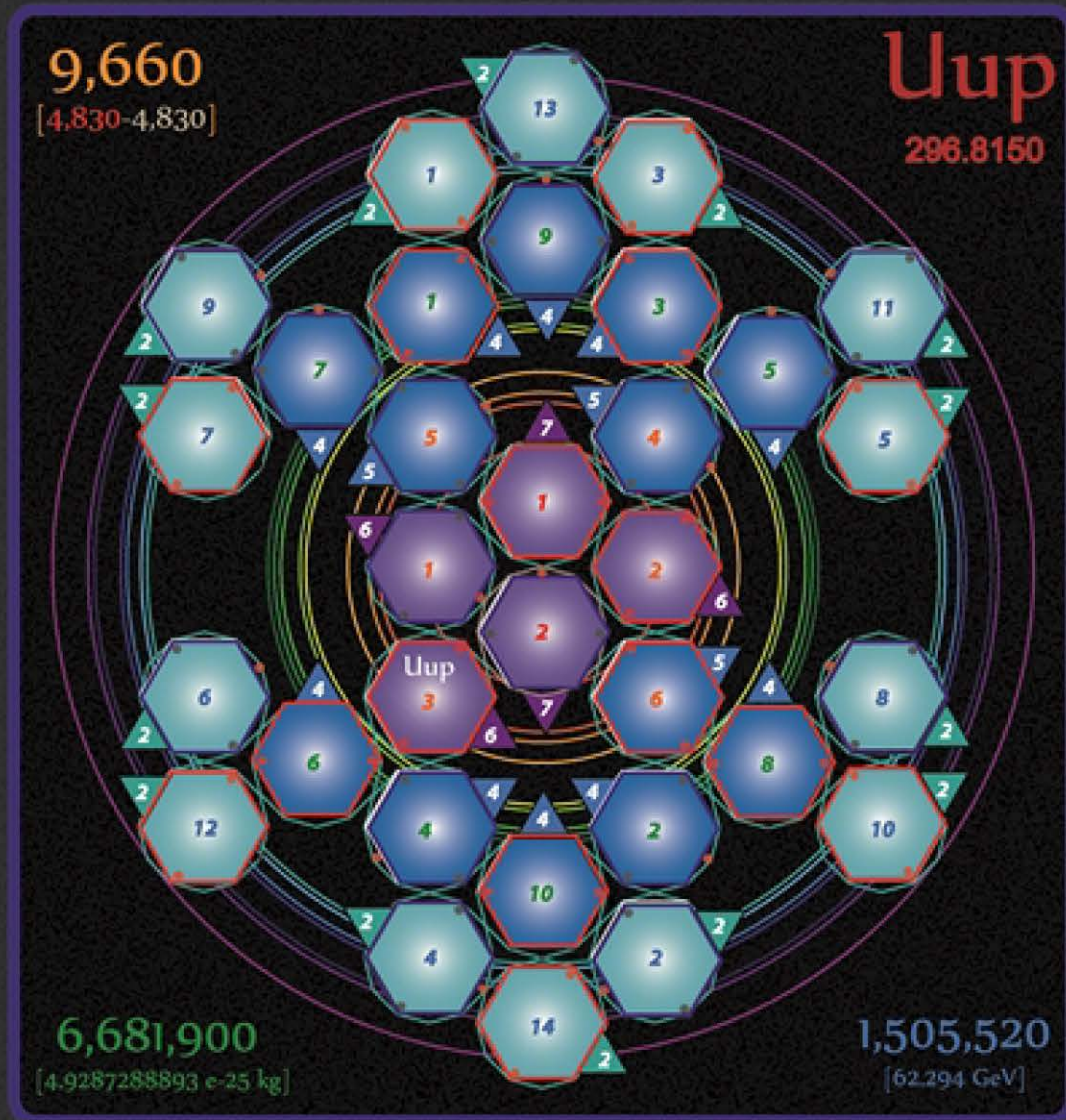
Tetryonics 51.112 - Copernicium atom



Tetryonics 51.113 - Ununtrium atom



Tetryonics 51.114 - Flerovium atom



electron configuration

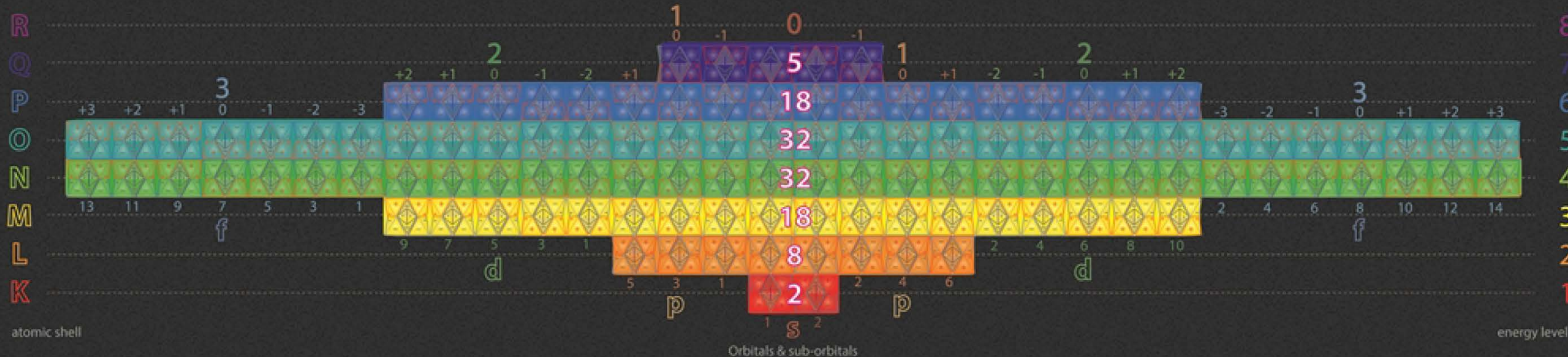
Aufbau



Ununpentium
115



115 [Protons [24-12] Neutrons [18-18] electrons [0-12]] n1-7 Metalloid

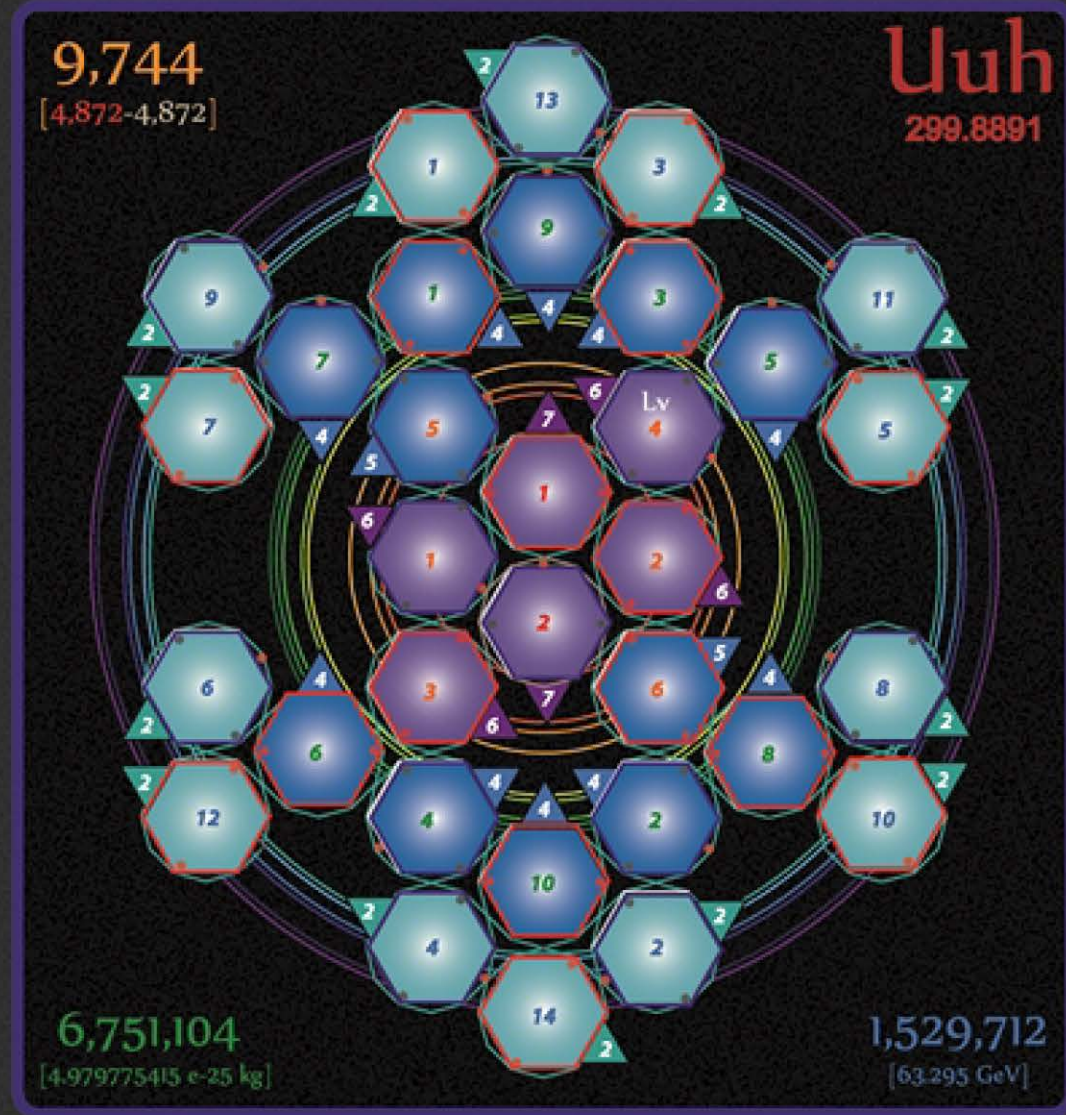


atomic shell

Orbitals & sub-orbitals

energy level

Tetryonics 51.115 - Ununpentium atom



electron configuration

Aufbau

[Rn] 5f¹⁴ 6d¹⁰ 7s² 7p⁴
86

Livermorium

116

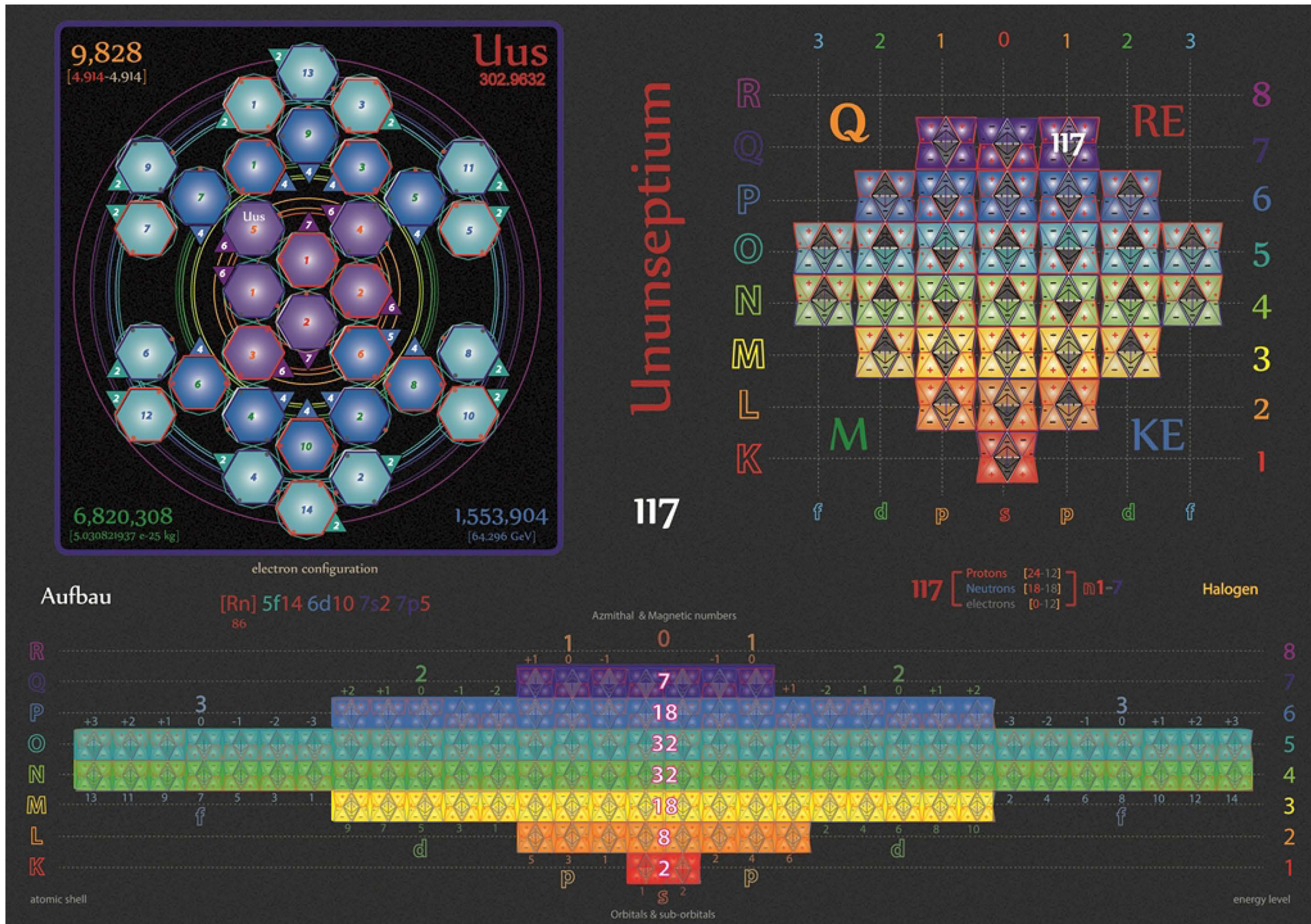


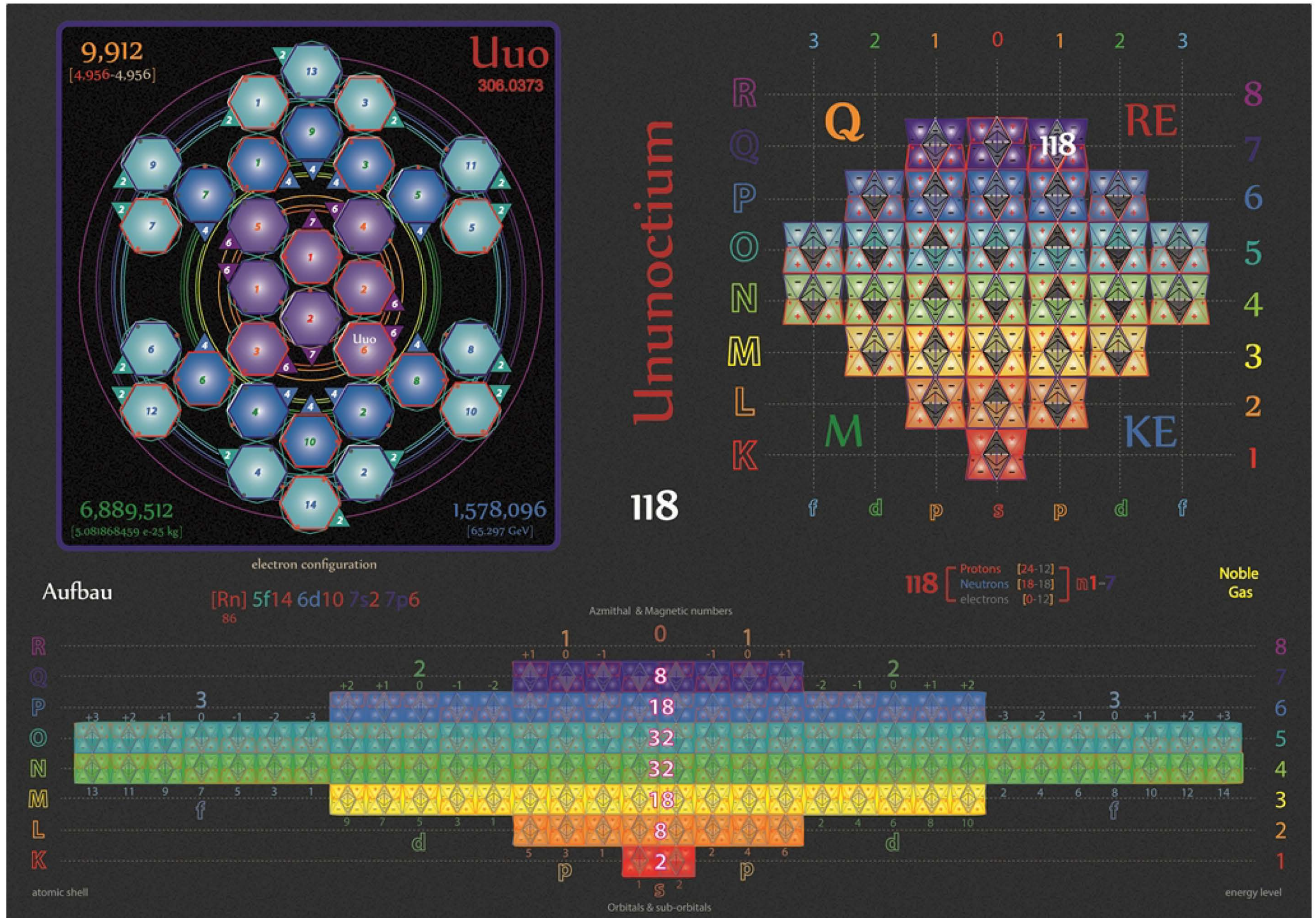
116 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n¹⁻⁷

Metalloid

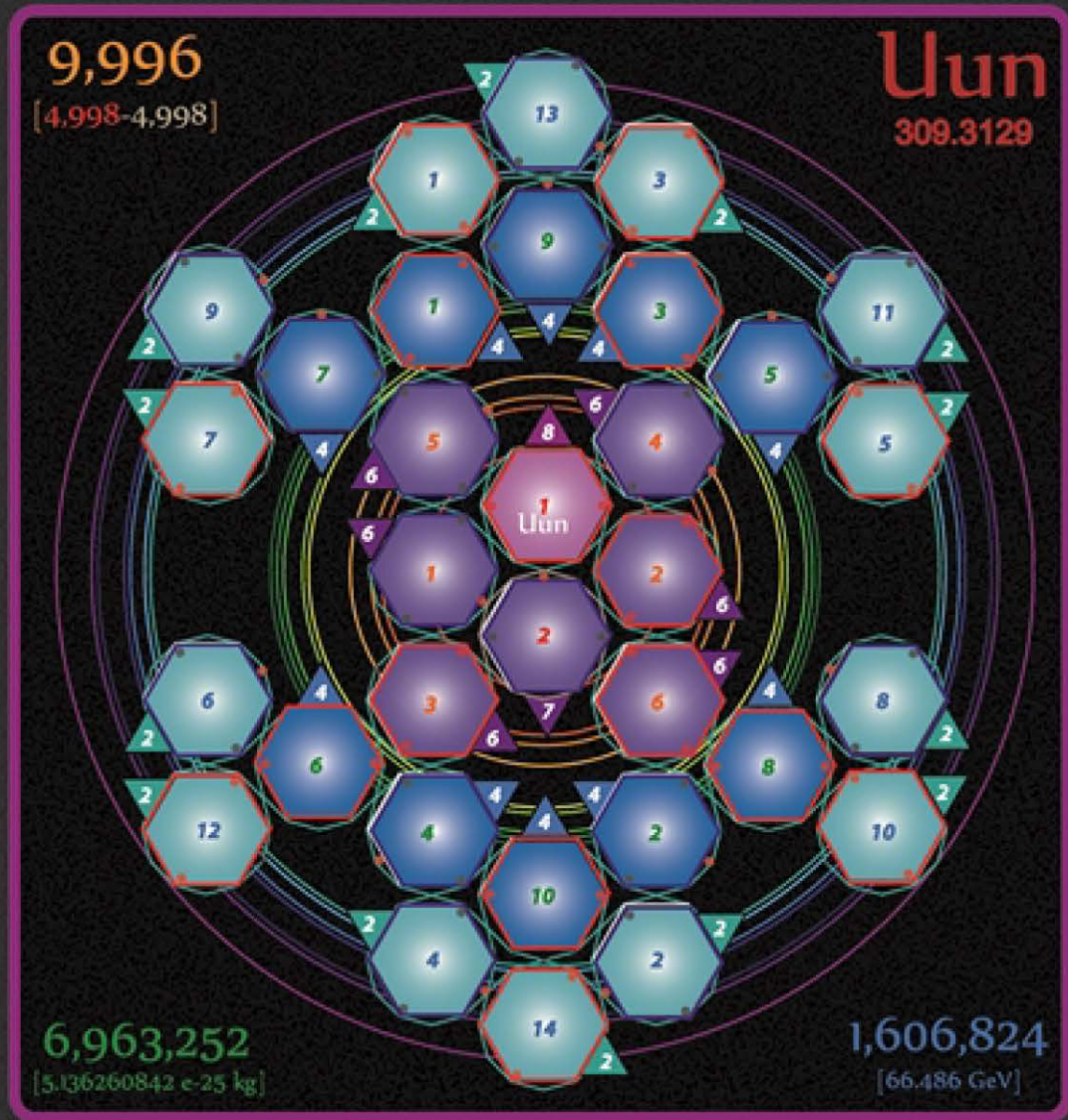


Tetryonics 51.116 - Livermorium atom

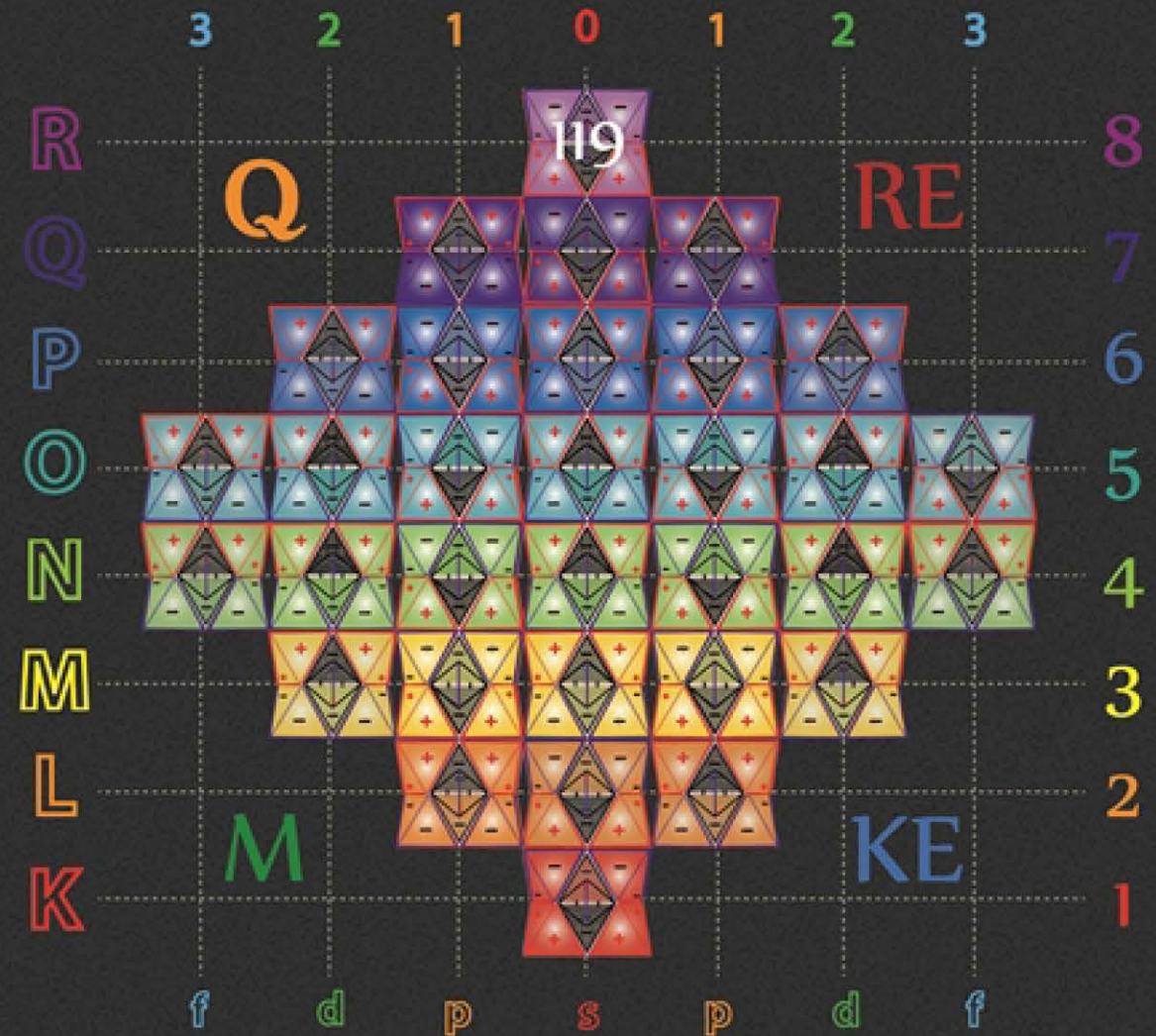




Tetryonics 51.118 - Ununoctium atom



Ununennium
119

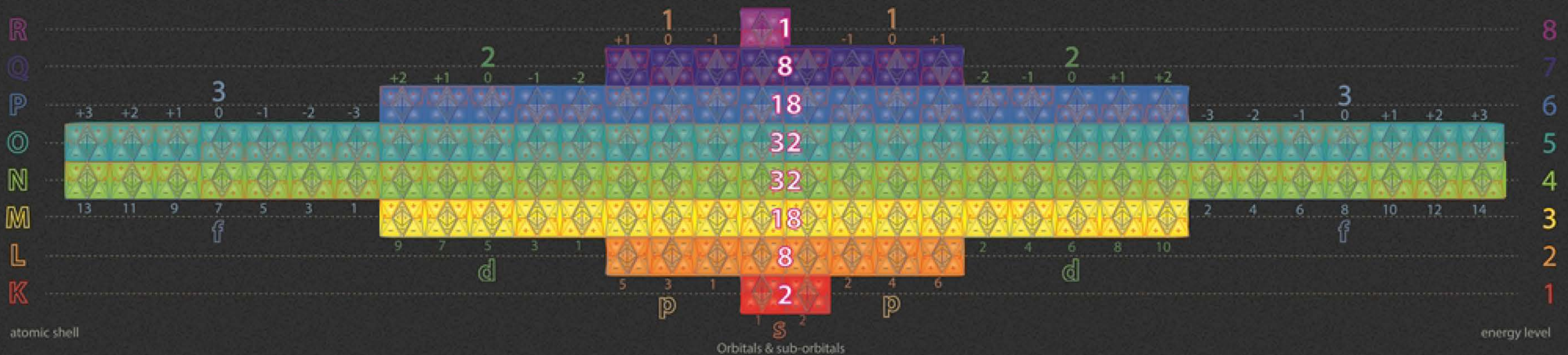


Aufbau
electron configuration
 $[Uuo] 8s1$
118

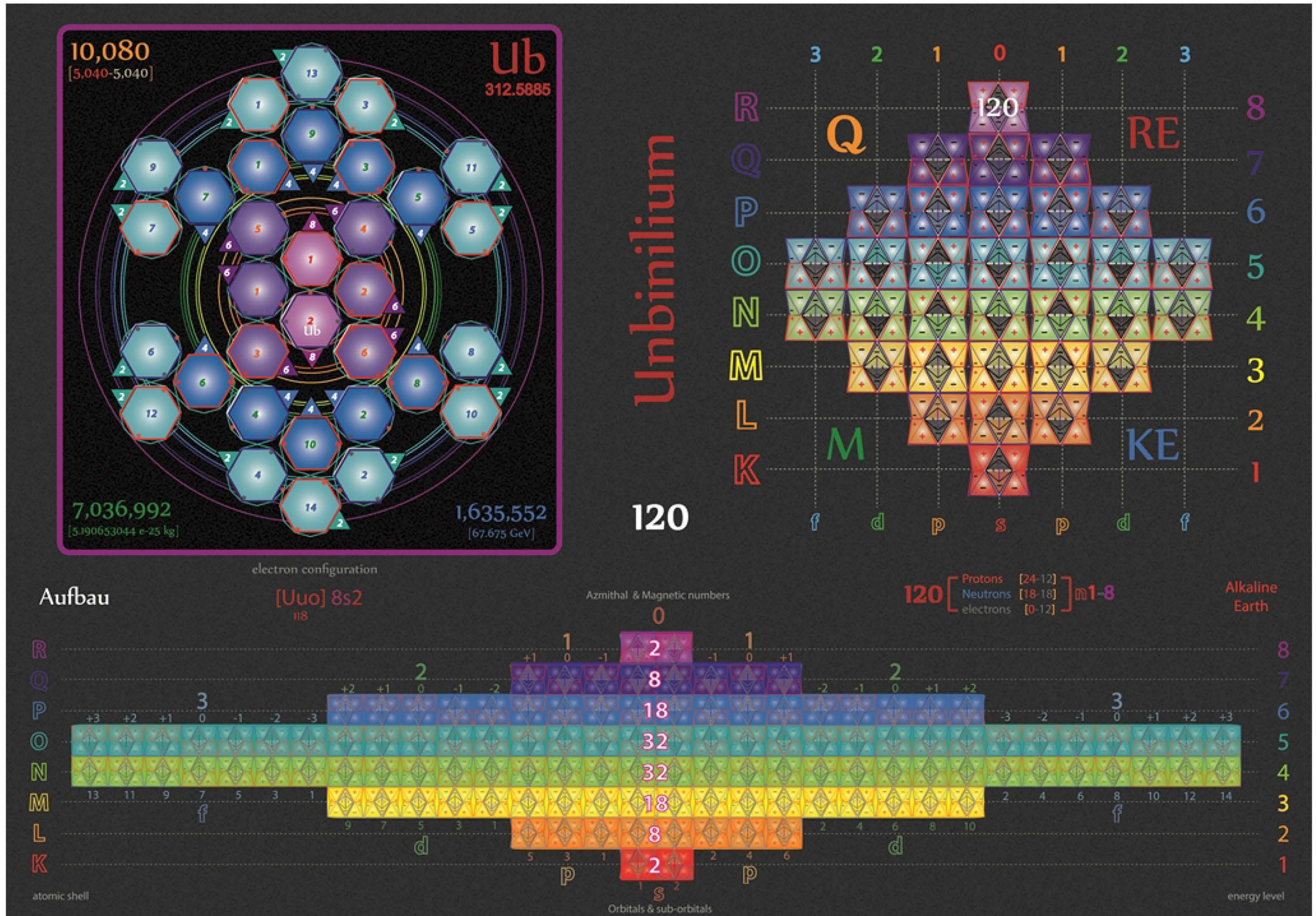
Azimuthal & Magnetic numbers

119 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-8

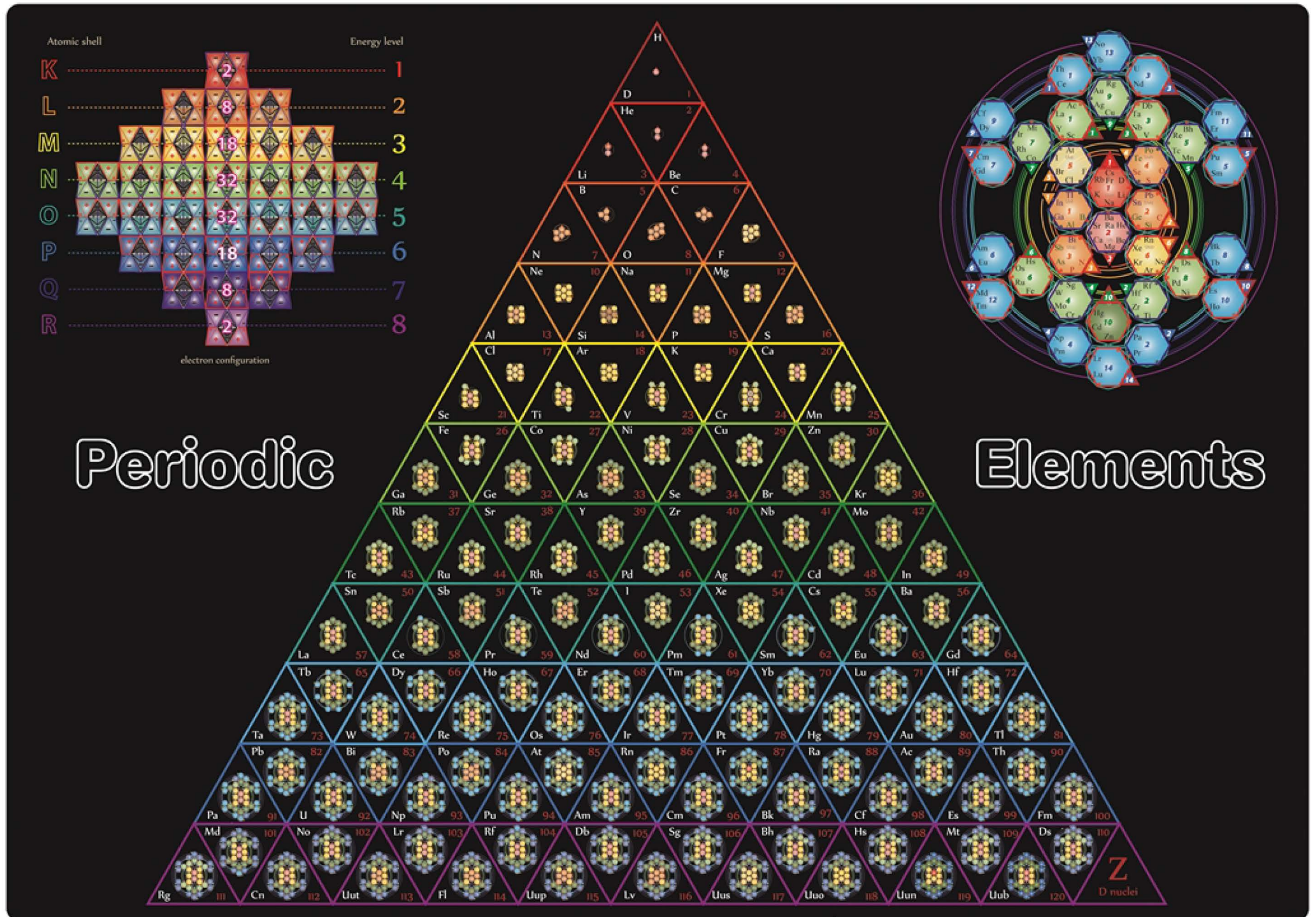
Alkali
Metal



Tetryonics 51.119 - Ununennium atom



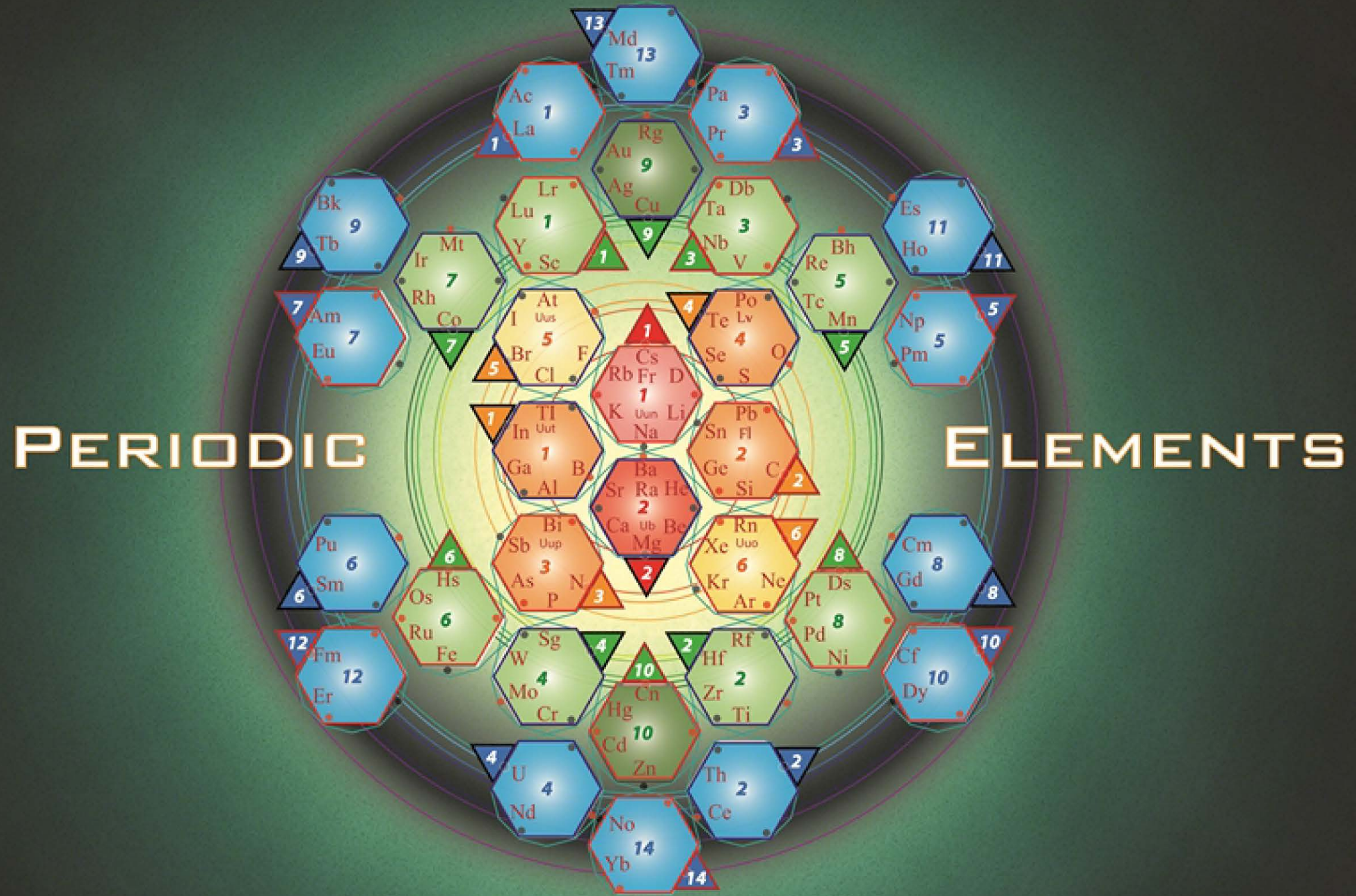
Tetryonics 51.120 - Unbinilium atom



Periodic

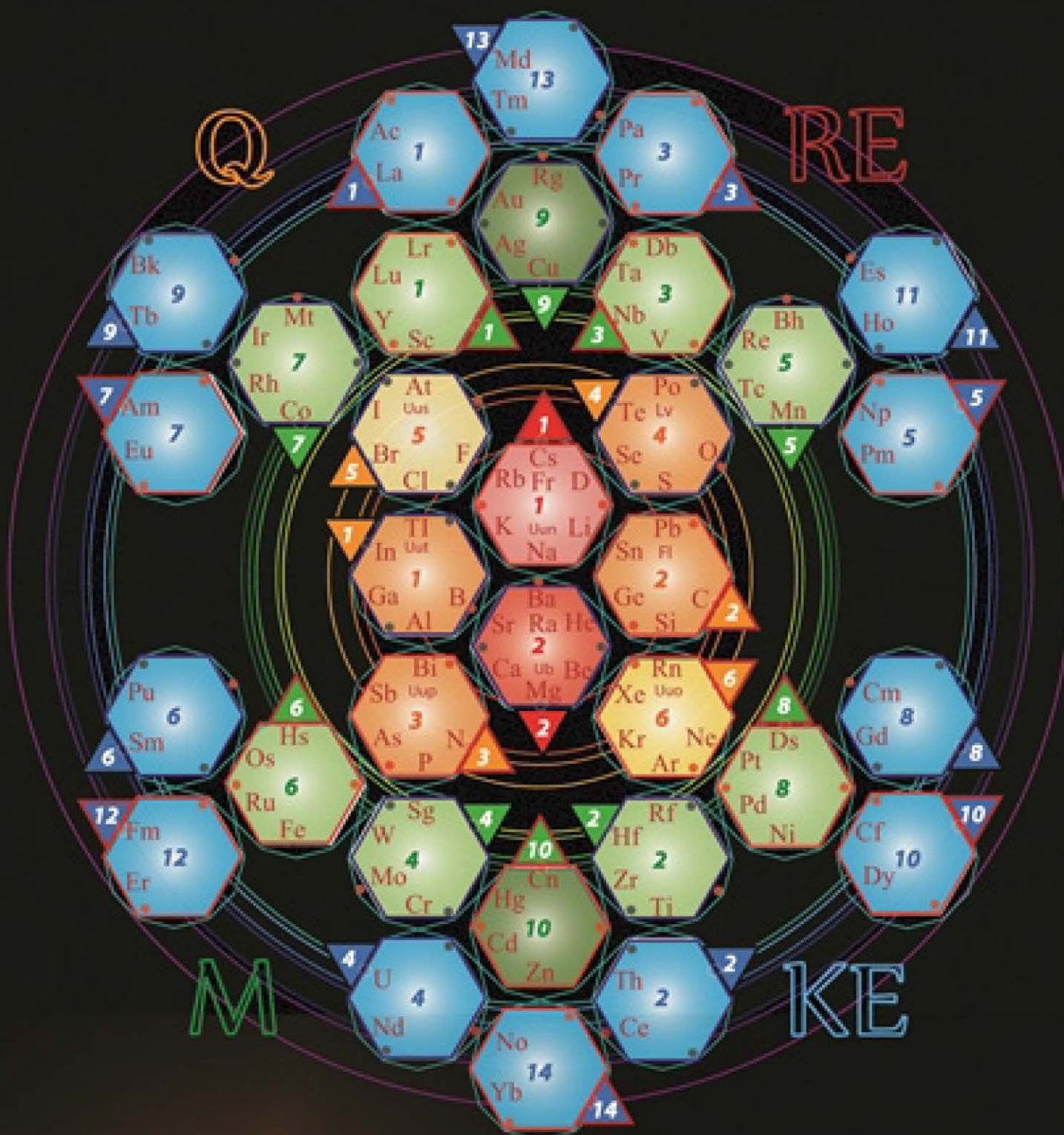
Elements

Tetryonics 52.01 - Tetryonic Element Table



TETRYONICS

The charged topology of periodic & compound Matter

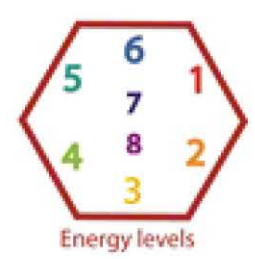
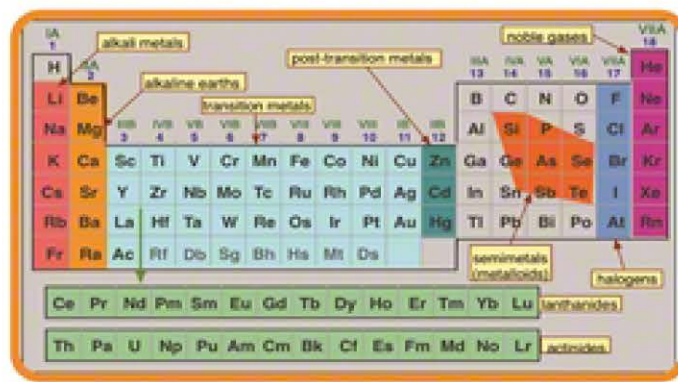
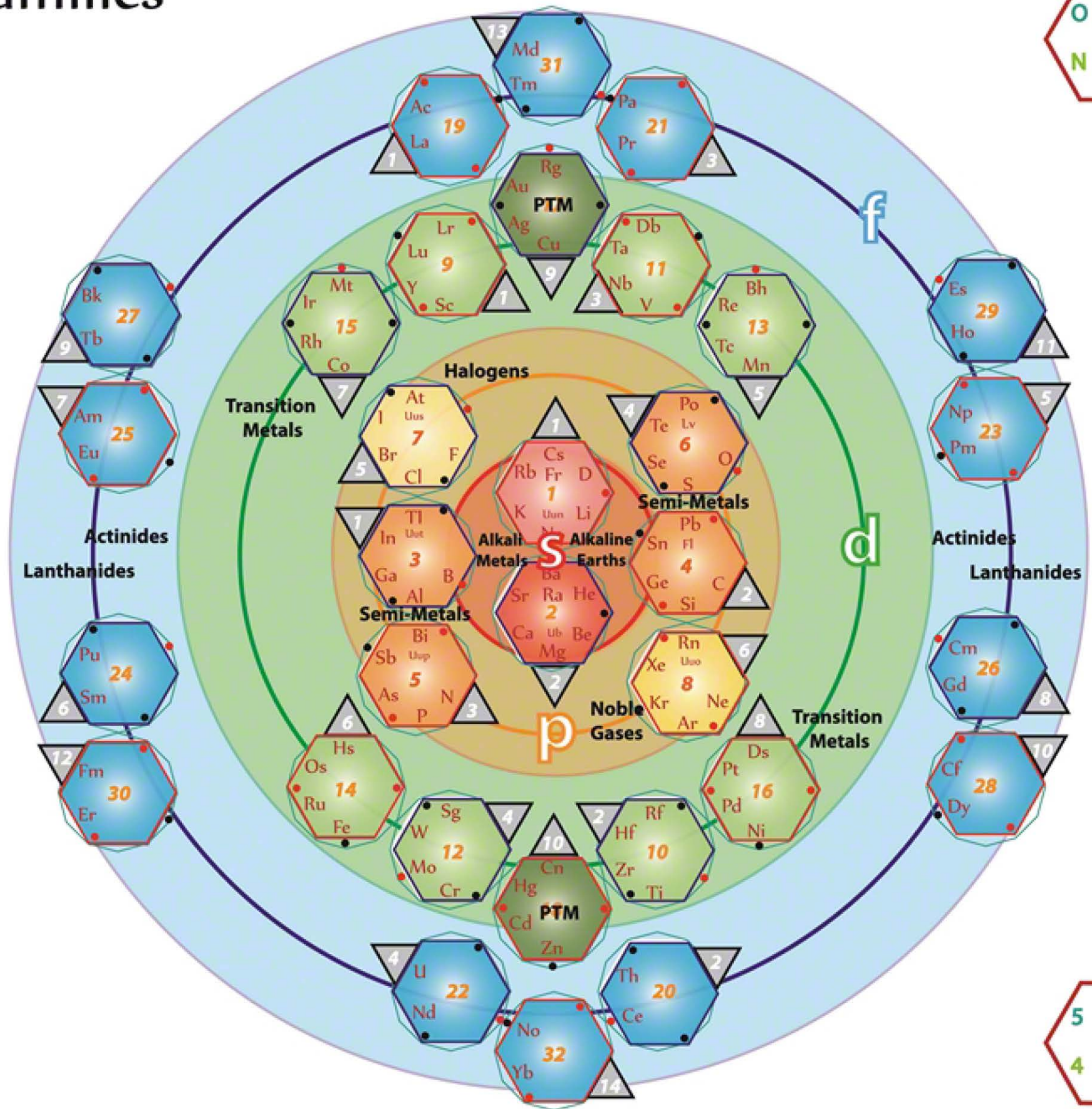
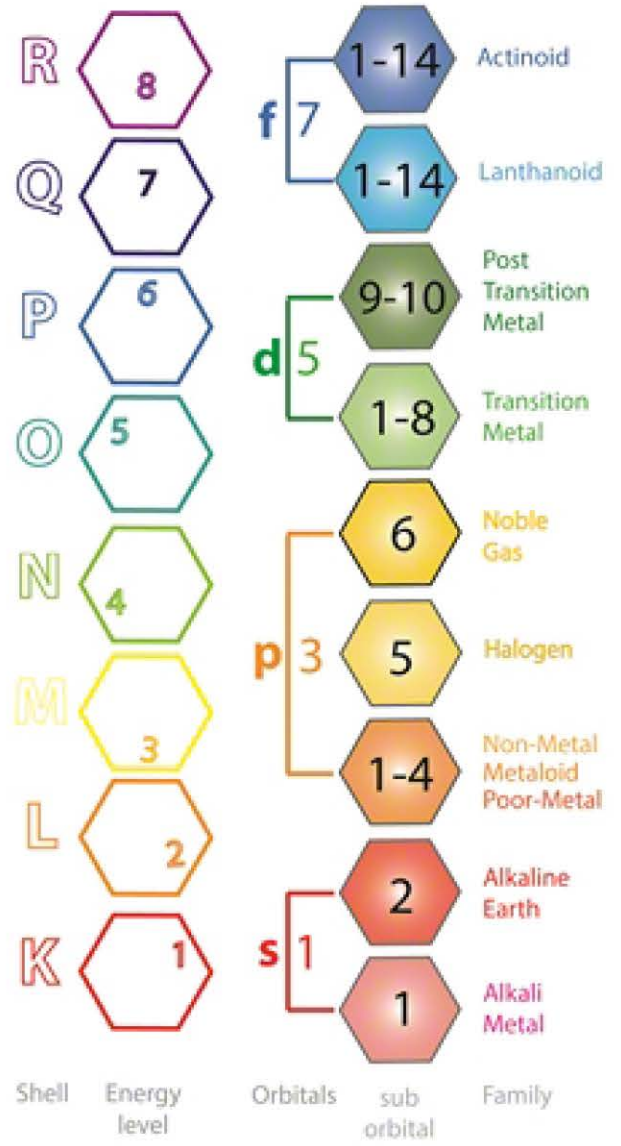


Foundational Quantum Chemistry

Abraham

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Periodic element Families



Alkali Metals

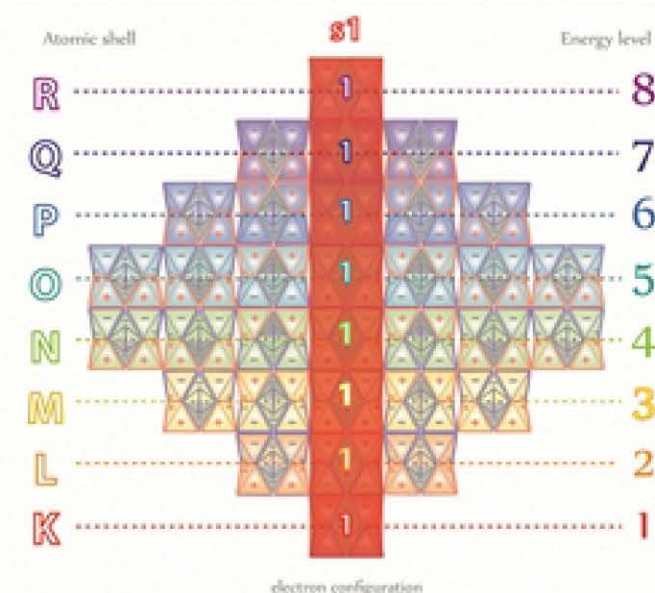
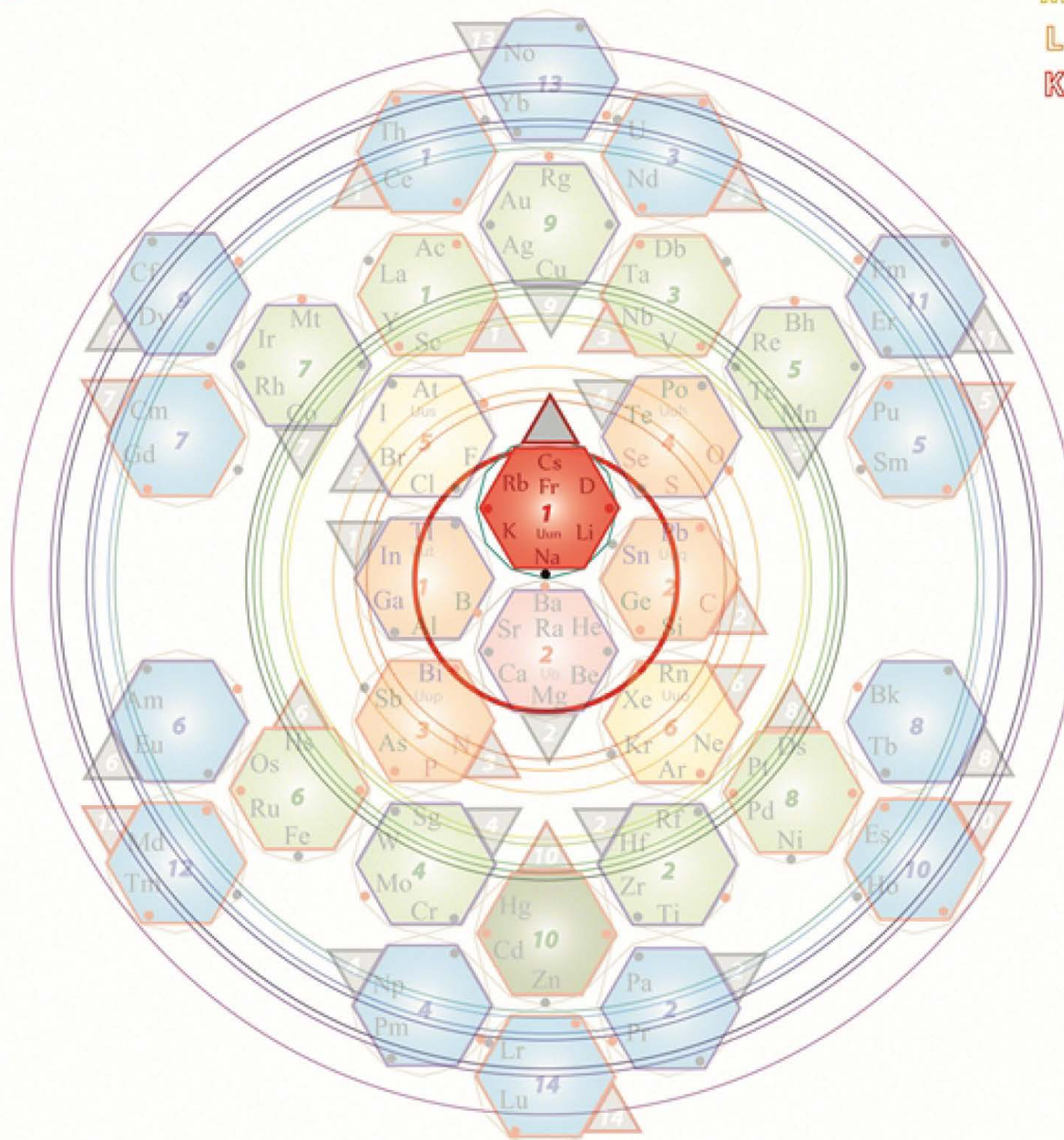
The alkali metals are silver-colored (caesium has a golden tinge), soft, low-density metals, which react readily with halogens to form ionic salts, and with water to form strongly alkaline (basic) hydroxides.

These elements all have one electron in their outermost shell, so the energetically preferred state of achieving a filled electron shell is to lose one electron to form a singly charged positive ion.

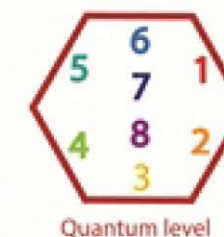


The alkali metals are all highly reactive and are never found in elemental form in nature.

As a result, in the laboratory they are stored under mineral oil. They also tarnish easily and have low melting points and densities. Potassium and rubidium possess a weak radioactive characteristic (harmless) due to the presence of long duration radioactive isotopes.

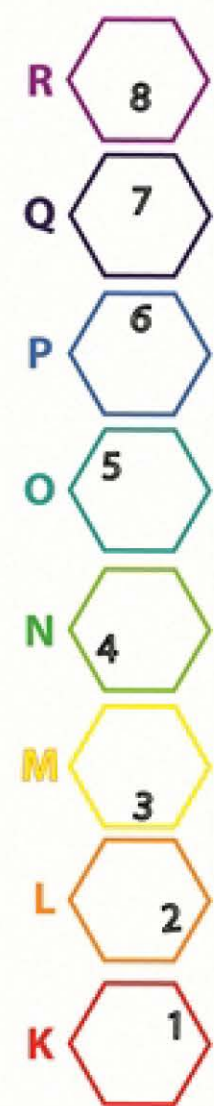


8
Alkaline Metals



Alkaline Earths

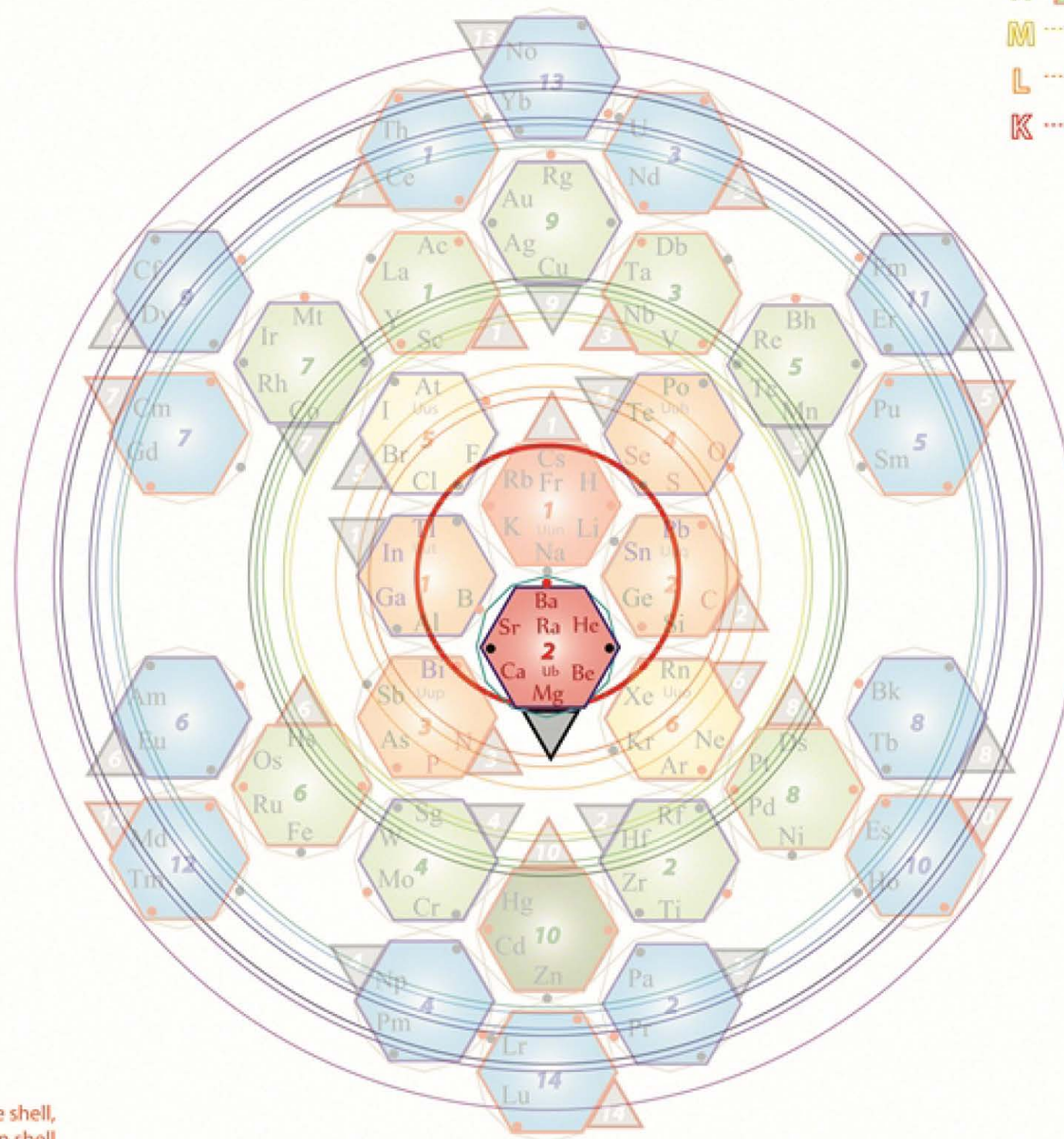
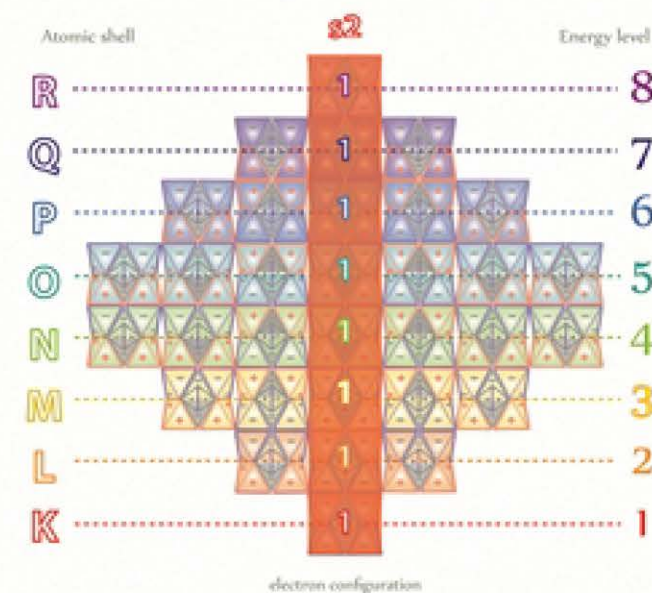
The alkaline earth metals are silver colored, soft metals, which react readily with halogens to form ionic salts, and with water, though not as rapidly as the alkali metals, to form strong alkaline (basic) hydroxides.



Shell Quantum level



8
Alkaline Earths



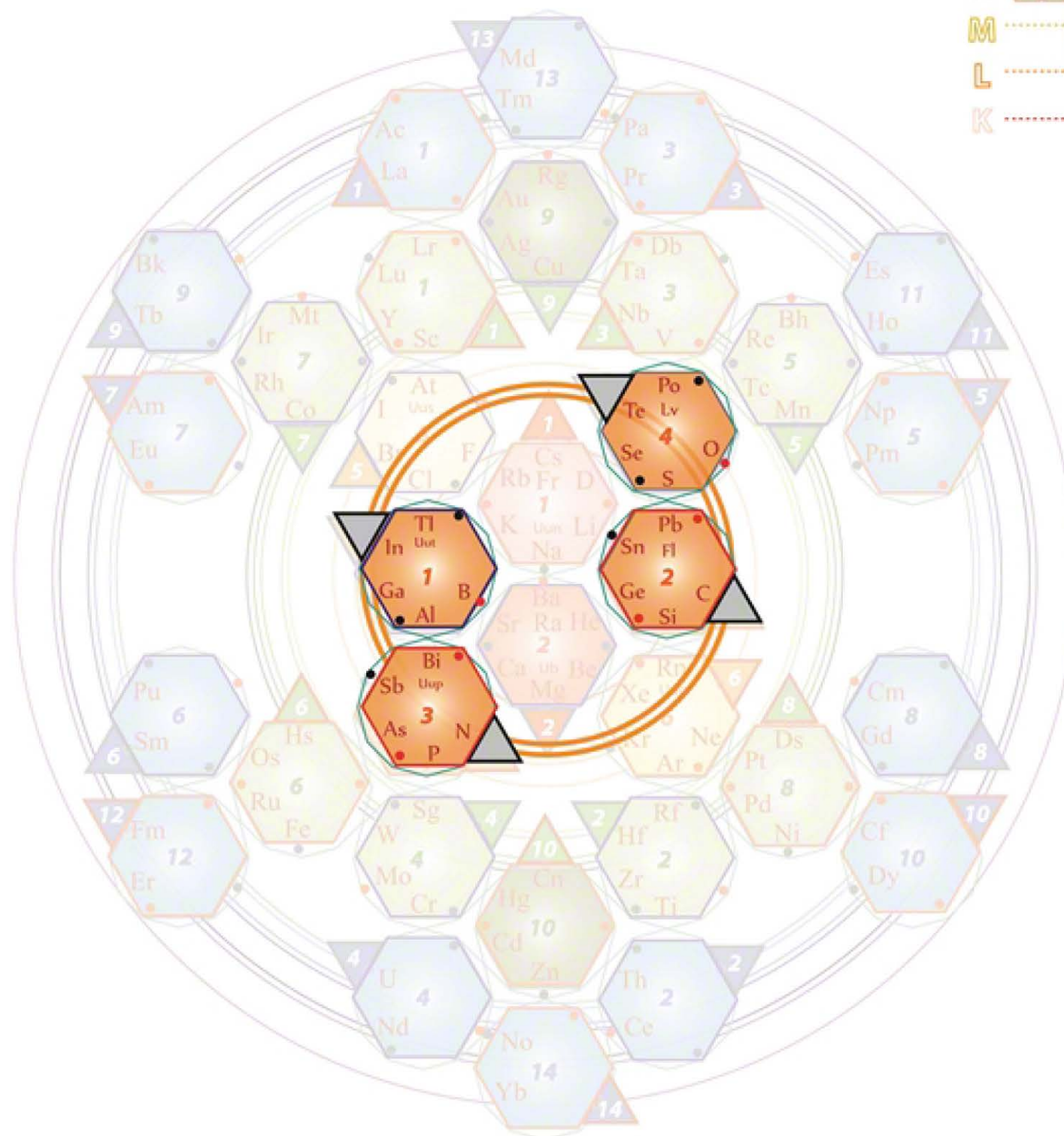
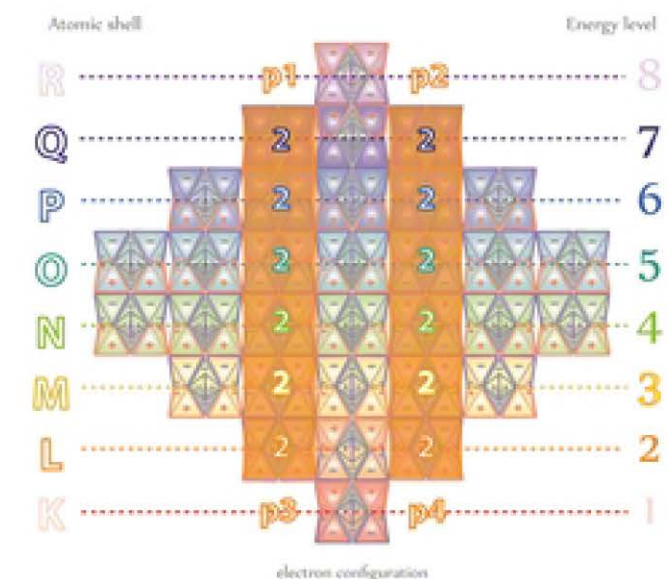
All the alkaline earth metals have two electrons in their valence shell, so the energetically preferred state of achieving a filled electron shell is to lose two electrons to form doubly charged positive ions.

Metalloids

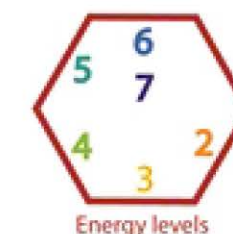
A metalloid is a material with a small overlap in the energy of the conduction band and valence bands.

Unlike a regular metal, metalloids have been described electrically as charge carriers of both types (holes and electrons), so it could be argue that they should be called 'double-metals' rather than metalloids.

As metalloids have fewer charge carriers than metals, they typically have lower electrical and thermal conductivities.



**24
Semi-Metals**



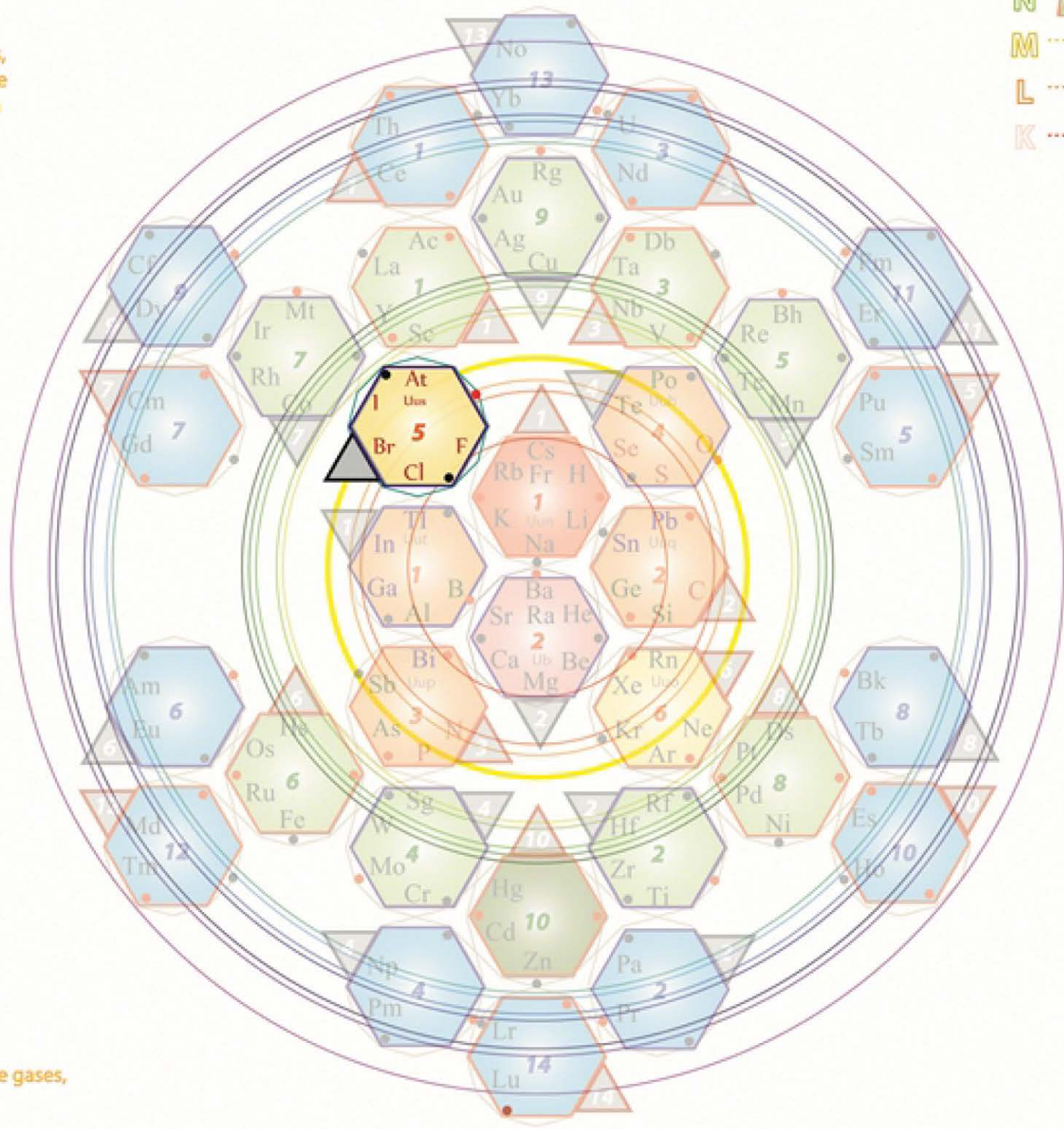
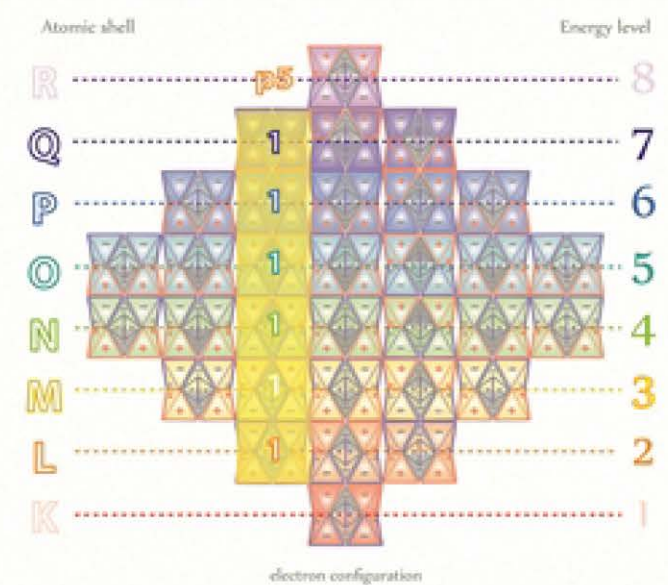
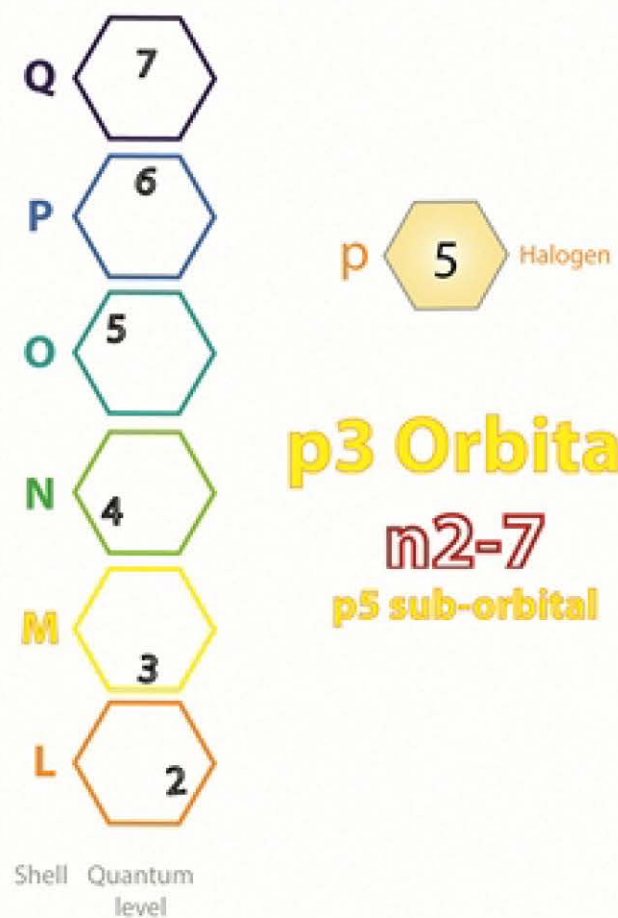
Charge carriers typically occur in much smaller numbers than in a real metal. In this respect they resemble degenerate semiconductors more closely. This explains why the electrical properties of metalloids are partway between those of metals and semiconductors.

Halogens

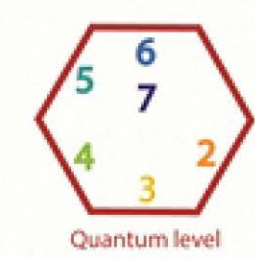
Owing to their high reactivity, the halogens are found in the environment only in compounds or as ions.

Halide ions and oxoanions such as iodate (IO_3^-) can be found in many minerals and in seawater.

Halogenated organic compounds can also be found as natural products in living organisms. In their elemental forms, the halogens exist as diatomic molecules, but these only have a fleeting existence in nature and are much more common in the laboratory and in industry.



6
Halogens



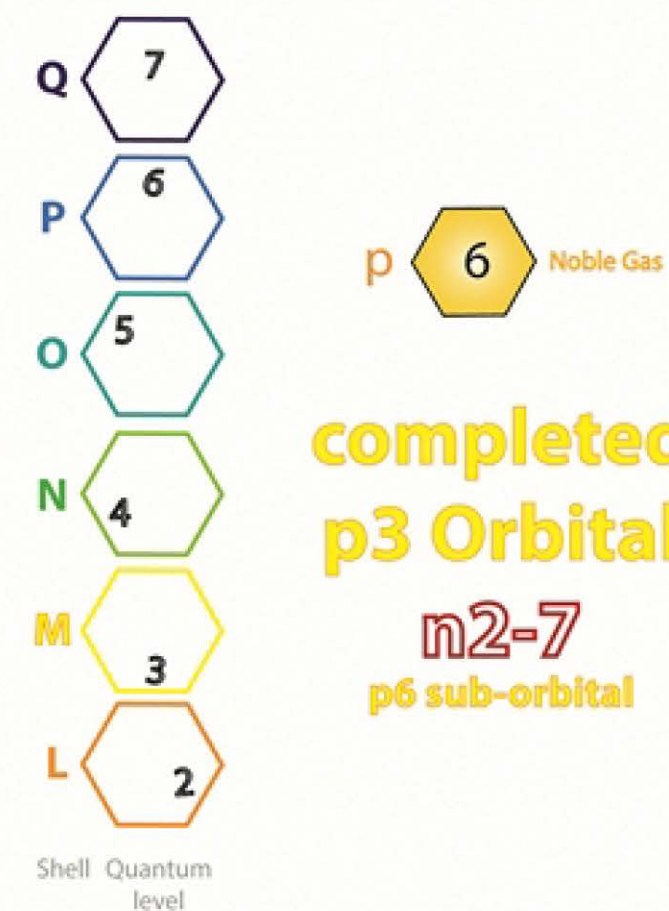
At room temperature and pressure, fluorine and chlorine are gases, bromine is a liquid and iodine and astatine are solids.

Group 17 is therefore the only periodic table group exhibiting all three states of matter at room temperature

Nobel Gases

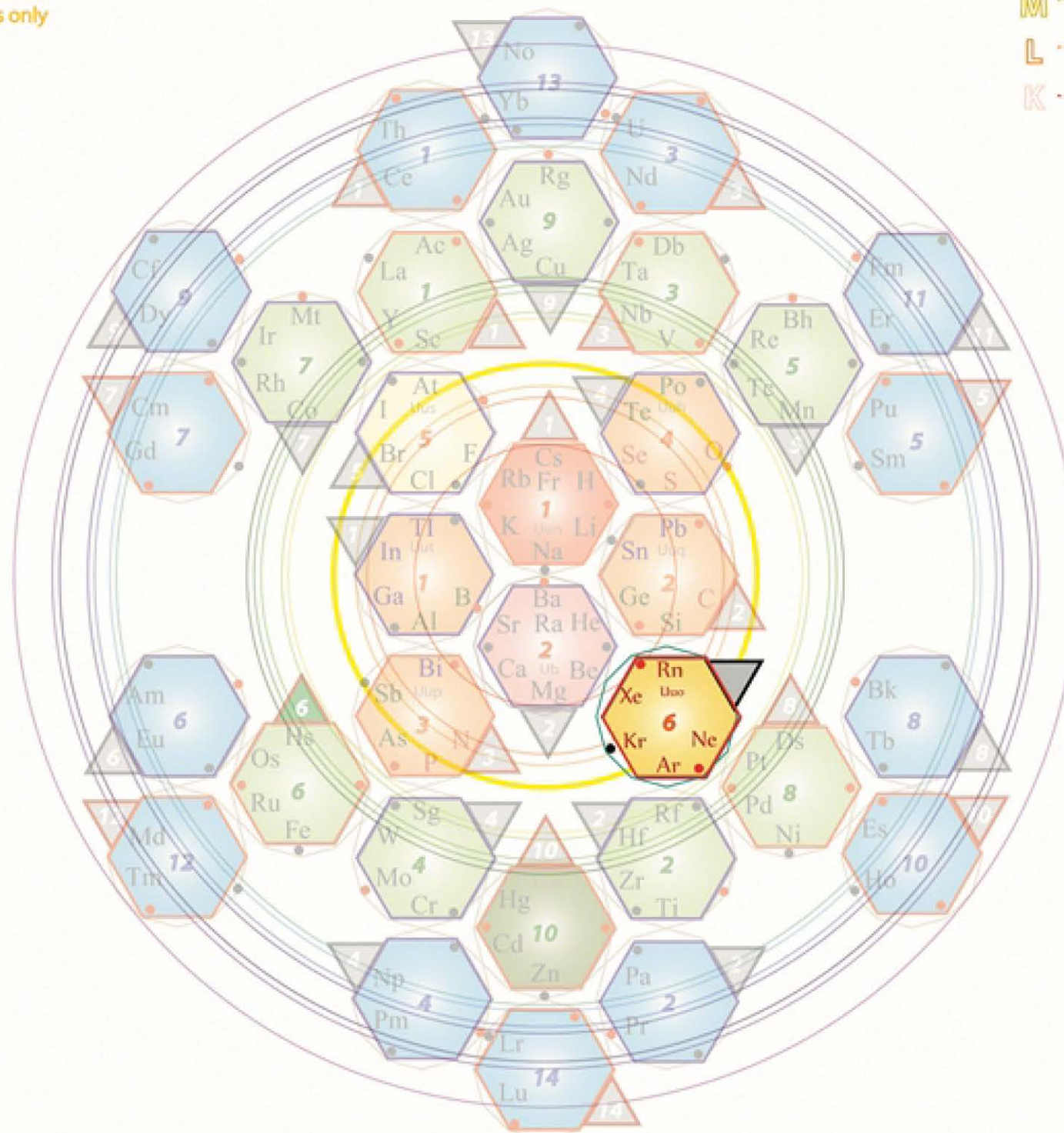
The properties of the noble gases can be well explained by modern theories of atomic structure: their outer shell of valence electrons is considered to be "full", giving them little tendency to participate in chemical reactions, and only a few hundred noble gas compounds have been prepared.

The melting and boiling points for each noble gas are close together, differing by less than 10 °C (18 °F); consequently, they are liquids only over a small temperature range.

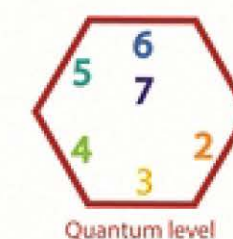


Neon, argon, krypton, and xenon are obtained from air using the methods of liquefaction of gases and fractional distillation.

Helium is typically separated from natural gas, and radon is usually isolated from the radioactive decay of dissolved radium compounds.



6 Nobel Gases



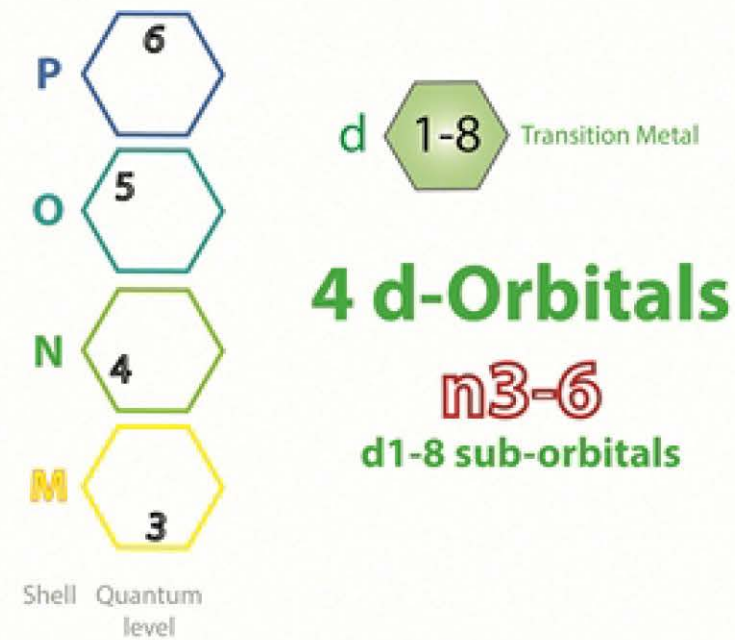
Transitional Metals

In chemistry, the term transition metal commonly refers to any element in the d-block of the periodic table, including the group 12 elements zinc, cadmium and mercury.

This corresponds to groups 3 to 12 on the periodic table, which are all metals.

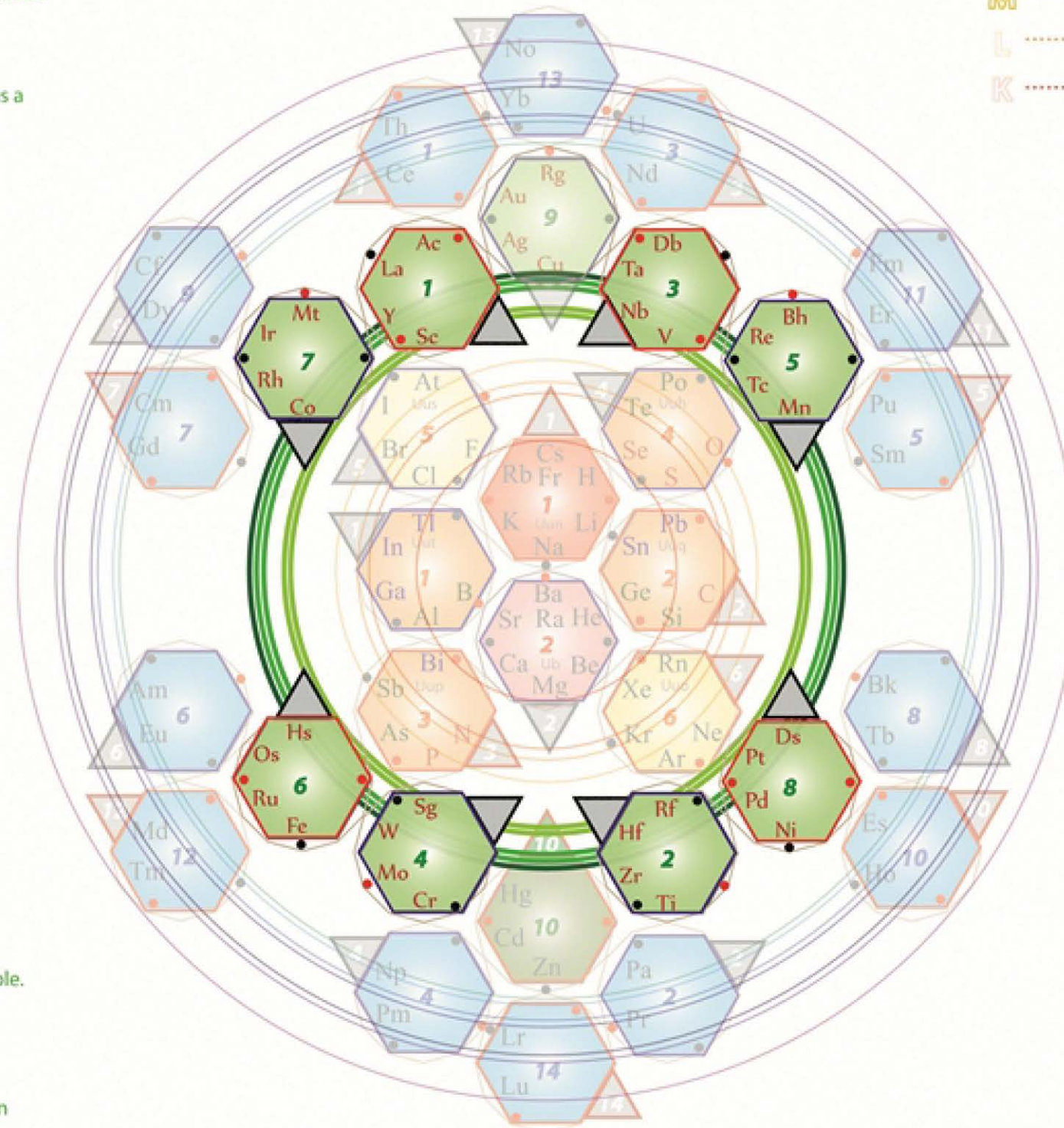
More strictly, IUPAC defines a transition metal as "an element whose atom has an incomplete d sub-shell, or which can give rise to cations with an incomplete d sub-shell."

The first definition is simple and has traditionally been used. However, many interesting properties of the transition elements as a group are the result of their partly filled d subshells.

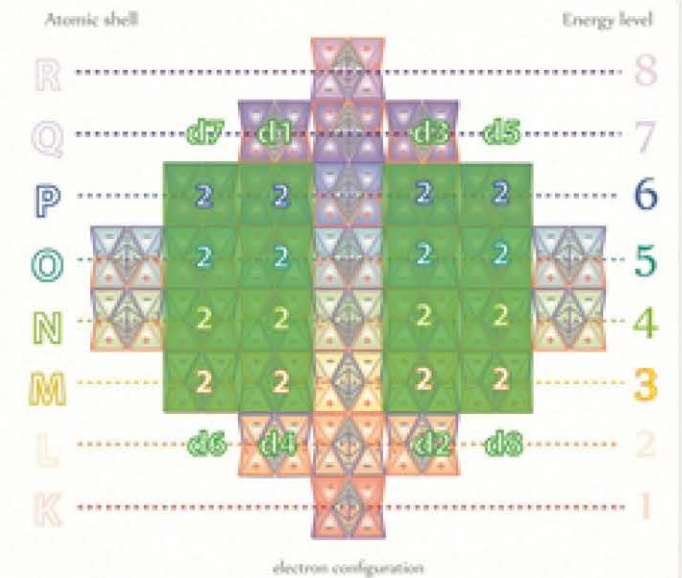


The name transition comes from their position in the periodic table. In each of the four periods in which they occur, these elements represent the successive addition of electrons to the d atomic orbitals of the atoms.

In this way, the transition metals represent the transition between group 2 elements and group 13 elements.



32
Transition
Metals



Post-Transition Metals

In chemistry, the term post-transition metal is used to describe the category of metallic elements to the right of the transition elements on the periodic table.

There are two IUPAC definitions of "transition element" that have been in apparent conflict with one another since September 2007.

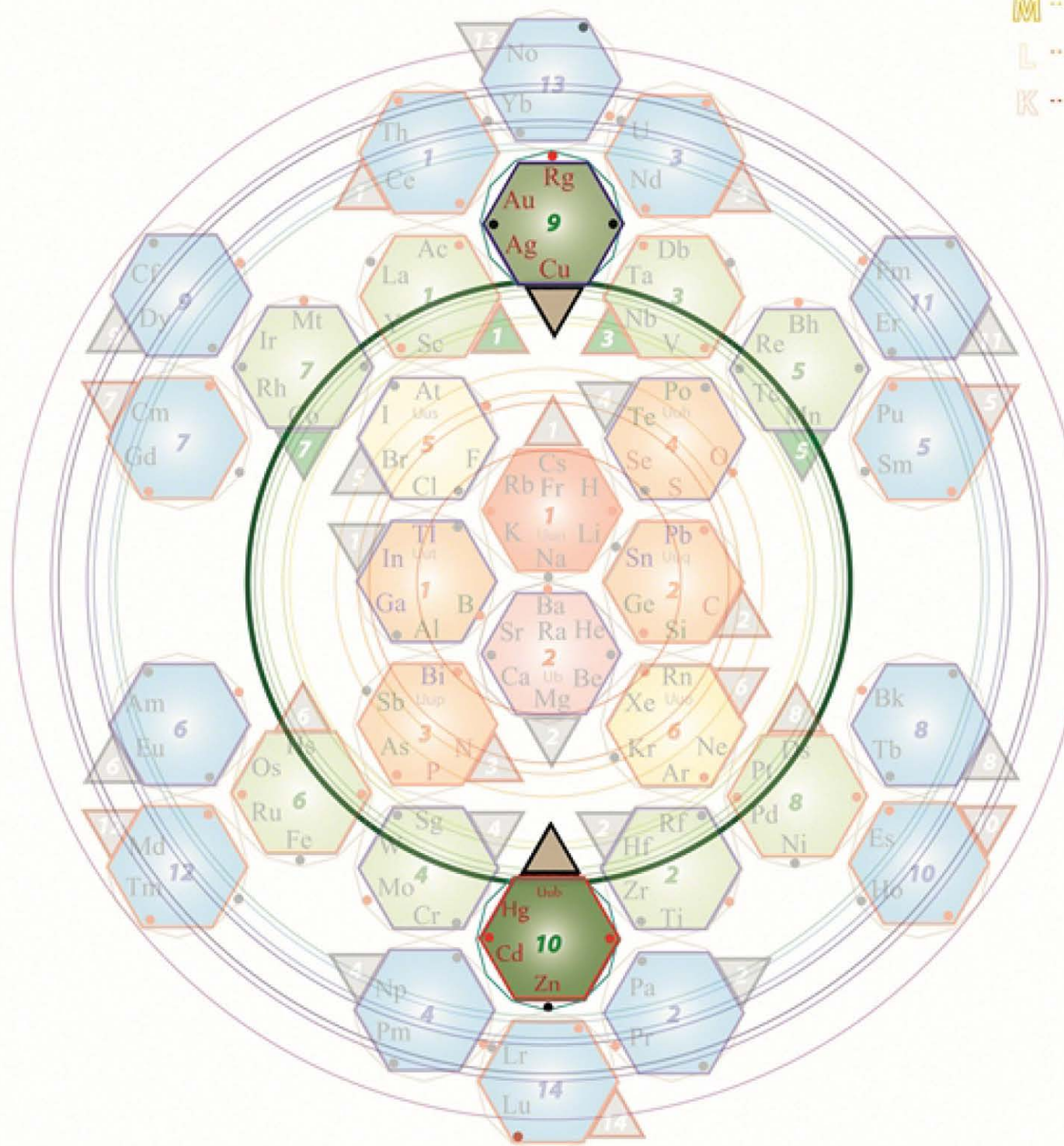
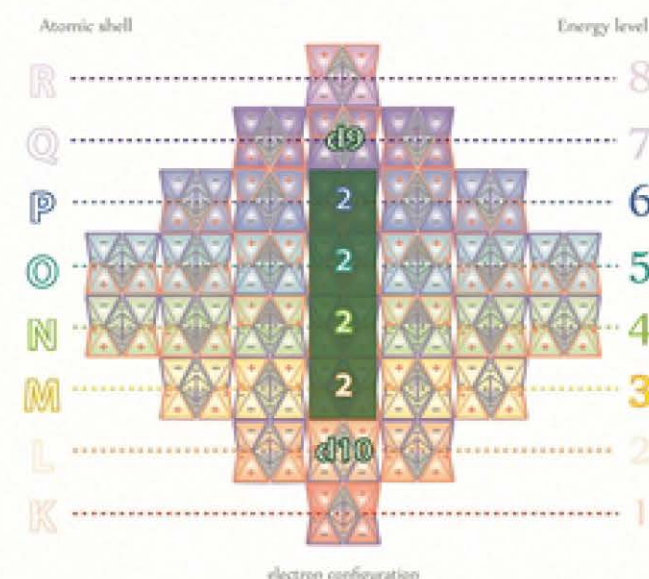
According to the first definition, transition metals are elements in group 3 through group 11.

In this case, post-transition metals include all of group 12—zinc, cadmium, mercury, and ununbium

According to the second definition, transition elements either have an incomplete d-subshell or have the ability to form an incomplete d-subshell.

Post Transitional metals are normally defined as completed d orbitals

Tetryonics suggests it may be appropriate to include all the d5 orbital elements in this grouping



8
Post-transitional
Metals

In 2007, mercury(IV) fluoride was synthesized.[2][3] This compound contains a mercury atom with an incomplete d-subshell, and ununbium is predicted to have the capacity to form a similar electronic configuration.

In this case, post-transition metals include only zinc and cadmium within group 12.



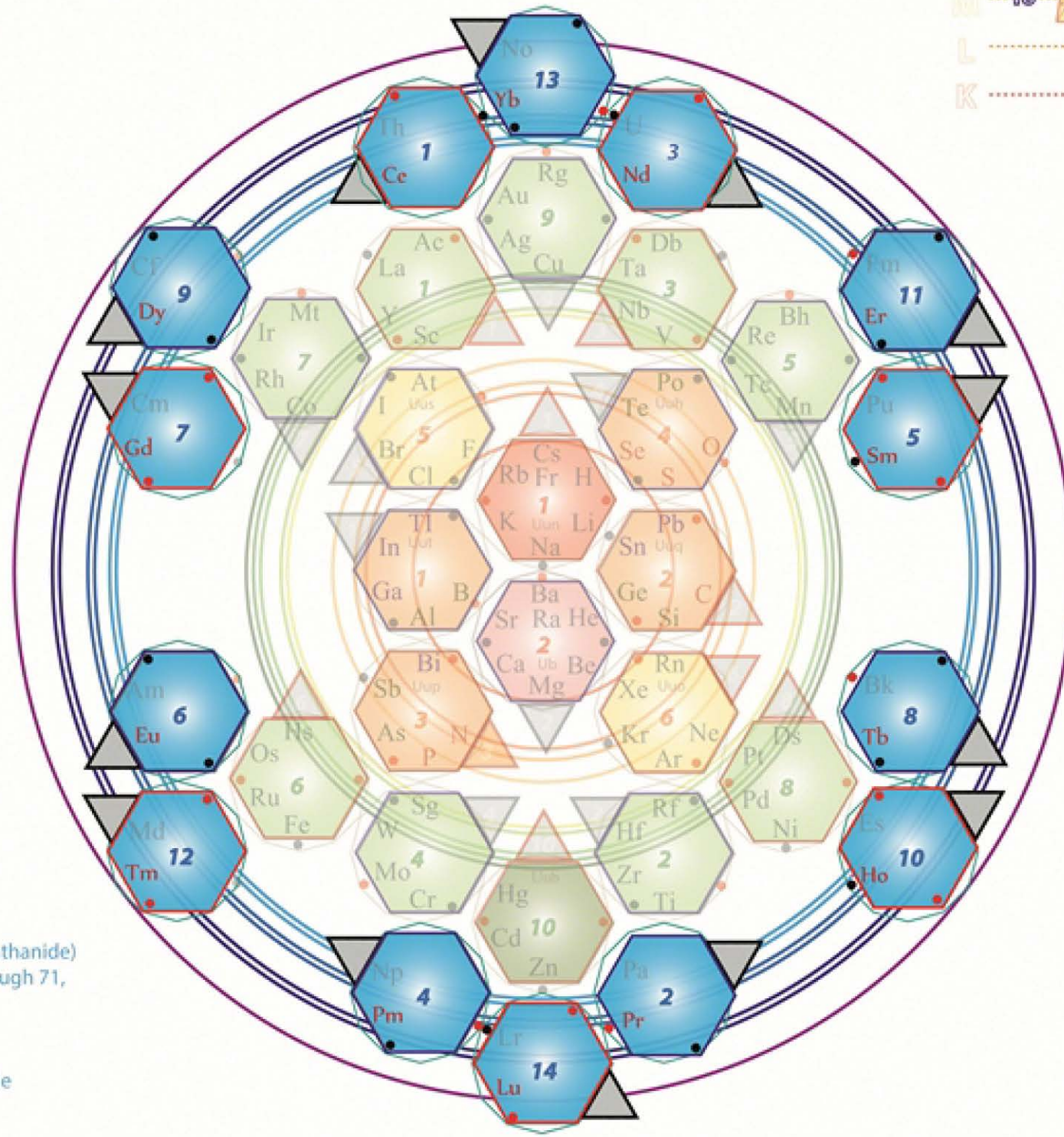
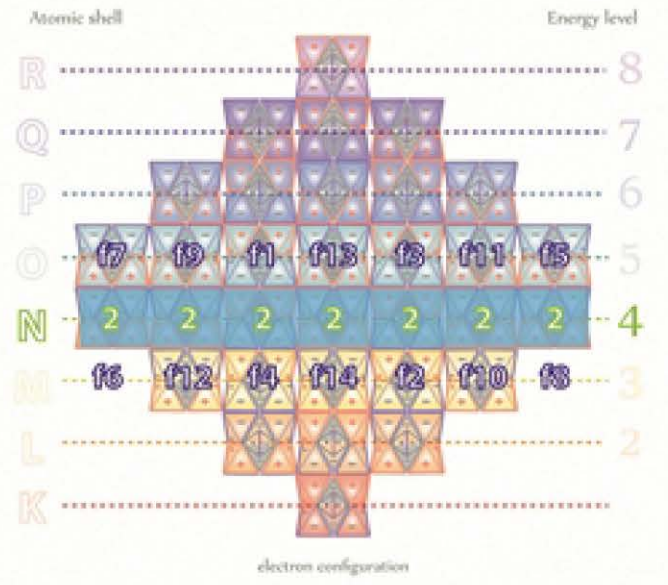
Lanthanoids

All lanthanoids are f-block elements, corresponding to the filling of the 4f electron shell

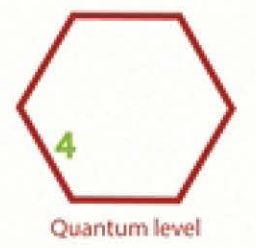
The lanthanoid series (Ln) is named after Lanthanum.

The trivial name "rare earths" is sometimes used to describe all the lanthanoids together with scandium and yttrium.

These elements are in fact fairly abundant in nature, although rare as compared to the "common" earths such as lime or magnesia. Cerium is the 26th most abundant element in the Earth's crust, neodymium is more abundant than gold and even thulium (the least common naturally-occurring lanthanoid) is more abundant than iodine.



14
Lanthanoids



7 f-Orbitals
n⁴
f1-14 sub-orbitals

The term "rare earths" arises from the minerals from which they were isolated, which were uncommon oxide-type minerals.

According to the IUPAC terminology, the lanthanoid (previously lanthanide) series comprises the fifteen elements with atomic numbers 57 through 71, from Lanthanum to Lutetium.

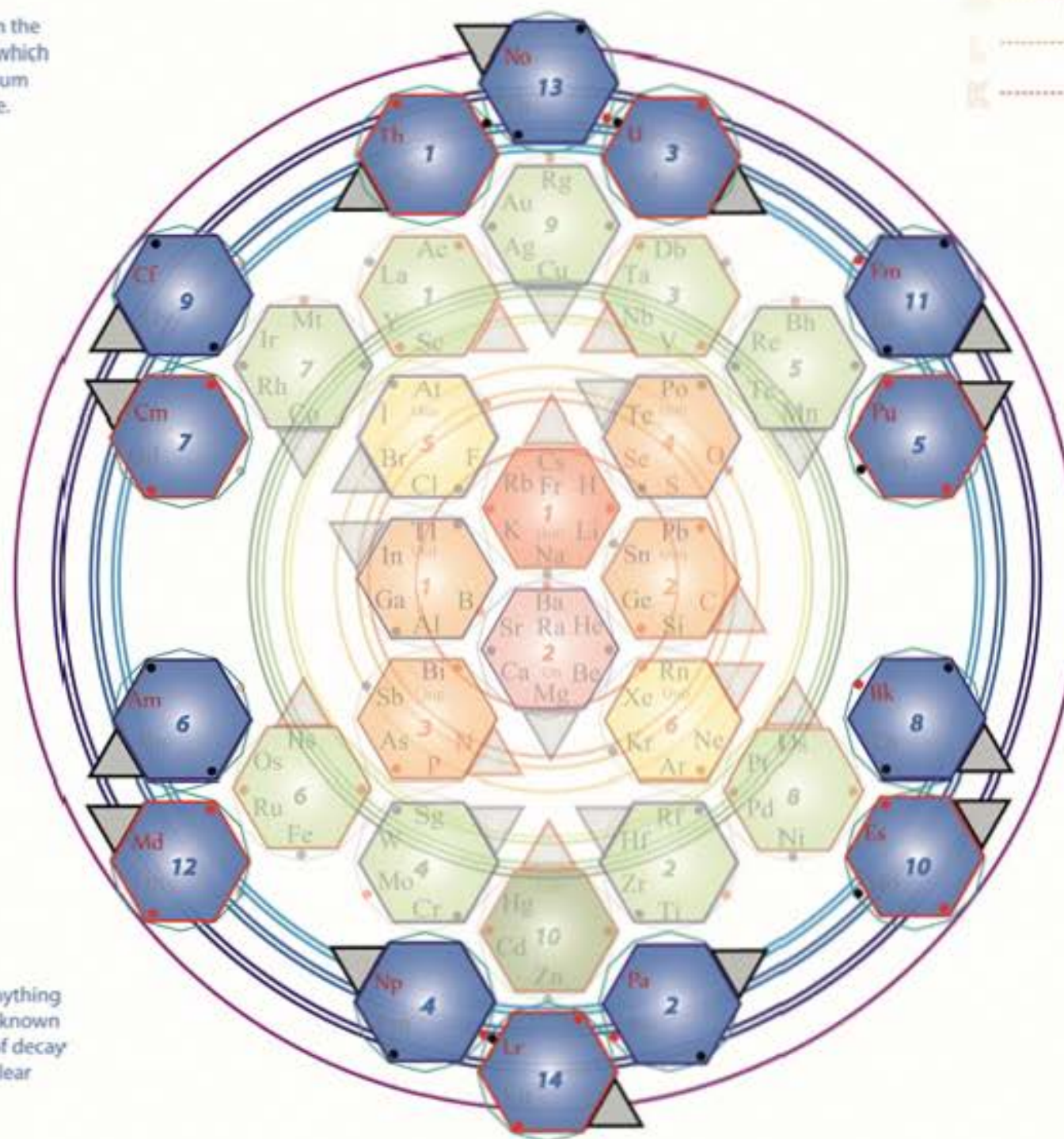
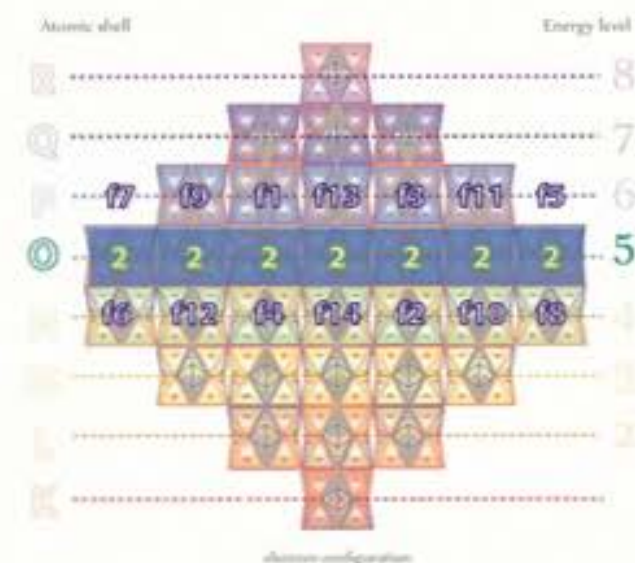
The use of this name is deprecated by IUPAC, as they are neither rare in abundance nor "earths" (an obsolete term for water-insoluble strongly basic oxides of electropositive metals incapable of being smelted into metal using late 18th century technology).

Actinoids

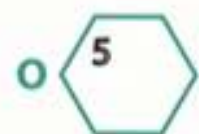
According to IUPAC nomenclature, the actinoid (previously actinide) series encompasses the 15 chemical elements that lie between actinium and lawrencium included on the periodic table, with atomic numbers 89 - 103.

The actinoid series derives its name from the first element in the series, actinium, and ultimately from the Greek ακτις (aktis), "ray," reflecting the elements' radioactivity.

The actinoids display less similarity in their chemical properties than the lanthanoid series (Ln), exhibiting a wider range of oxidation states, which initially led to confusion as to whether actinium, thorium, and uranium should be considered d-block elements. All actinoids are radioactive.



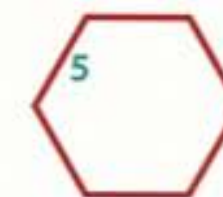
f 1-14 Actinoid



Shell Quantum level

7 f-Orbitals
 $n=5$
 f1-14 sub-orbitals

14 Actinoids



Quantum level

Only thorium and uranium occur naturally in the earth's crust in anything more than trace quantities. Neptunium and plutonium have been known to show up naturally in trace amounts in uranium ores as a result of decay or bombardment. The remaining actinoids were discovered in nuclear fallout, or were synthesized in particle colliders.

The latter half of the series possess exceedingly short half-lives.

$$E = nhv$$

$$\sum_{K=1}^{R=32} \left[\overset{\text{Baryon rest masses}}{72(n)^2} + \overset{\text{lepton rest mass}}{12e19} + \overset{\text{KEM}}{m_c v^2} \right]_1^8$$

Deuterium mass-energy per shell

$$m = Ev^2/c^2$$

Periodic summation formula

re-termining the masses of the periodic summation formula into Planck energy quanta we can derive a quadratic formulation for the mass-energies of any periodic element

Baryon energies determine electron KEMs

$$h \sum_{K=1}^{R=32} \left[\overset{\text{Baryon rest mass-energy}}{72(n^2)} + \overset{\text{KEM}}{v} + \overset{\text{lepton rest mass-energy}}{12e19} \right]_1^8$$

Deuterium mass-energy per shell

electron rest mass-Matter is velocity invariant

quadratic PΣ formulation

$$n = 1e19v$$

this quadratic form can be again re-organised to better reflect the specific rest mass-energy contributions of Baryons, electrons & their KEM fields to the molar mass-energy-Matter of any specific element

atomic shell energies

$$\sum_{K=1}^{R=32} \left[\overset{\text{Baryon rest quanta}}{72(n^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^8$$

nuclear mass-energy quanta per shell

spectral line transitions

Elementary PΣ formulation

aufbau filling principle

The aufbau principle was developed by Neils Bohr and Wolfgang Pauli in 1920 as they applied quantum mechanics to the physical properties of chemistry

It attempted to model the properties of electrons in atoms to and led to the introduction of the $n+l$ orbitals, and later to the development of Schrodiner's quantum numbers



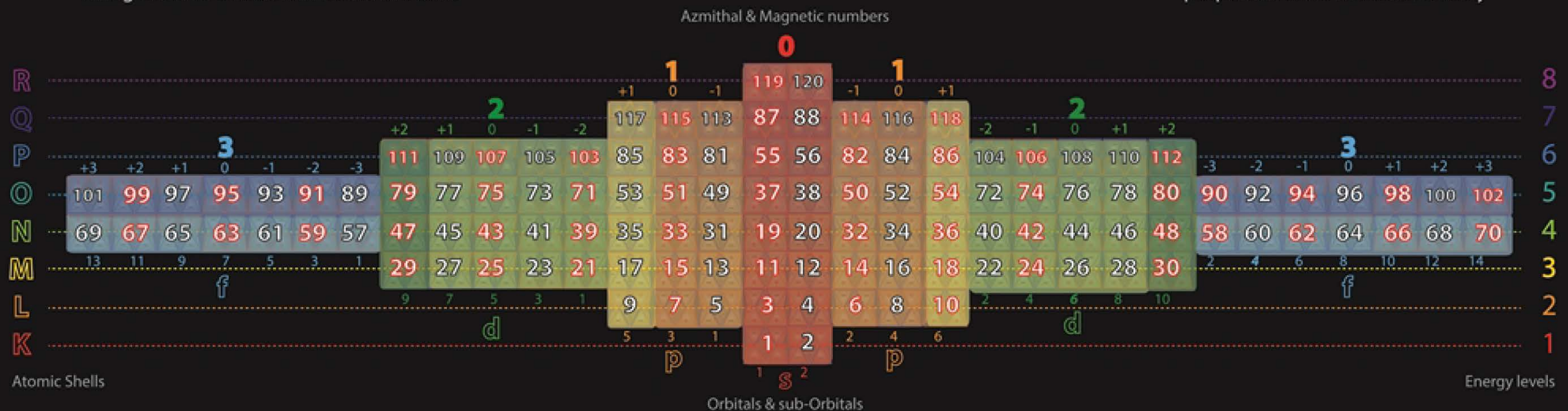
"The orbitals of lower energy are filled in first with the electrons and only then the orbitals of higher energy are filled."

While succesful in describing lower numbered elements, many anomalous configurations arise from it in the d & f electron orbitals that need to be corrected

Tetryonic orbital filling

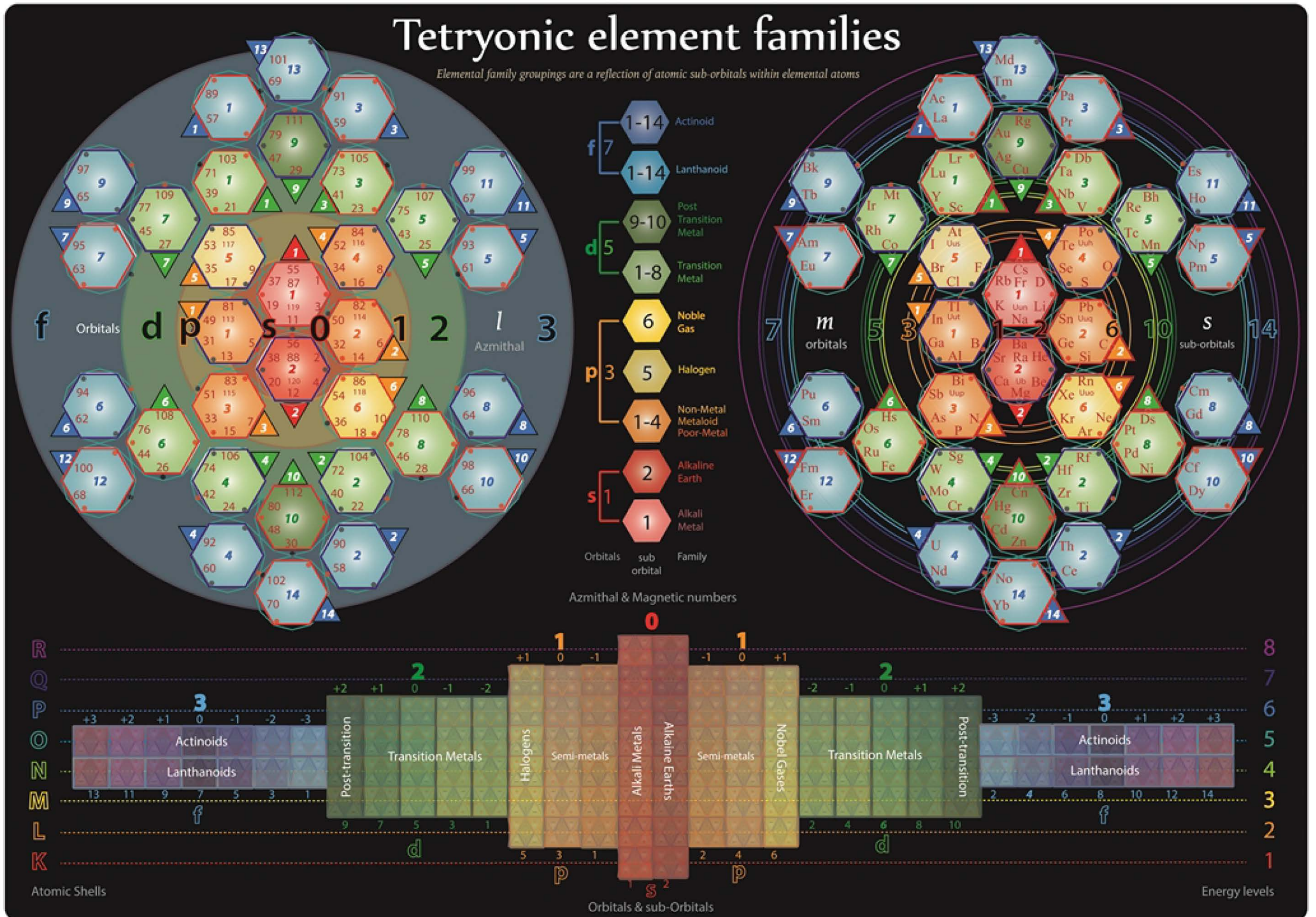
Tetryonic theory refines the aufbau principle by correcting it to follow the true quantum filling order of Deuterium nuclei in atoms

This then allows for all elementary nuclei, their atomic configurations & quantum properties to be modeled exactly



Tetryonic element families

Elemental family groupings are a reflection of atomic sub-orbitals within elemental atoms

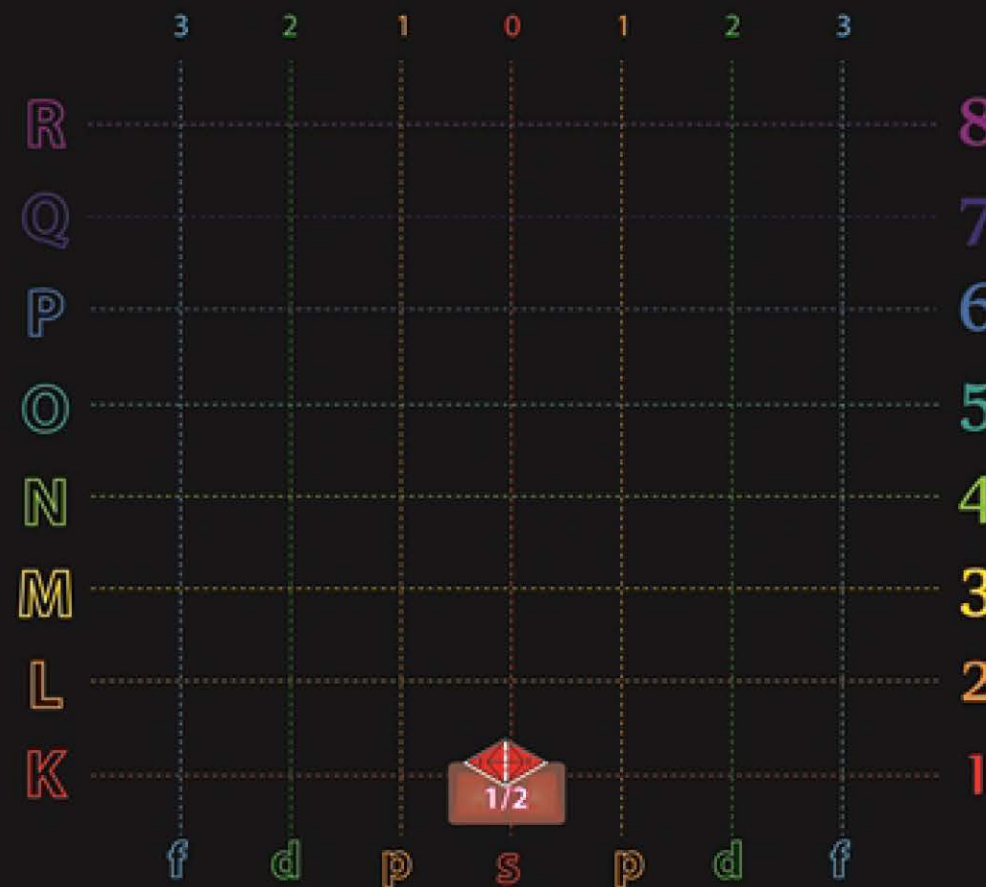


Tetryonics 52.15 - Tetryonic elemental families

elemental family geometry



electron configuration



Hydrogen is NOT a periodic table element

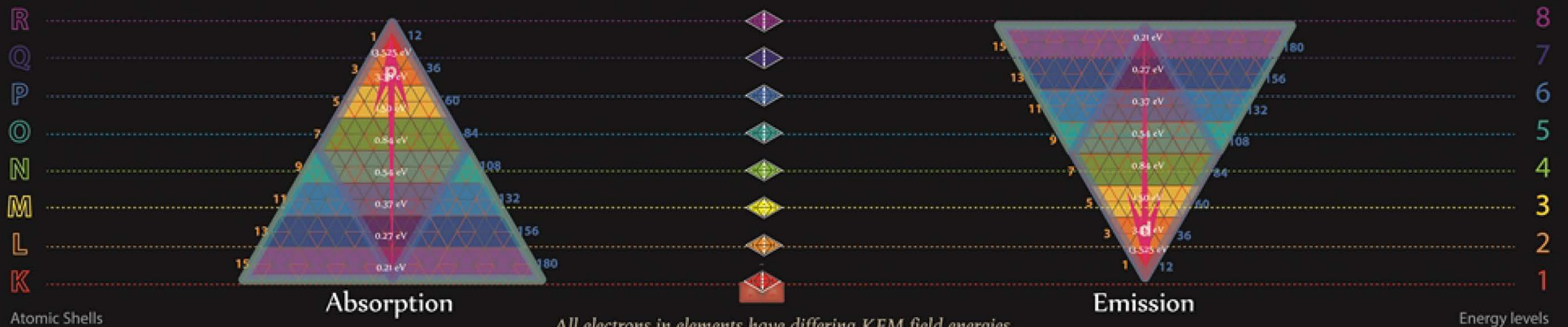
Hydrogen

Baryonic energy levels determine photo-electron KEM field energies

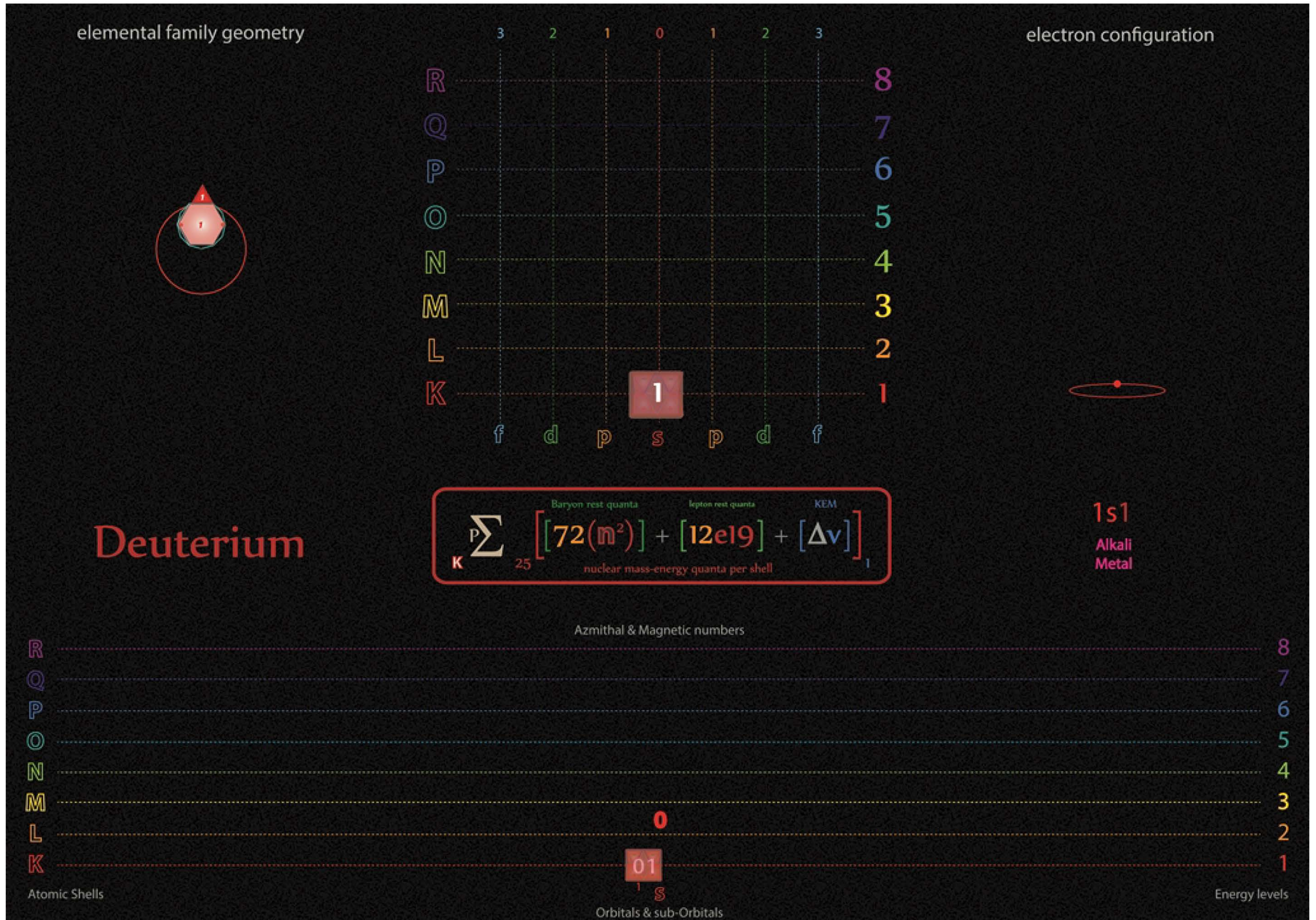
$$\sum_K^P \left[\underset{\text{nuclear mass-energy quanta per shell}}{72(n^2)} + \underset{\text{lepton rest quanta}}{12e19} + \underset{\text{KEM}}{\Delta v} \right]_i^S$$

Free Radical element

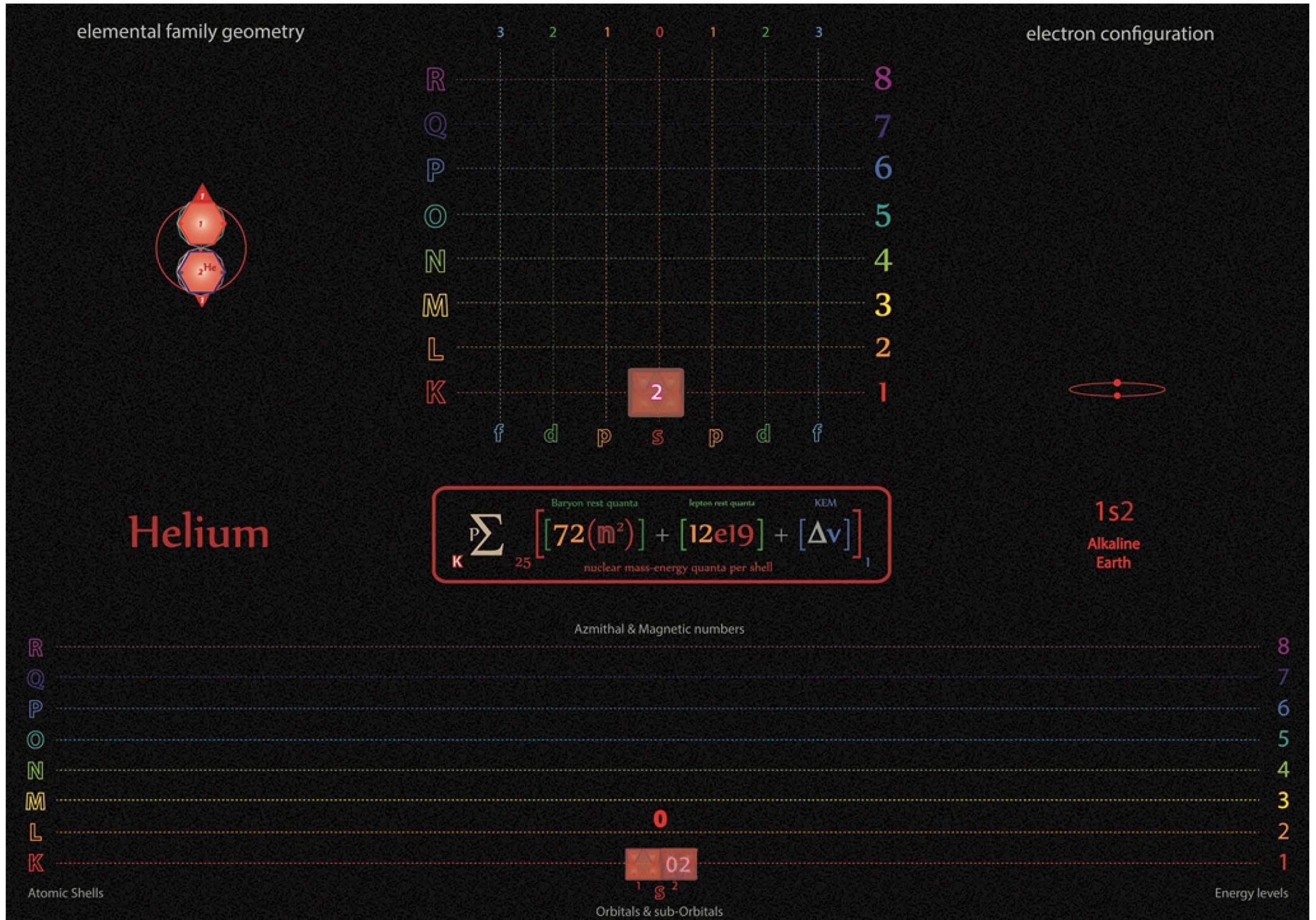
accelerating photo-electrons produce spectral lines



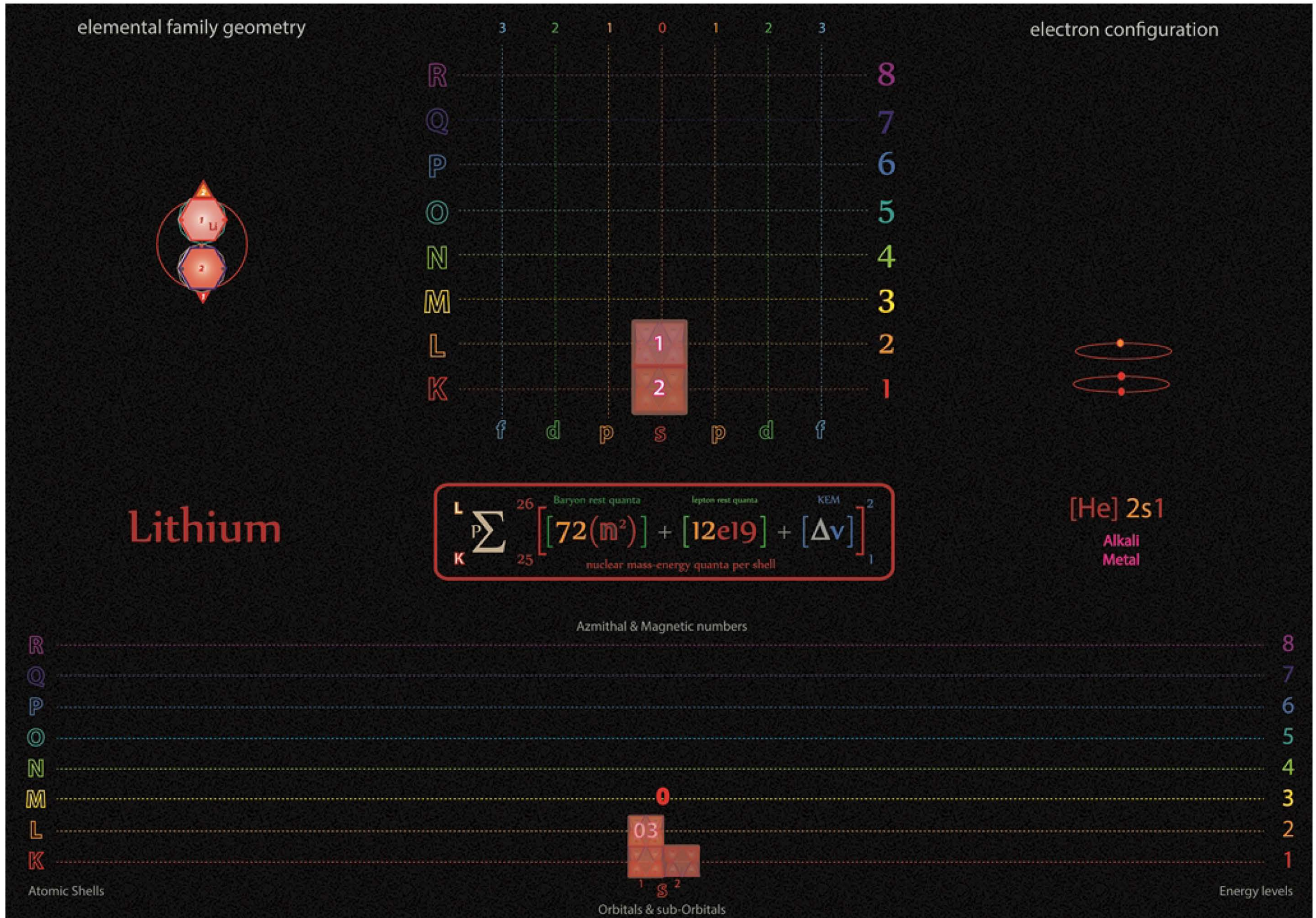
All electrons in elements have differing KEM field energies



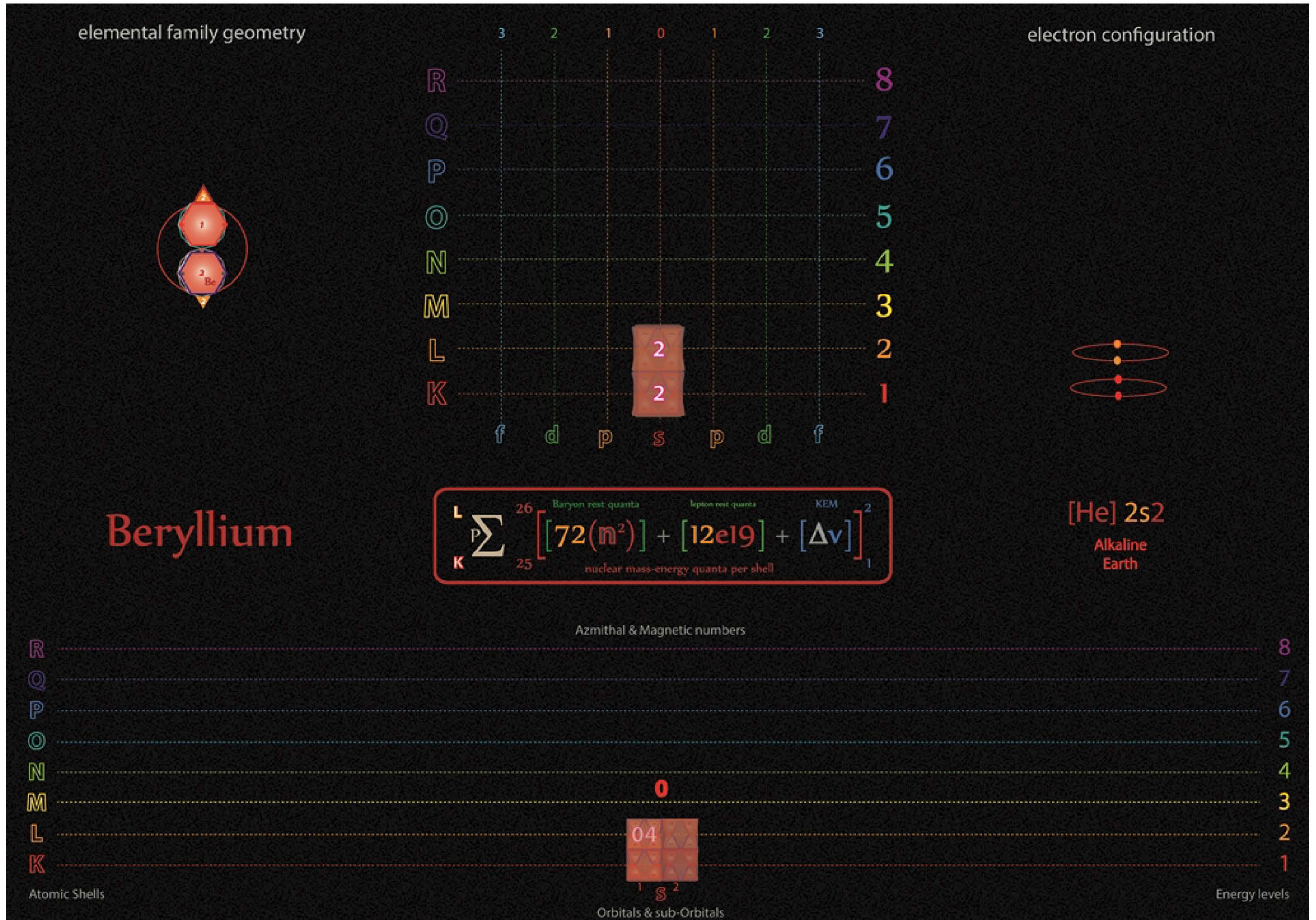
Tetryonics 53.01 - Deuterium atomic config



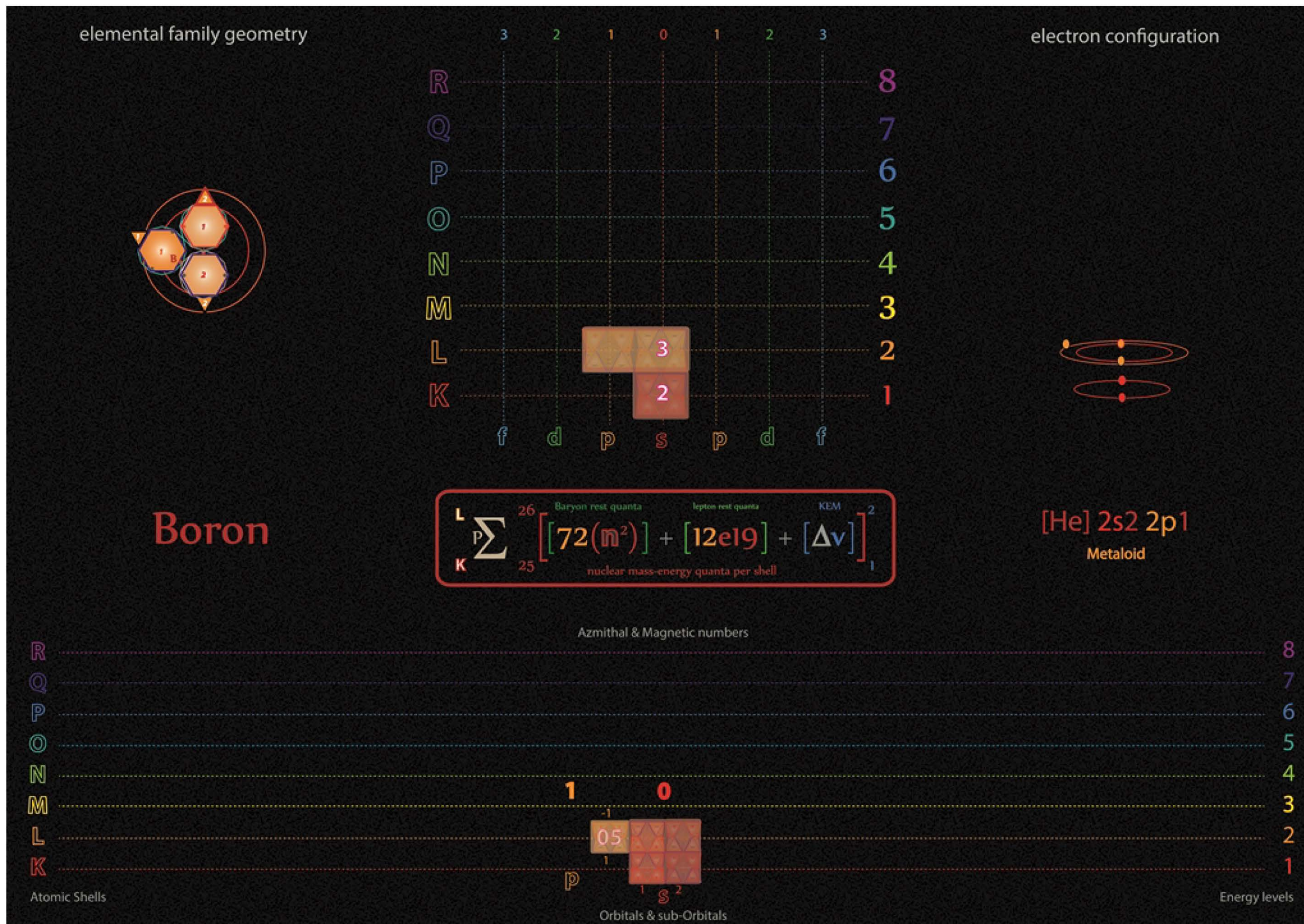
Tetryonics 53.02 - Helium atomic config



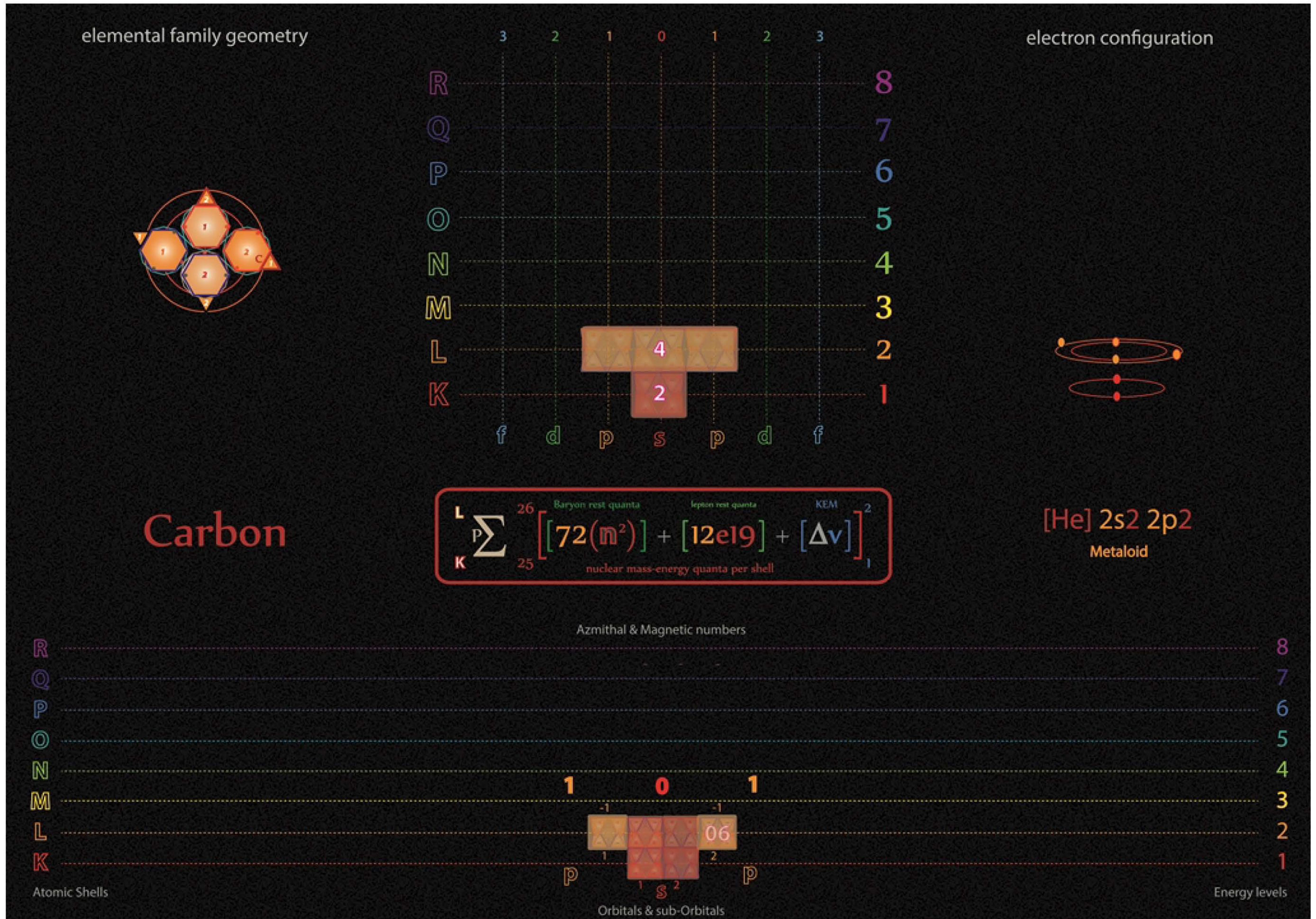
Tetryonics 53.03 - Lithium atomic config



Tetryonics 53.04 - Beryllium atomic config

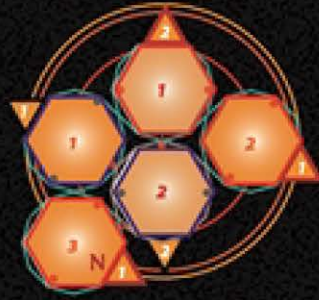


Tetryonics 53.05 - Boron atomic config

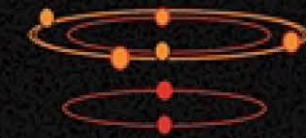


Tetryonics 53.06 - Carbon atomic config

elemental family geometry



electron configuration



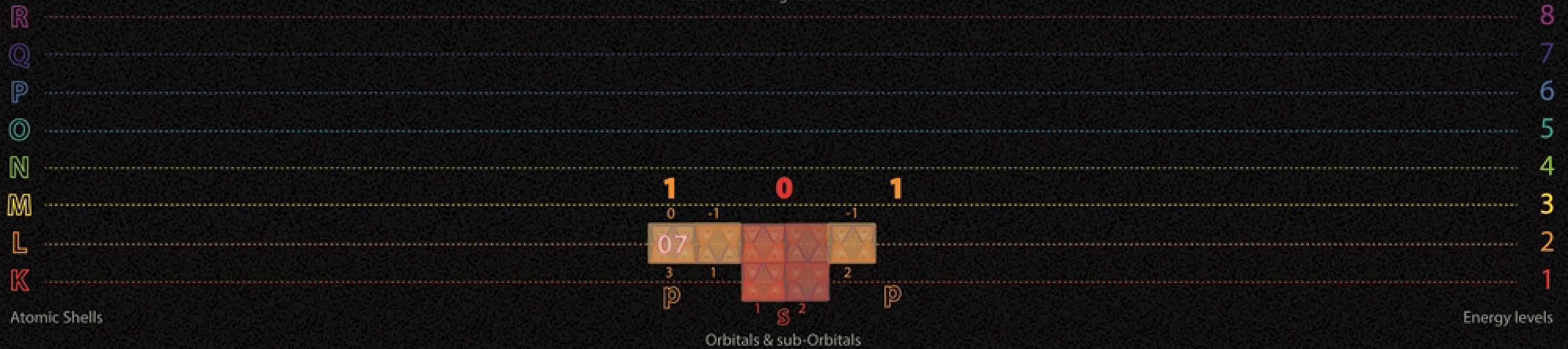
Nitrogen

$$\sum_{K=25}^{L=26} \left[\overset{\text{Baryon rest quanta}}{72(n^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^2$$

nuclear mass-energy quanta per shell

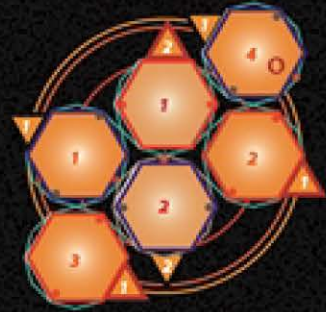
[He] 2s2 2p3
Metalloid

Azimuthal & Magnetic numbers

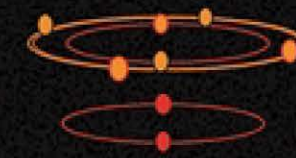


Tetryonics 53.07 - Nitrogen atomic config

elemental family geometry



electron configuration



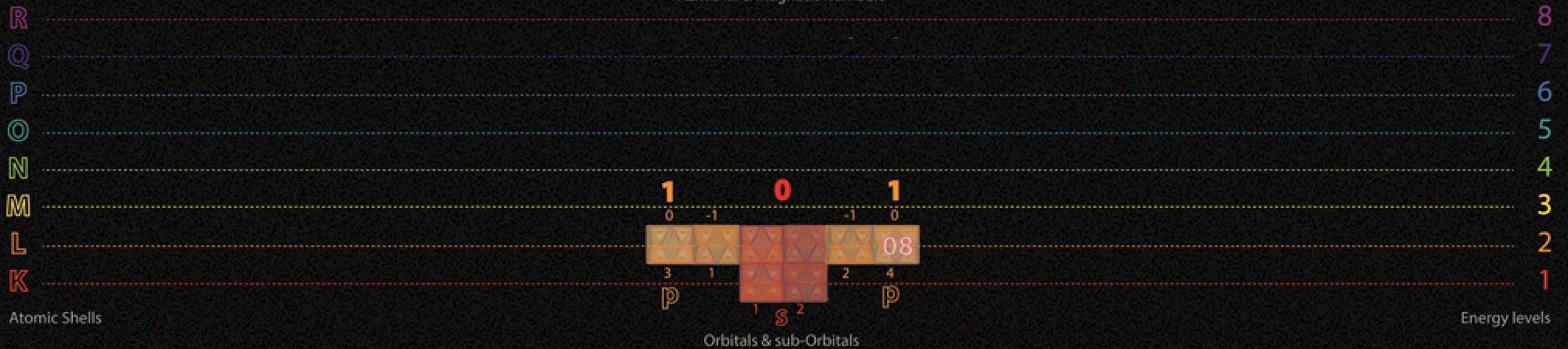
Oxygen

$$\sum_{K=25}^{L=26} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]^2$$

nuclear mass-energy quanta per shell

[He] 2s2 2p4
Metalloid

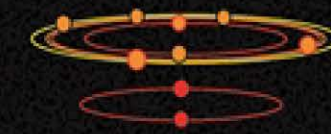
Azmithal & Magnetic numbers



elemental family geometry



electron configuration



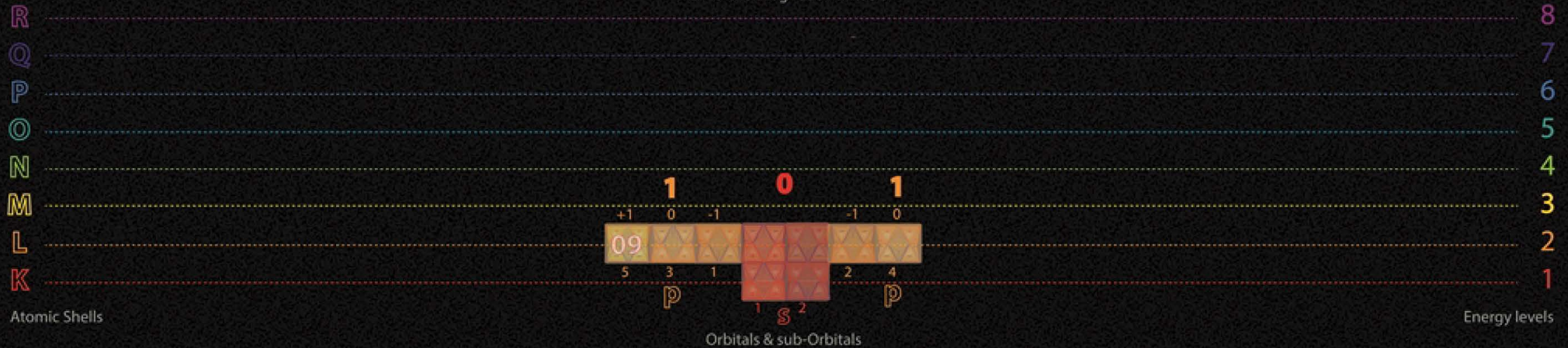
Fluorine

$$\sum_{K=25}^{L=26} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^2$$

nuclear mass-energy quanta per shell

[He] 2s² 2p⁵
Halogen

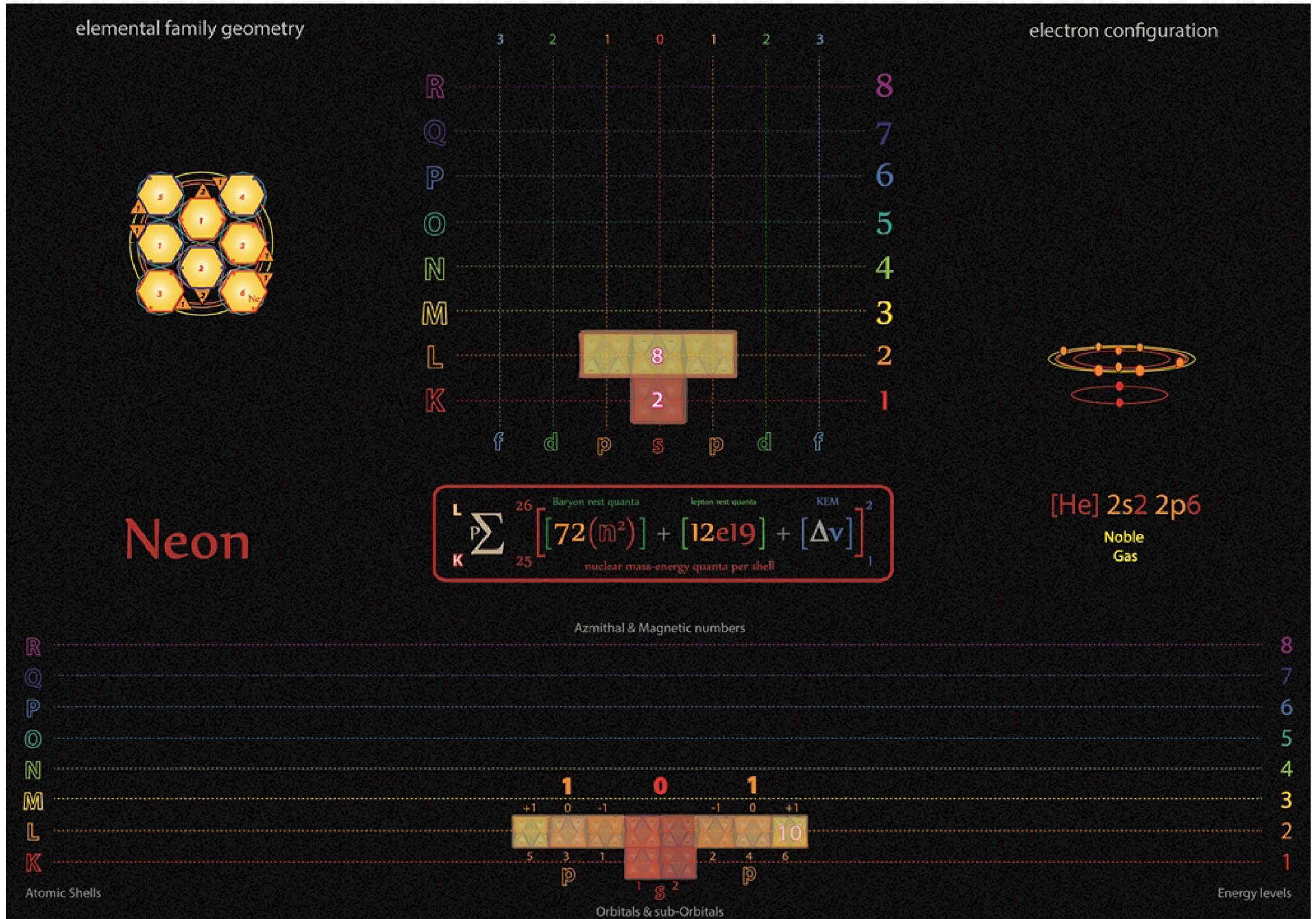
Azimuthal & Magnetic numbers



Atomic Shells

Energy levels

Orbitals & sub-Orbitals

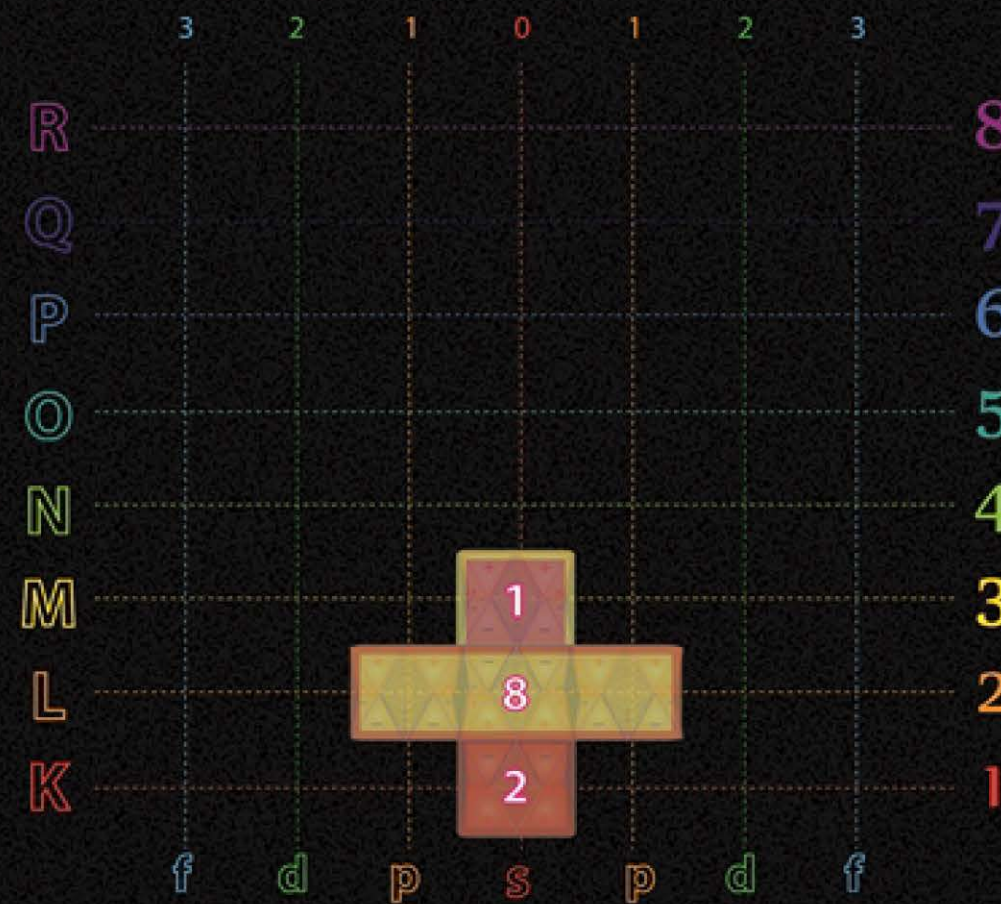
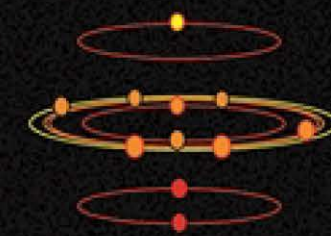


Tetryonics 53.10 - Neon atomic config

elemental family geometry



electron configuration

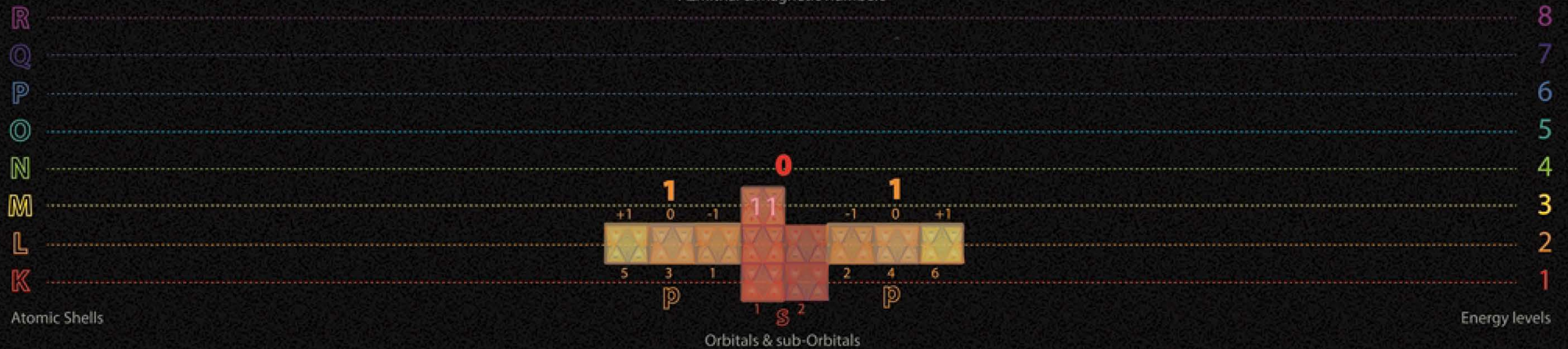


Sodium

$$\begin{matrix} \text{M} \\ \text{P} \\ \text{K} \end{matrix} \sum_{25}^{27} \left[\begin{matrix} \text{Baryon rest quanta} \\ 72(m^2) \\ \text{nuclear mass-energy quanta per shell} \end{matrix} \right] + \left[\begin{matrix} \text{lepton rest quanta} \\ 12e19 \\ \end{matrix} \right] + \left[\begin{matrix} \text{KEM} \\ \Delta v \\ \end{matrix} \right]_1^3$$

[Ne] 3s1
Alkali Metal

Azimuthal & Magnetic numbers

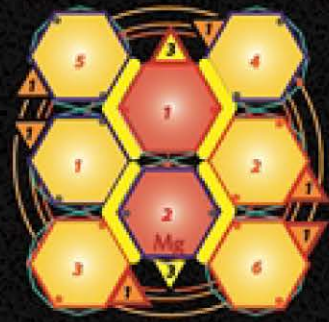


Atomic Shells

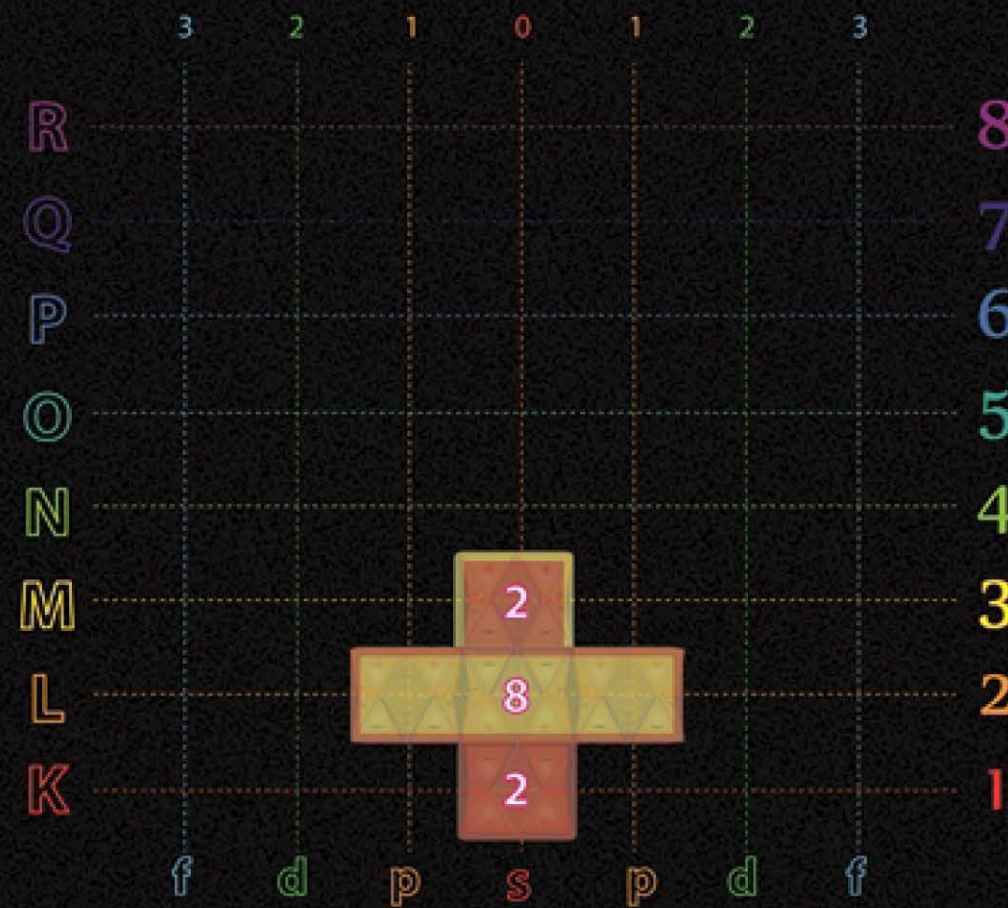
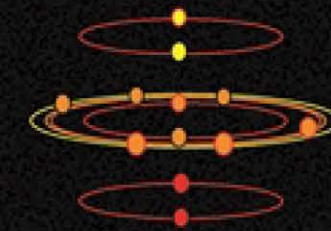
Energy levels

Orbitals & sub-Orbitals

elemental family geometry



electron configuration



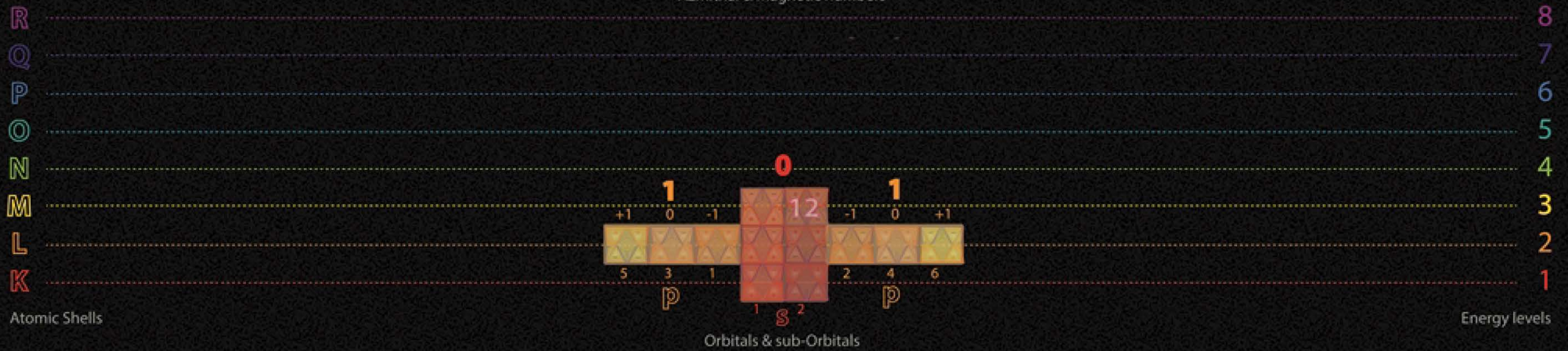
Magnesium

$$\begin{matrix} \text{M} \\ \text{P} \\ \text{K} \end{matrix} \sum_{25}^{27} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^3$$

nuclear mass-energy quanta per shell

[Ne] 3s²
Alkaline Earth

Azimuthal & Magnetic numbers



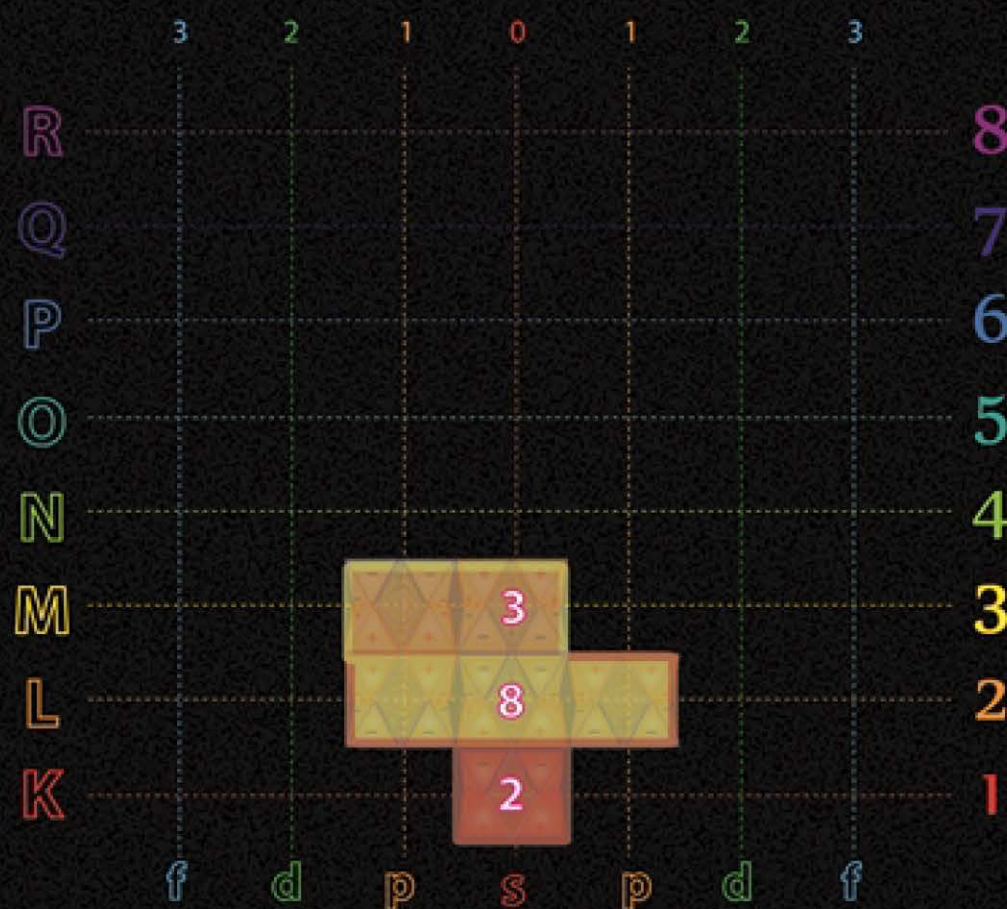
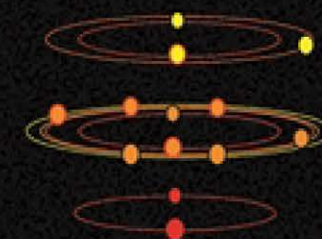
Atomic Shells

Energy levels

elemental family geometry



electron configuration



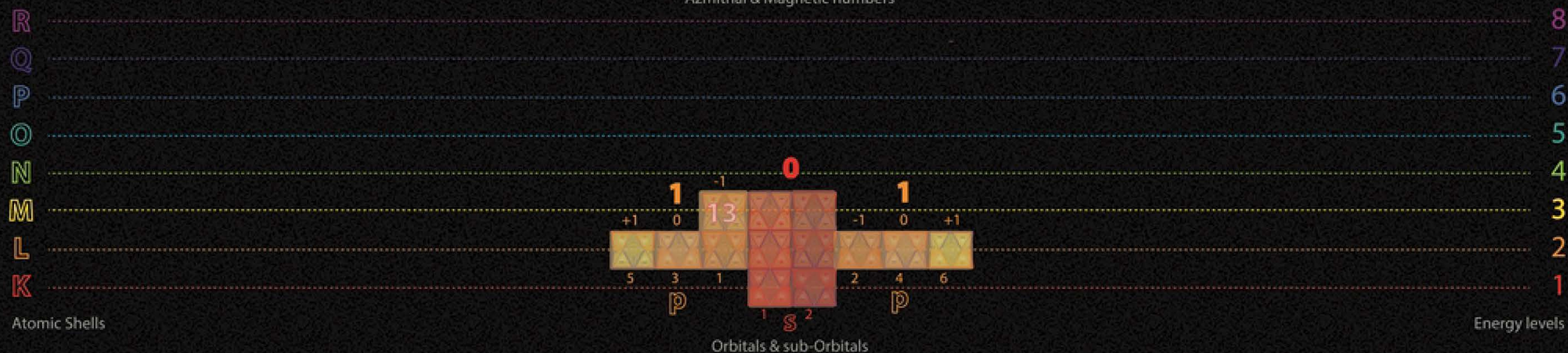
Aluminium

$$\sum_{K=25}^{M=27} \left[72(m^2) + 12e19 + [\Delta v] \right]_1^3$$

Baryon rest quanta lepton rest quanta KEM
nuclear mass-energy quanta per shell

[Ne] 3s² 3p¹
Metalloid

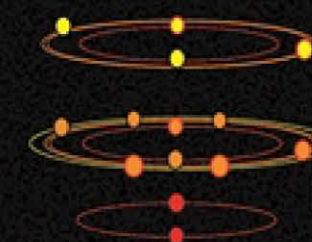
Azmithal & Magnetic numbers



elemental family geometry



electron configuration



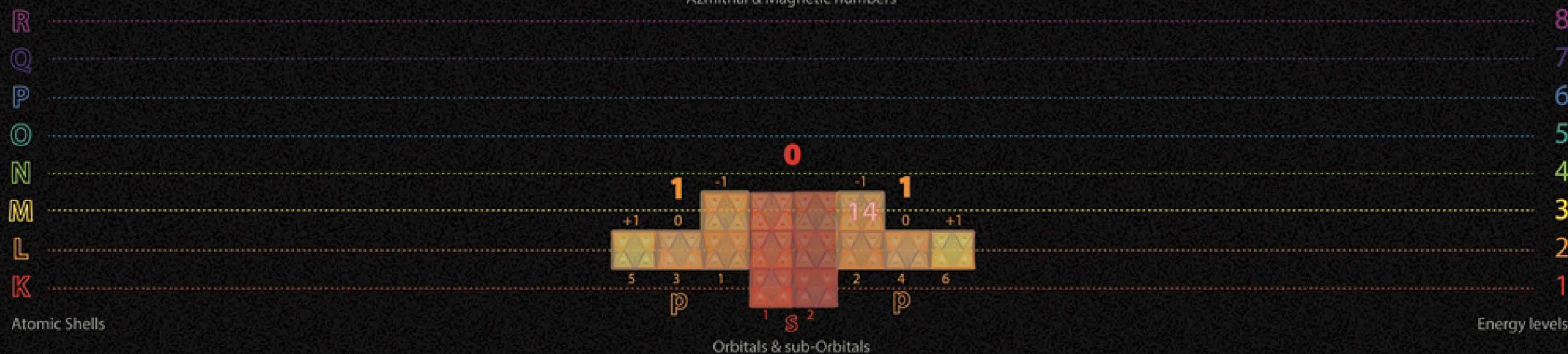
Silicon

$$\sum_{K=25}^{M=27} \left[\overset{\text{Baryon rest quanta}}{72(n^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^3$$

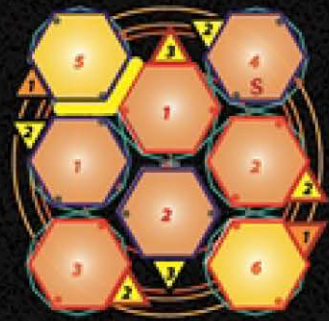
nuclear mass-energy quanta per shell

[Ne] 3s² 3p²
Metalloid

Azimuthal & Magnetic numbers

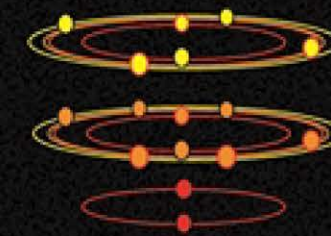


elemental family geometry



Sulfur

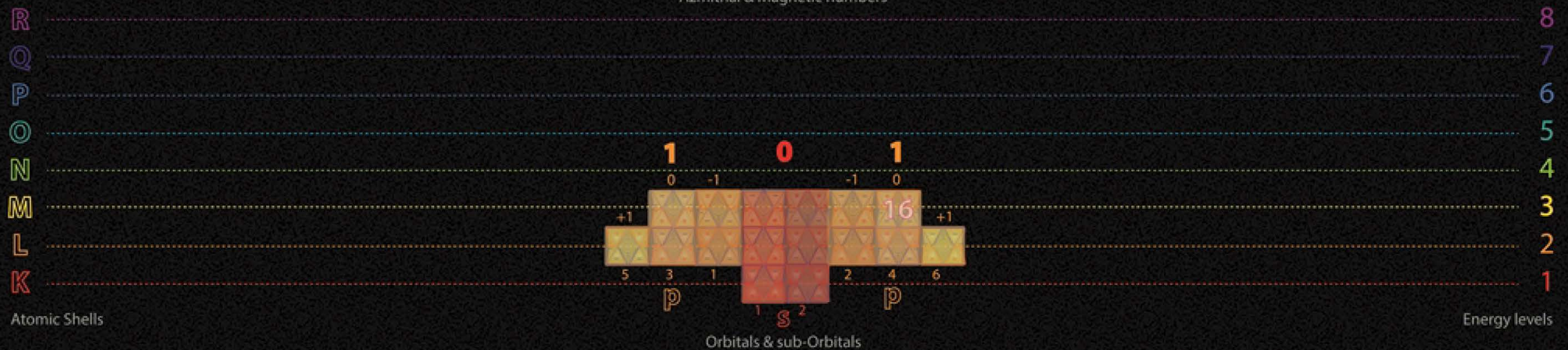
electron configuration

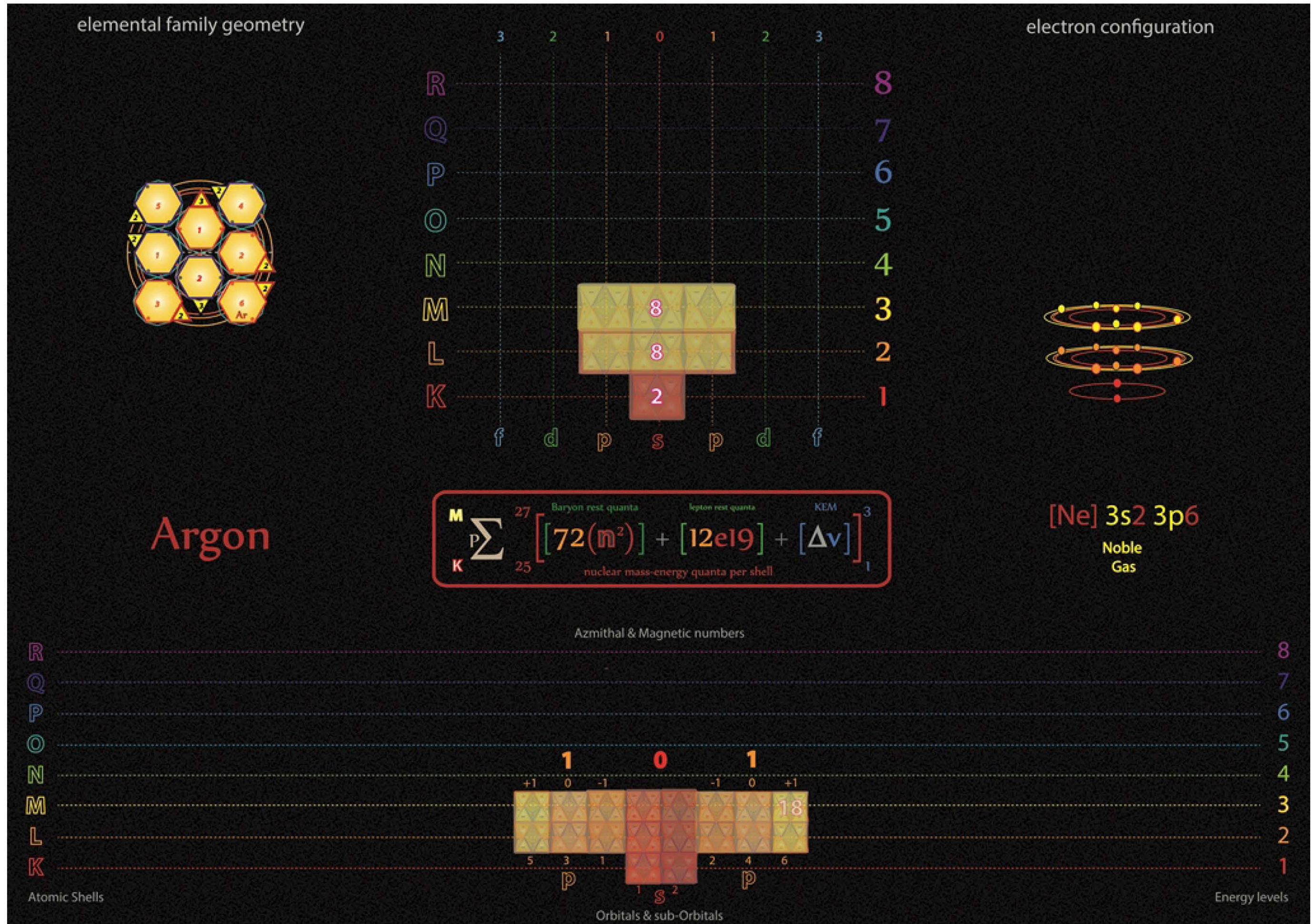


$$\begin{matrix} \text{M} \\ \text{P} \\ \text{K} \end{matrix} \sum_{25}^{27} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^3$$

nuclear mass-energy quanta per shell

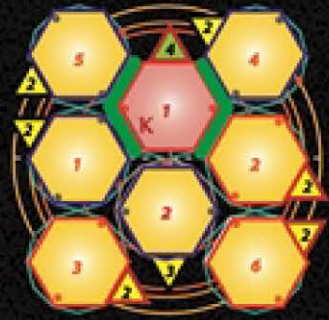
Azimuthal & Magnetic numbers



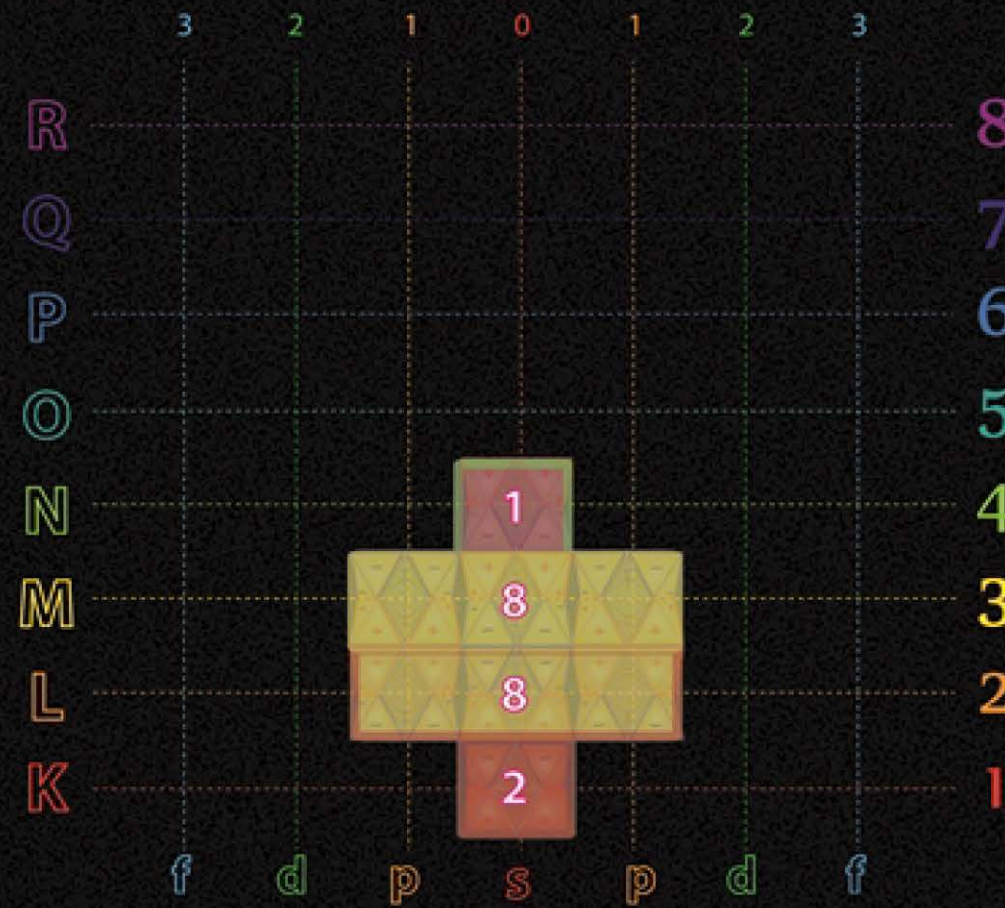


Tetryonics 53.18 - Argon atomic config

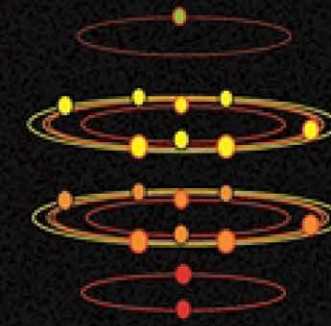
elemental family geometry



Potassium



electron configuration

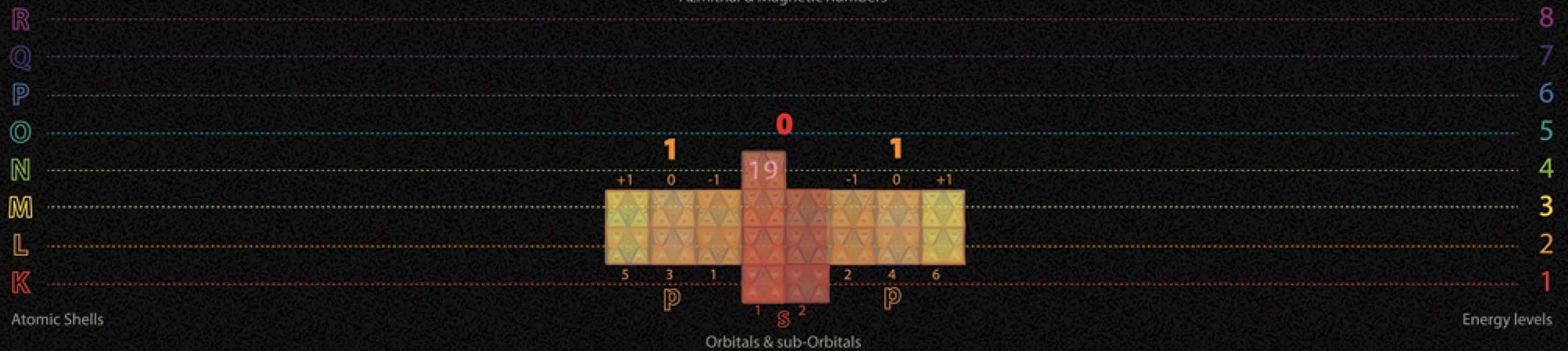


$${}^N_{\text{K}}\text{P}\Sigma_{\text{K}}^{28}_{25} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^4$$

nuclear mass-energy quanta per shell

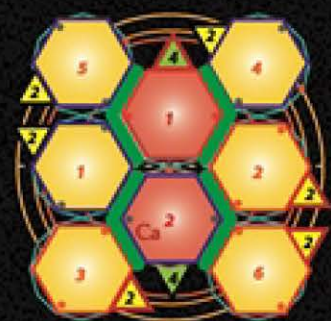


Azimuthal & Magnetic numbers

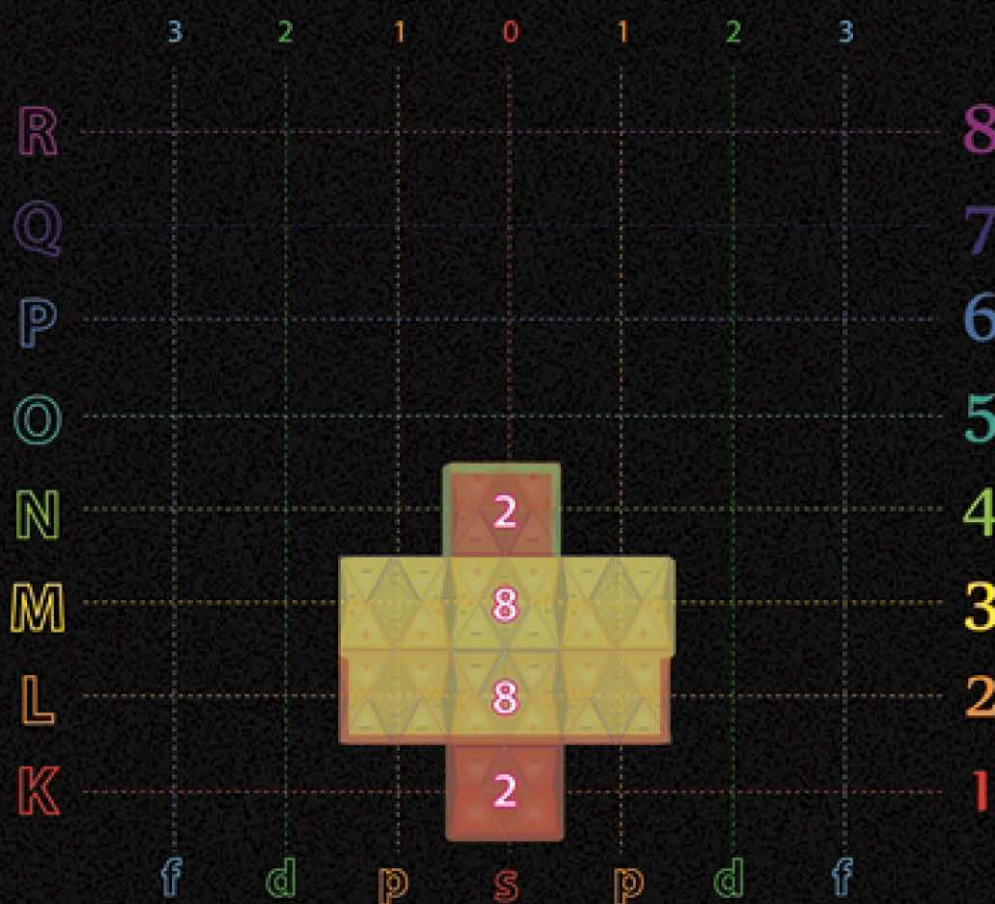
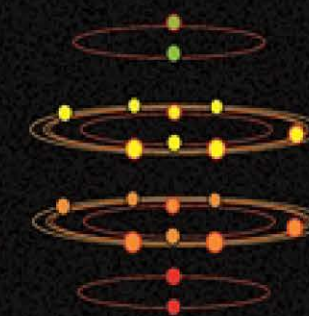


Tetryonics 53.19 - Potassium atomic config

elemental family geometry



electron configuration



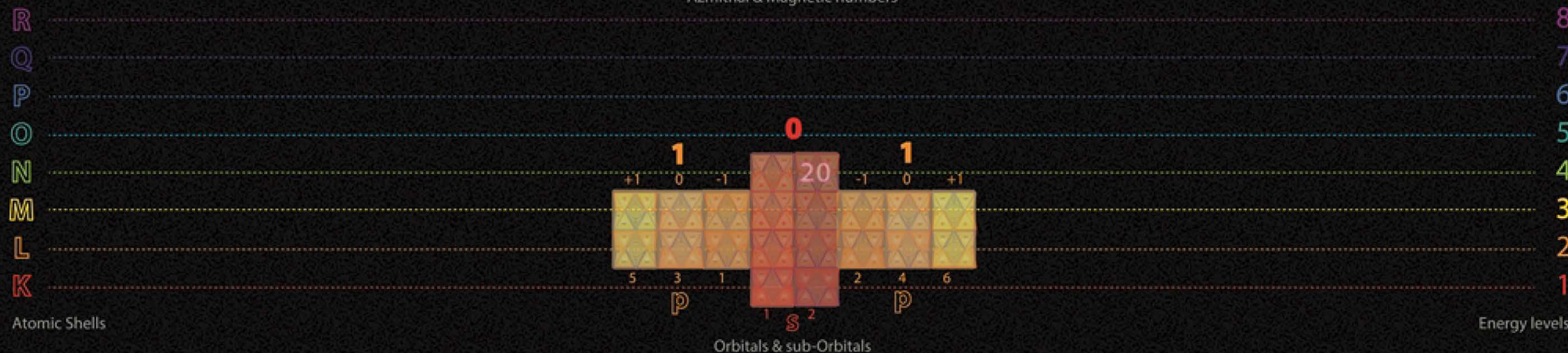
Calcium

$$\sum_{K=25}^{N=28} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_{i=1}^4$$

nuclear mass-energy quanta per shell

[Ar] 4s²
Alkaline Earth

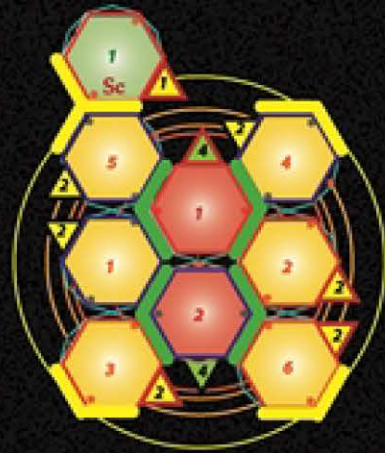
Azimuthal & Magnetic numbers



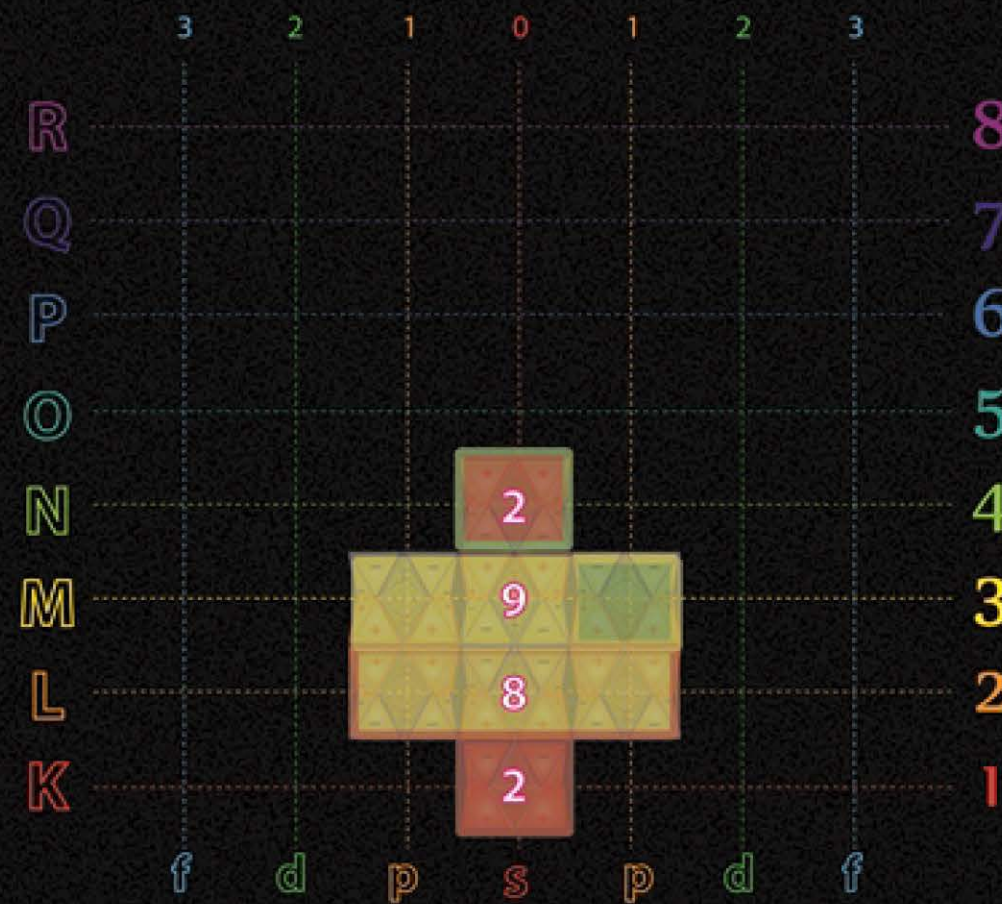
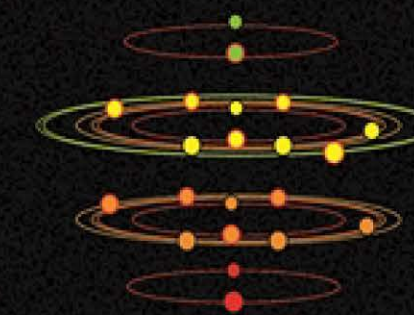
Atomic Shells

Energy levels

elemental family geometry



electron configuration



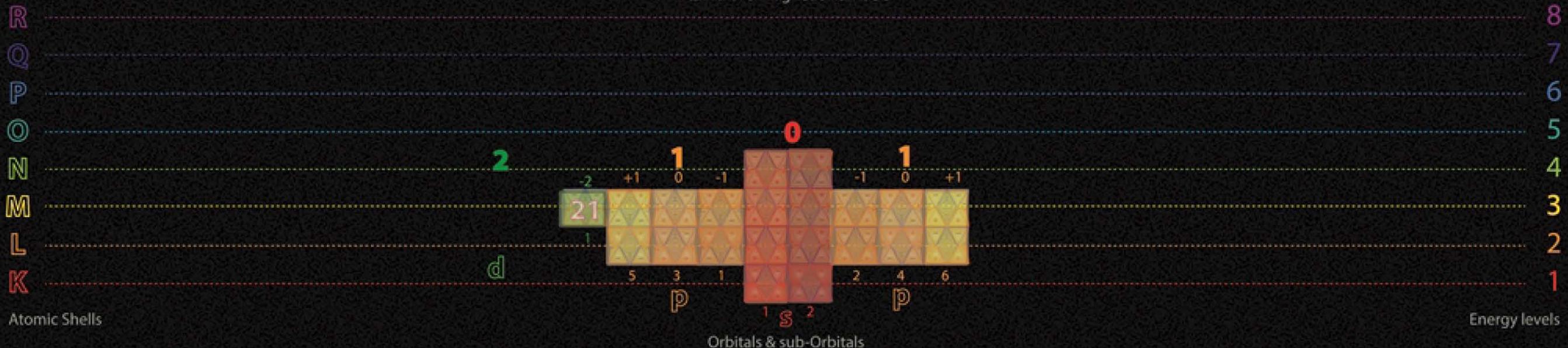
Scandium

$${}^N_P \sum_K^{28} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^4$$

nuclear mass-energy quanta per shell

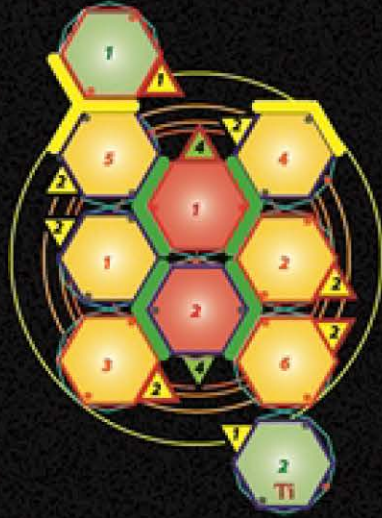
[Ar] 3d1 4s2
Transition Metal

Azimuthal & Magnetic numbers

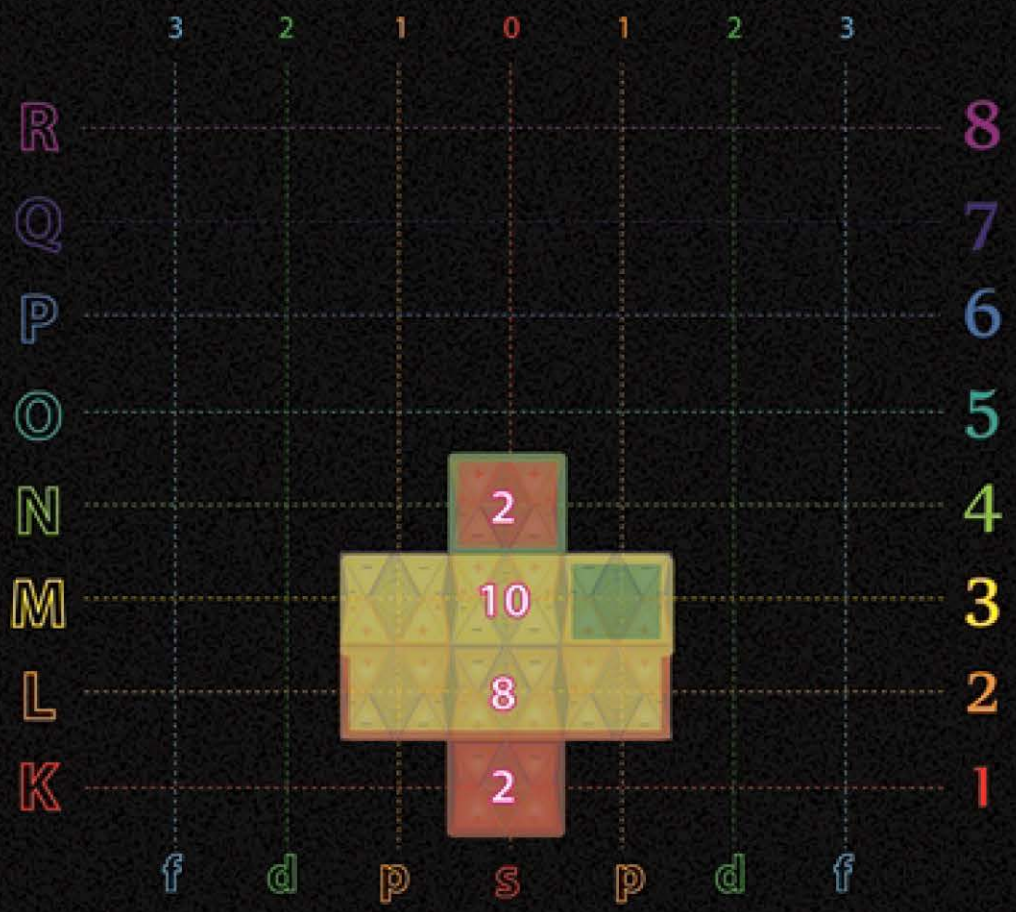


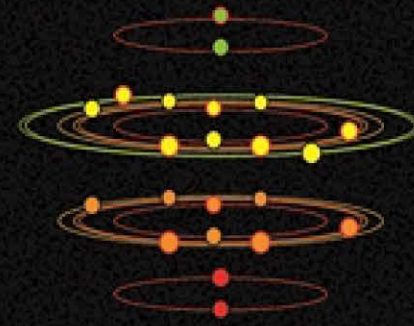
Tetryonics 53.21 - Scandium atomic config

elemental family geometry



electron configuration





Titanium

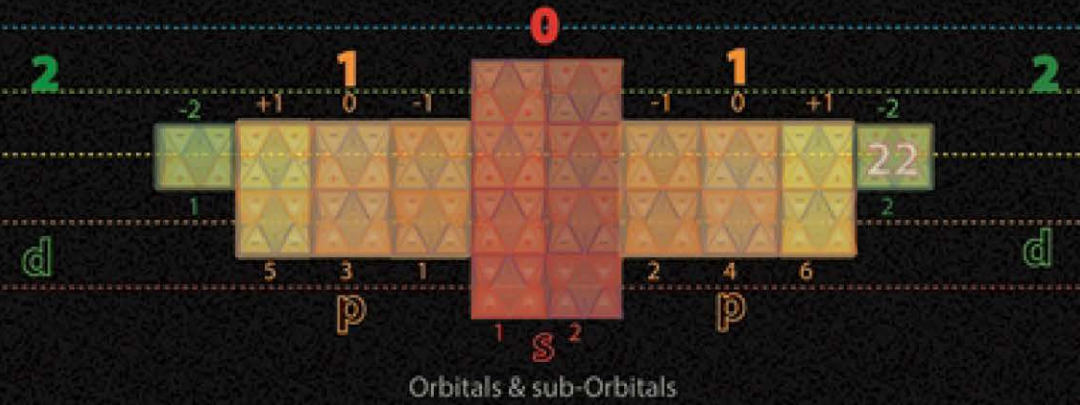
$$\sum_{K=25}^{N=28} \left[\underbrace{72(m^2)}_{\text{nuclear mass-energy quanta per shell}} + \underbrace{12e19}_{\text{lepton rest quanta}} + \underbrace{[\Delta v]}_{\text{KEM}} \right]^4$$

[Ar] 3d2 4s2
Transition Metal

Atomic Shells

R
Q
P
O
N
M
L
K

Azimuthal & Magnetic numbers

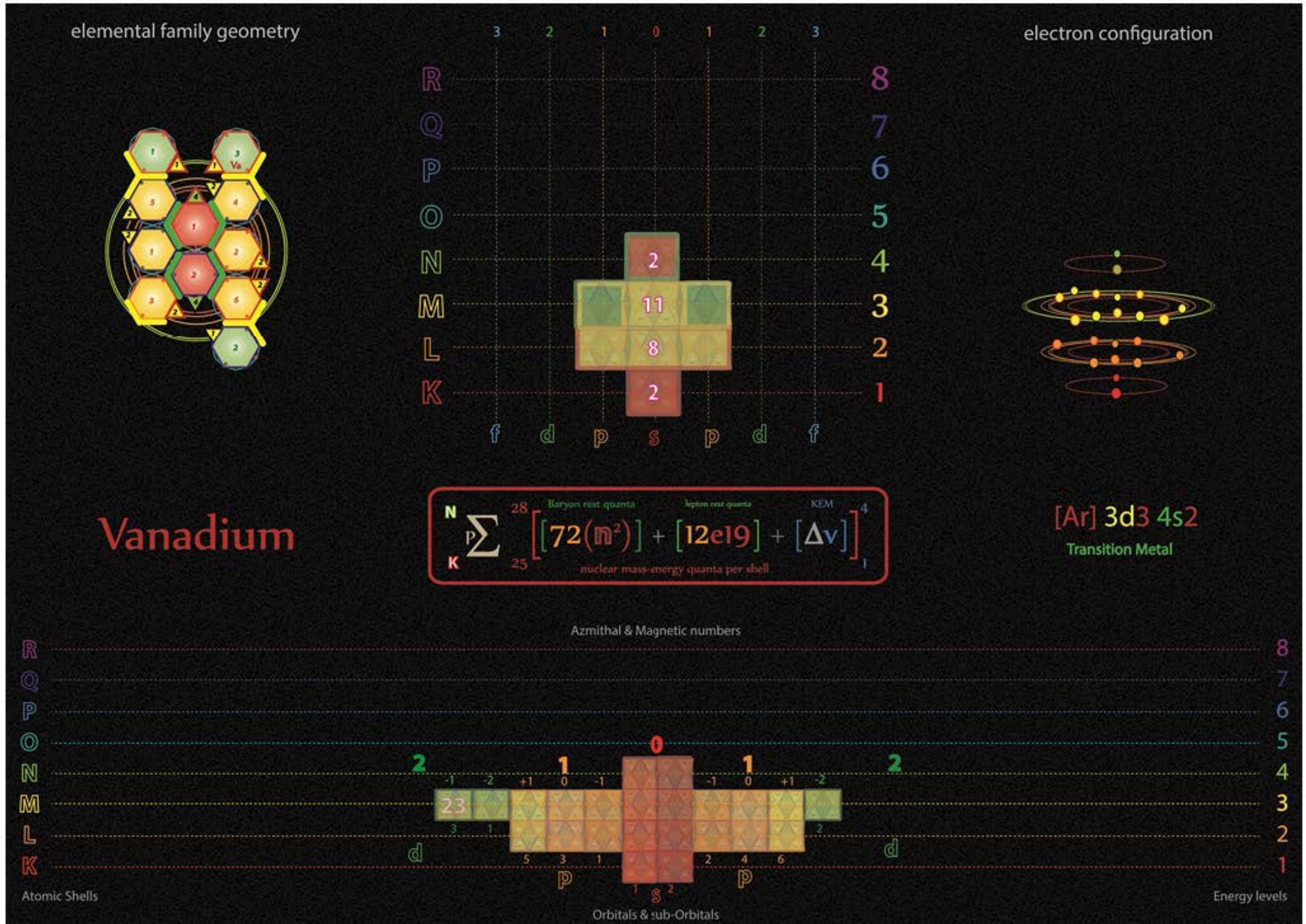


Orbitals & sub-Orbitals

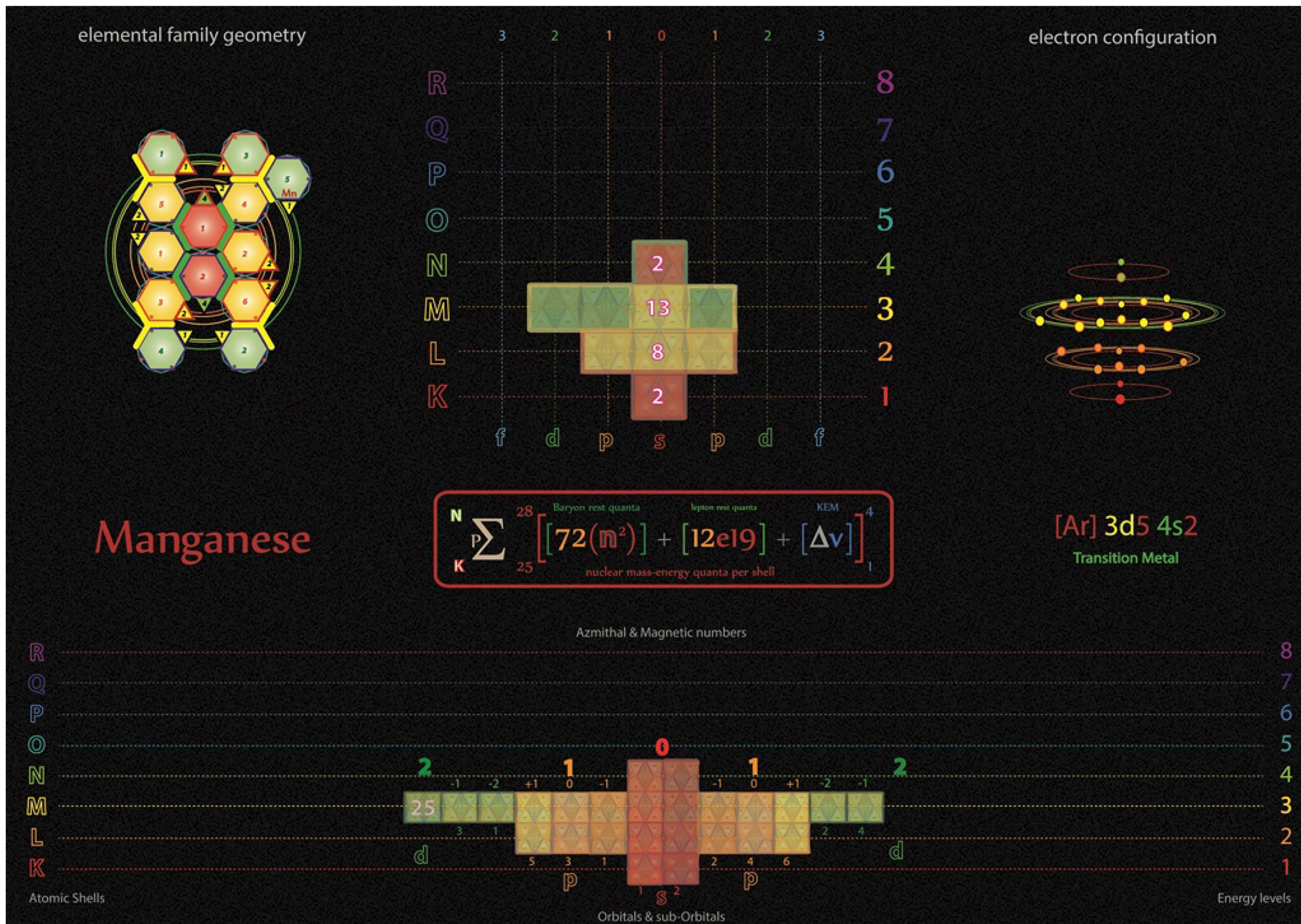
Energy levels

8
7
6
5
4
3
2
1

Tetryonics 53.22 - Titanium atomic config

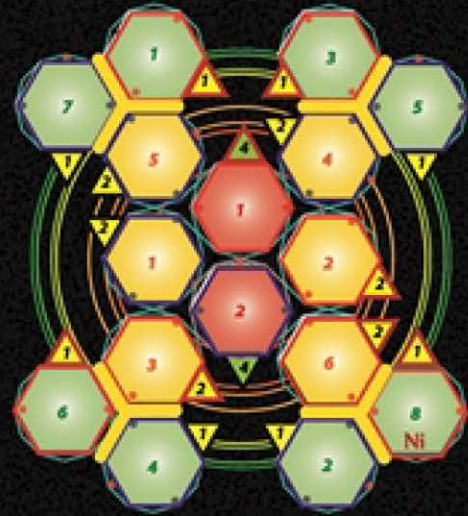


Tetryonics 53.23 - Vanadium atomic config

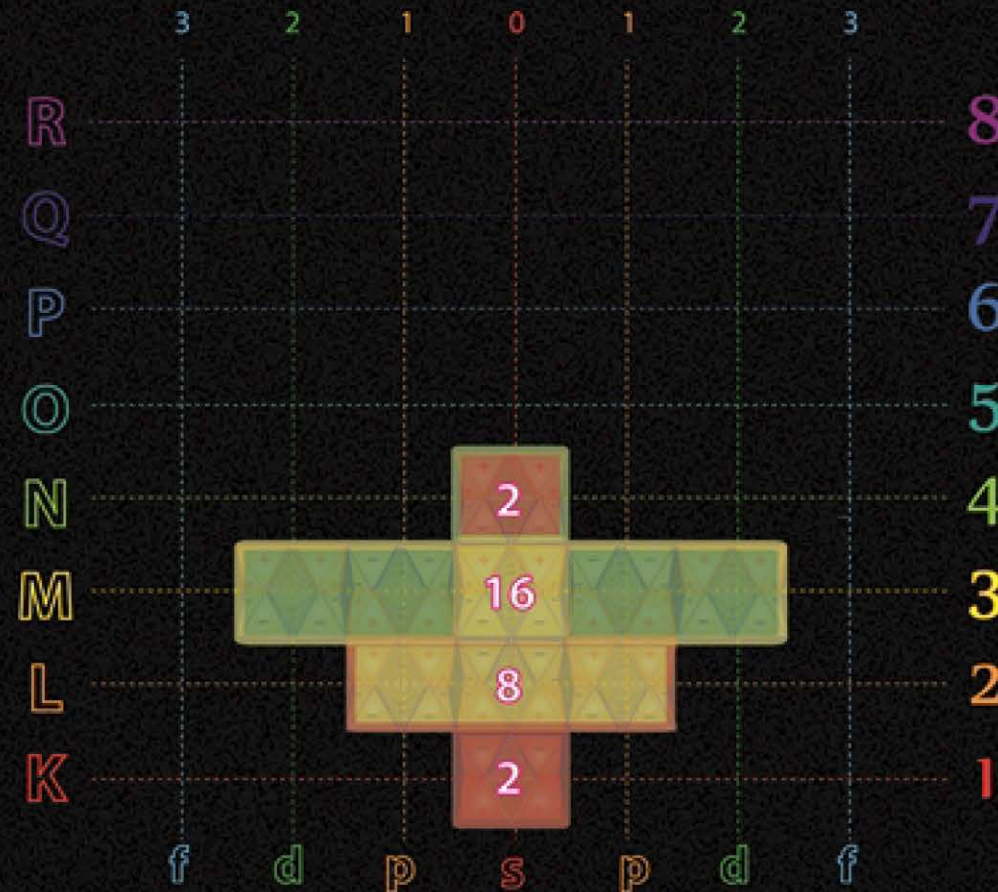


Tetryonics 53.25 - Manganese atomic config

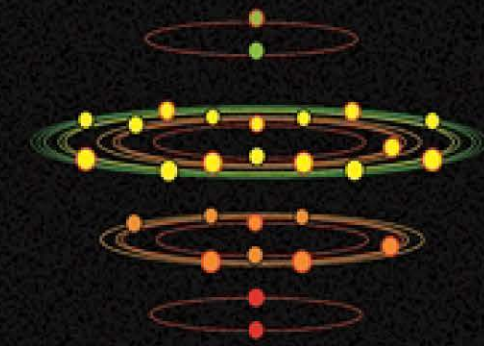
elemental family geometry



Nickel



electron configuration

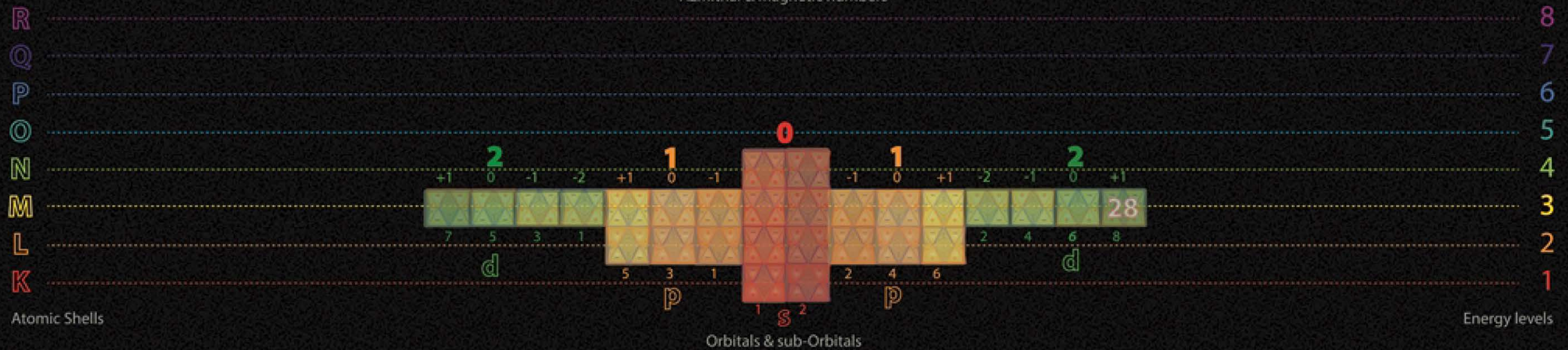


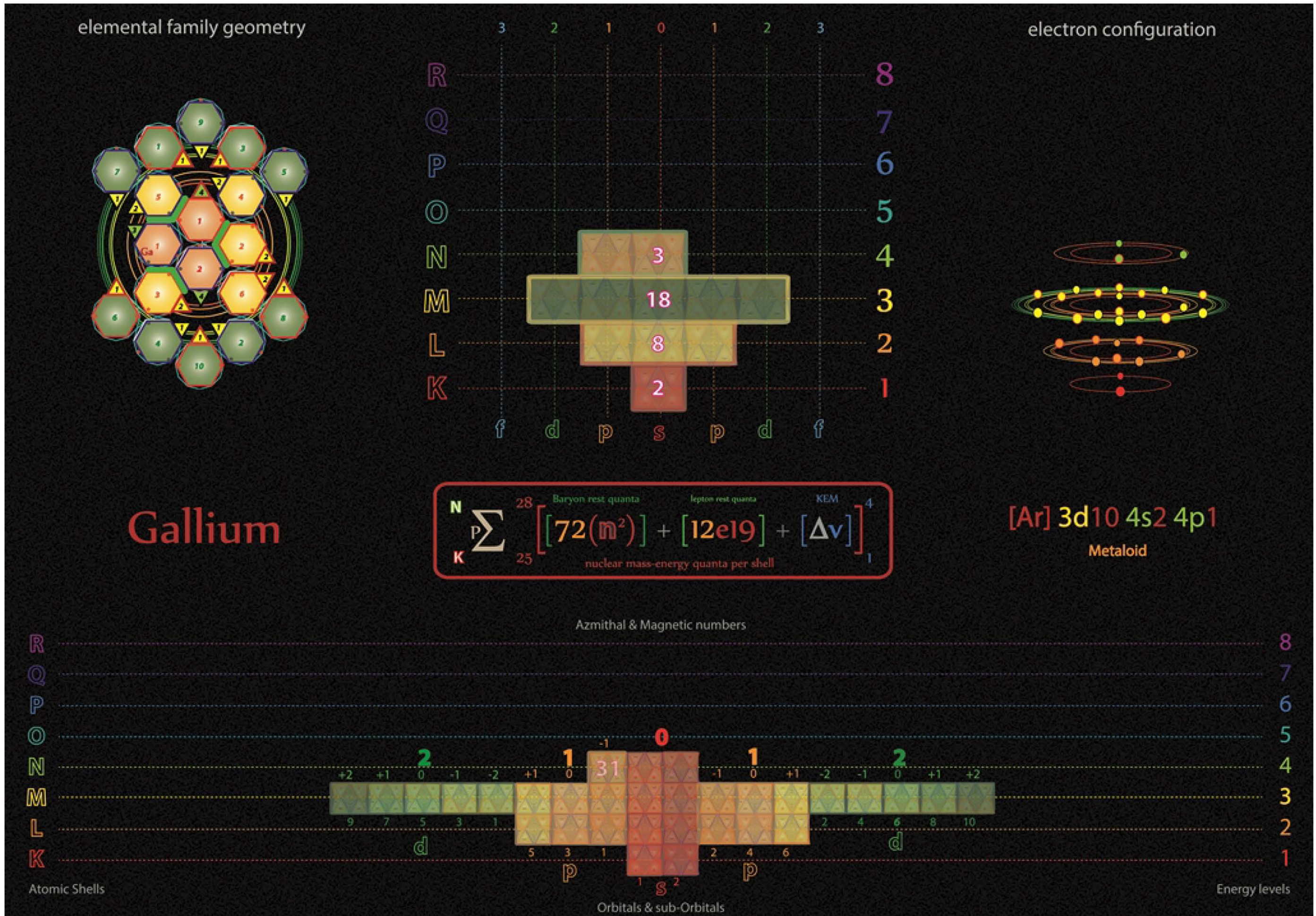
$$\sum_{K=25}^N \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^4$$

nuclear mass-energy quanta per shell

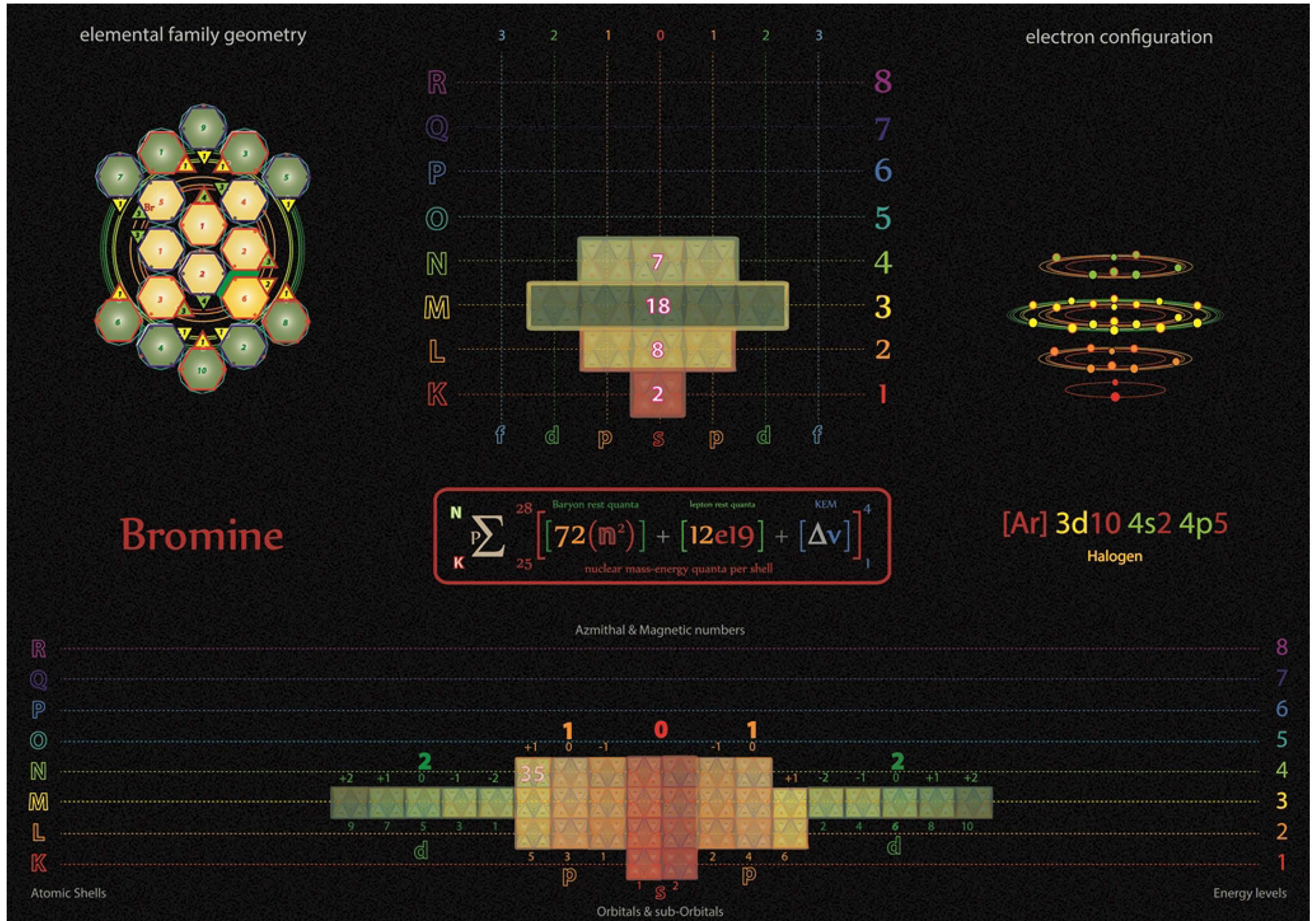
[Ar] 3d8 4s2
Transition Metal

Azimuthal & Magnetic numbers



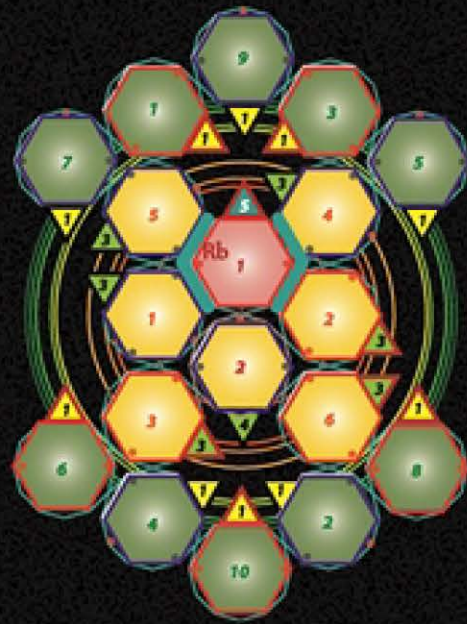


Tetryonics 53.31 - Gallium atomic config

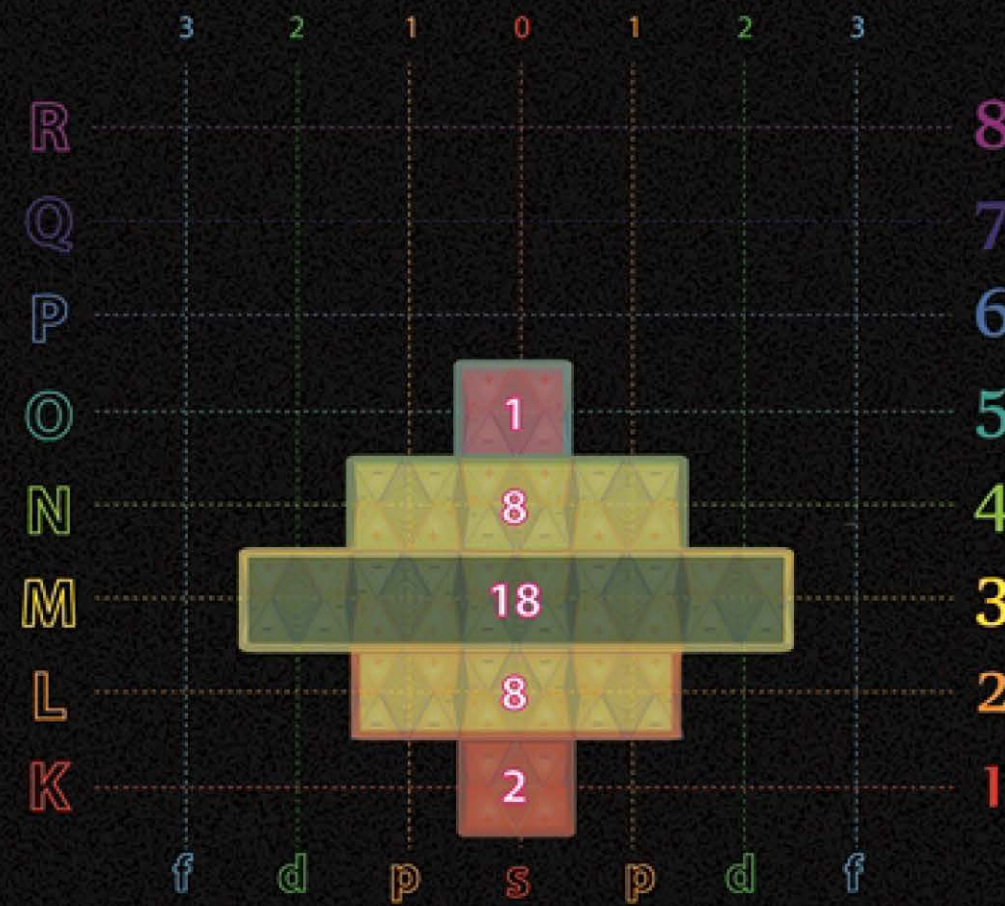
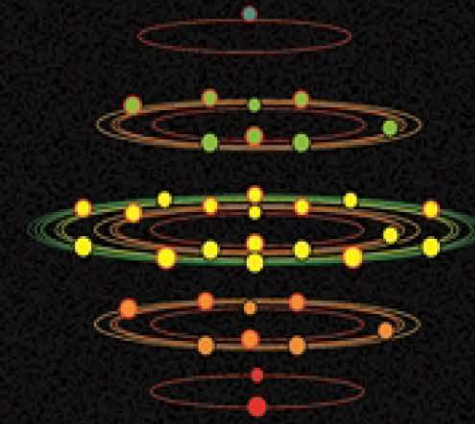


Tetryonics 53.35 - Bromine atomic config

elemental family geometry



electron configuration



Rubidium

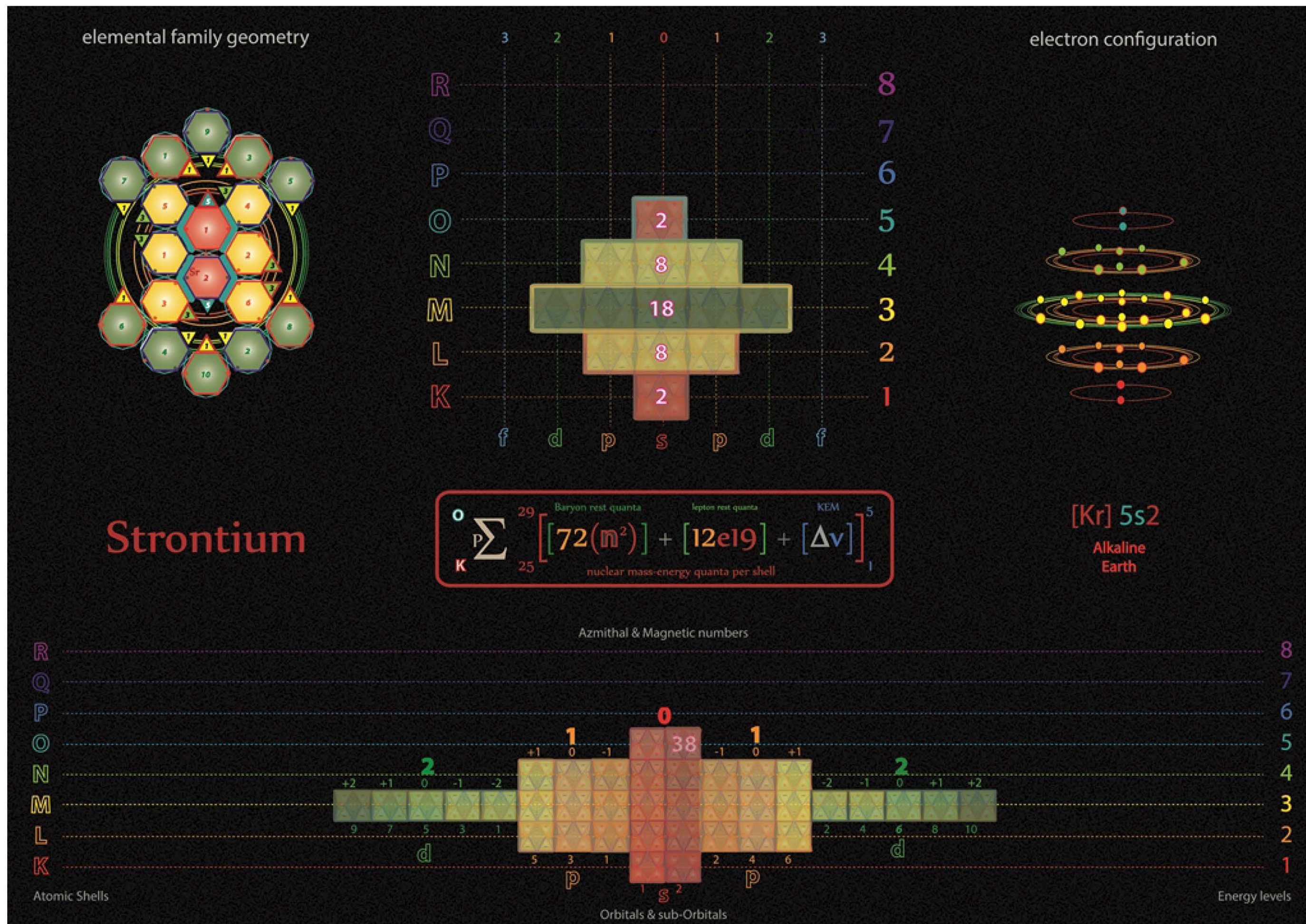
$${}^{\circ}_{\text{K}}\text{P}\Sigma_{25}^{29} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^5$$

nuclear mass-energy quanta per shell

[Kr] 5s1
Alkali Metal

Azimuthal & Magnetic numbers



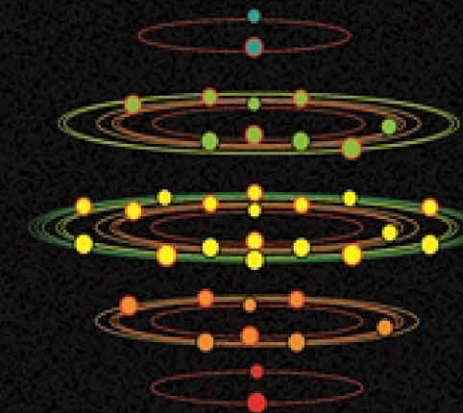
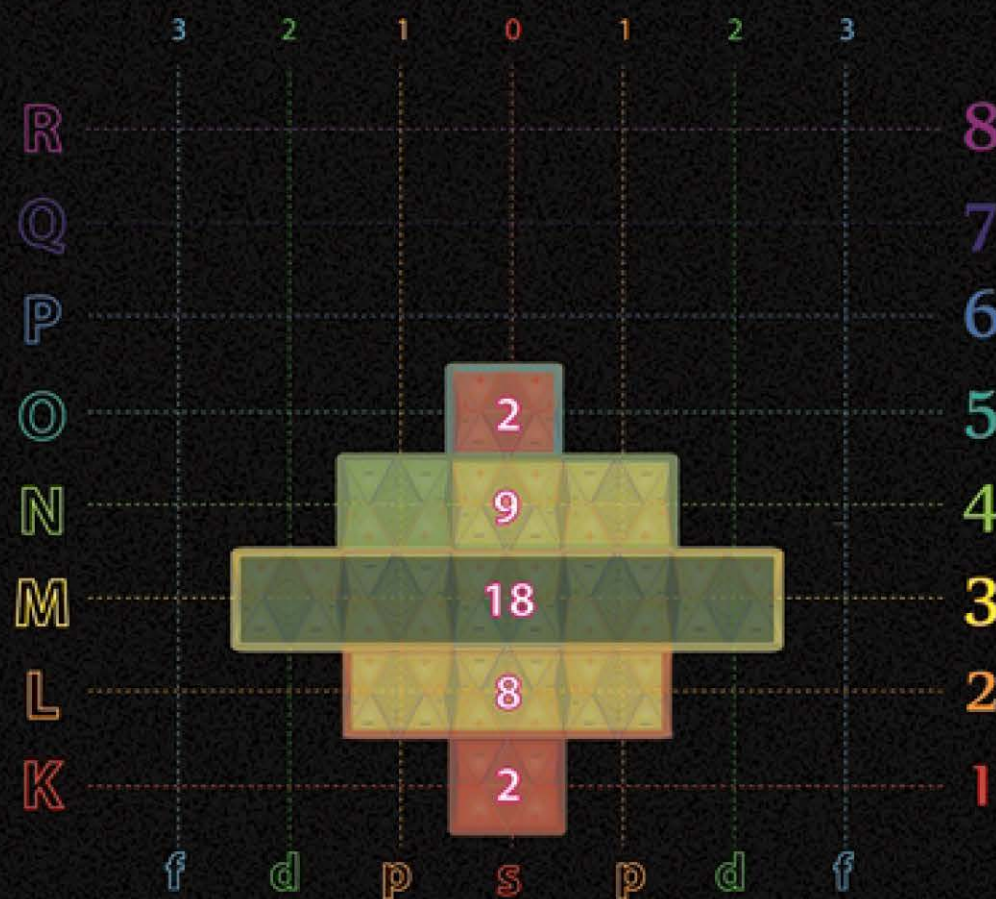


Tetryonics 53.38 - Strontium atomic config

elemental family geometry



electron configuration

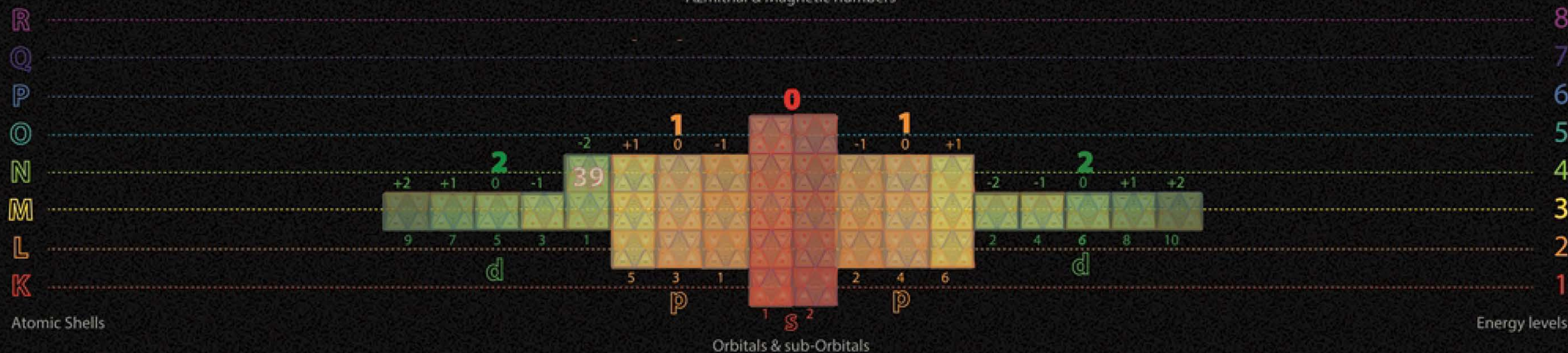


Yttrium

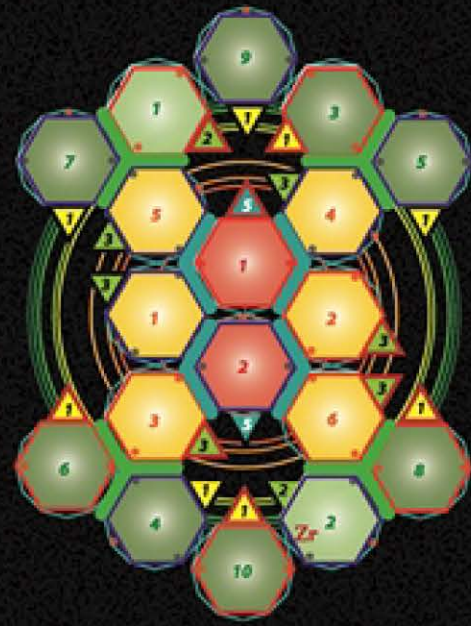
$$\begin{matrix}
 \text{o} & & & \text{Baryon rest quanta} & & \text{lepton rest quanta} & & \text{KEM} \\
 \text{P} & \sum & \begin{matrix} 29 \\ 25 \end{matrix} & \left[72(m^2) \right] & + & \left[12e19 \right] & + & \left[\Delta v \right] \\
 \text{K} & & & \text{nuclear mass-energy quanta per shell} & & & & 5 \\
 & & & & & & & 1
 \end{matrix}$$

[Kr] 5s2 4d1
Transition Metal

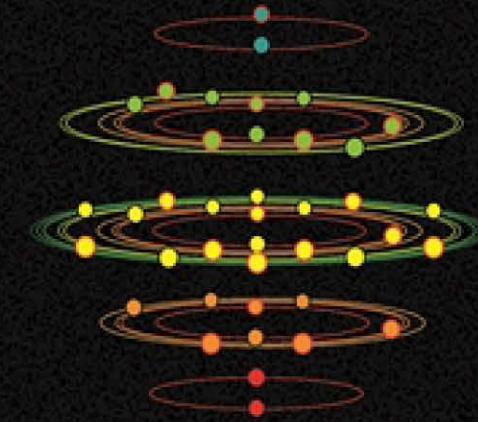
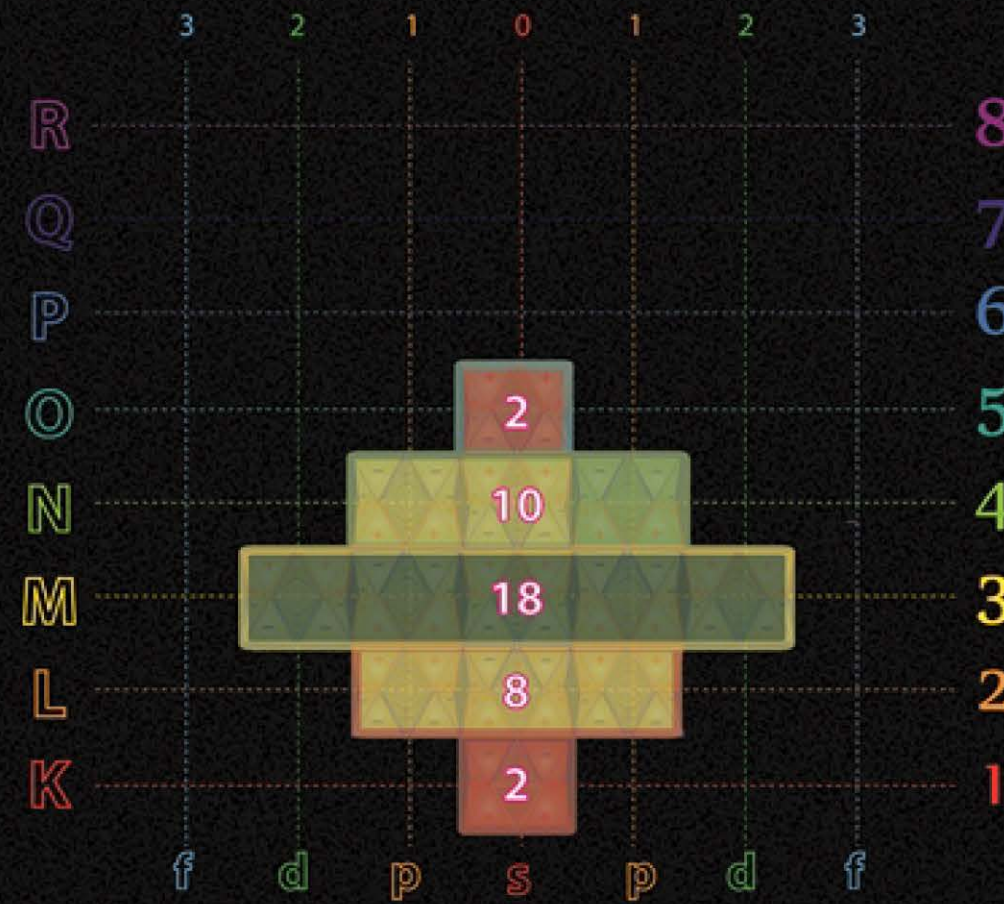
Azimuthal & Magnetic numbers



elemental family geometry



electron configuration

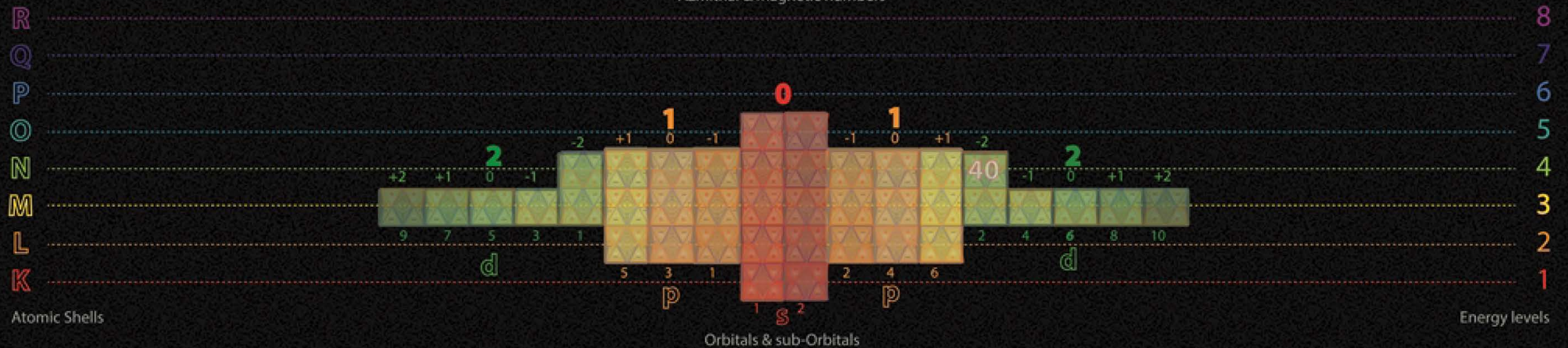


Zirconium

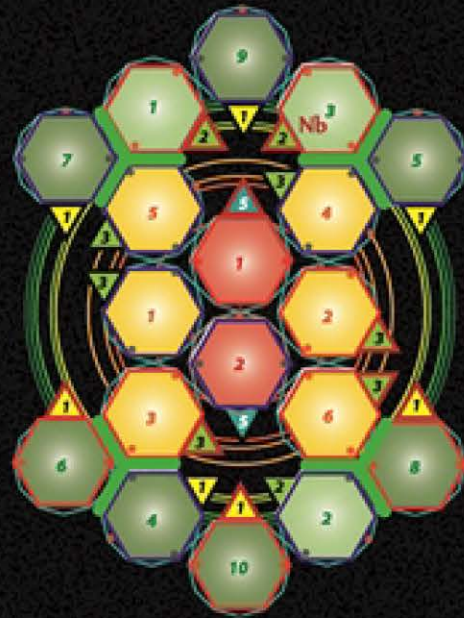
$$\begin{matrix} \circ \\ \text{P} \\ \text{K} \end{matrix} \Sigma_{25}^{29} \left[\begin{matrix} \text{Baryon rest quanta} \\ [72(n^2)] \\ \text{nuclear mass-energy quanta per shell} \end{matrix} \right] + \begin{matrix} \text{lepton rest quanta} \\ [12e19] \end{matrix} + \begin{matrix} \text{KEM} \\ [\Delta v] \\ 1 \end{matrix} \Bigg]_1^5$$

[Kr] 5s² 4d²
Transition Metal

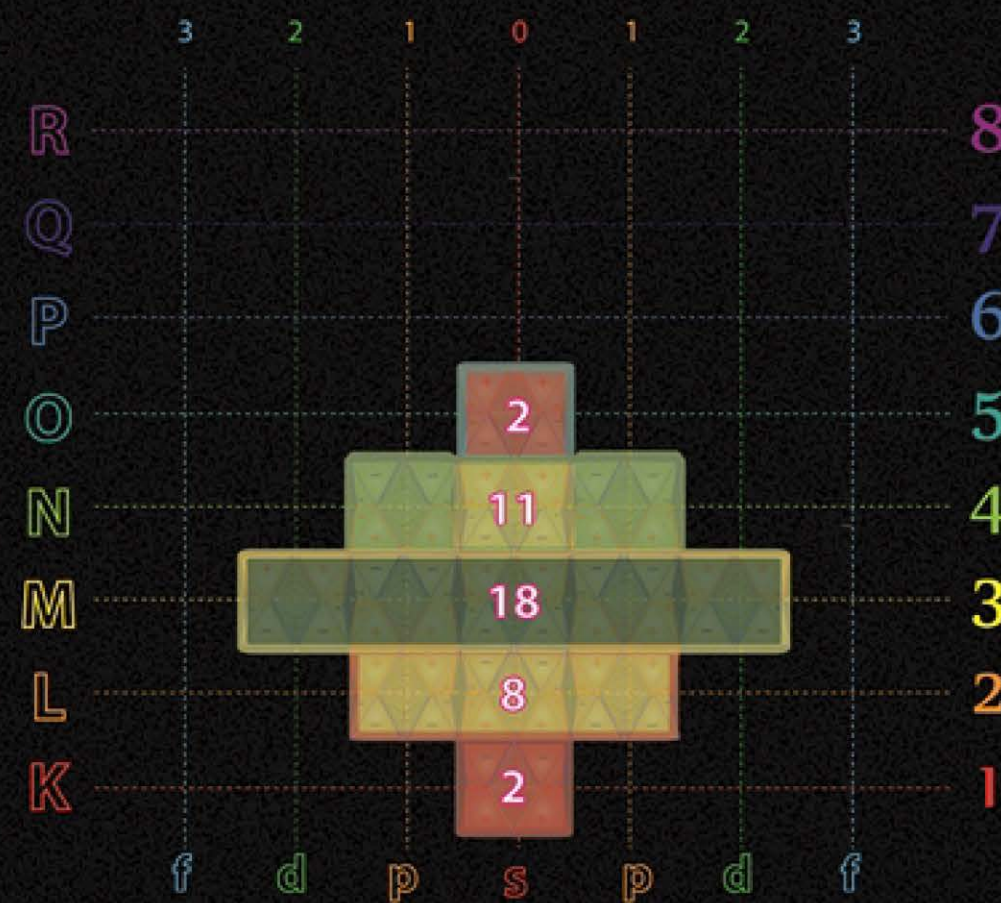
Azimuthal & Magnetic numbers



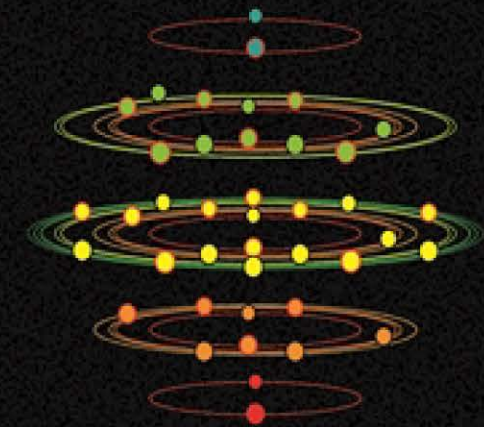
elemental family geometry



Niobium



electron configuration

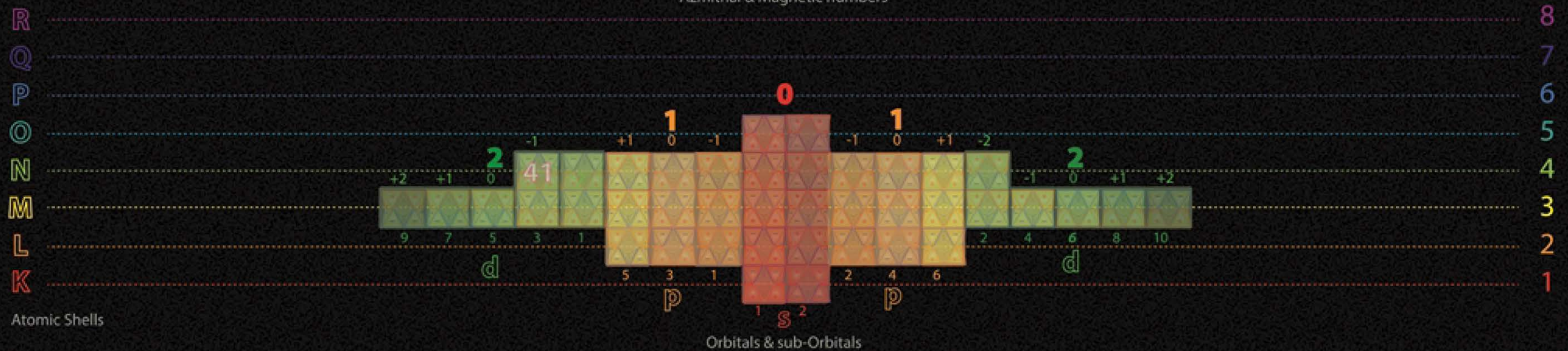


$${}_{\text{K}}^{\text{O}}\text{P}\sum_{\text{K}}^{29} \left[\begin{matrix} \text{Baryon rest quanta} \\ 72(m^2) \end{matrix} \right] + \left[\begin{matrix} \text{lepton rest quanta} \\ 12e19 \end{matrix} \right] + \left[\begin{matrix} \text{KEM} \\ \Delta v \end{matrix} \right]_1^5$$

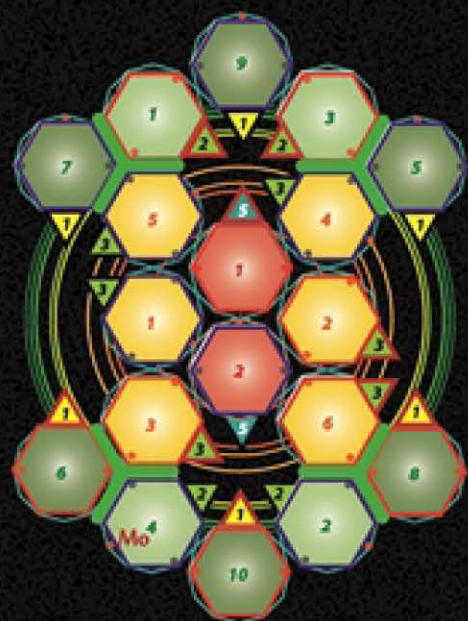
nuclear mass-energy quanta per shell

[Kr] 5s² 4d³
Transition Metal

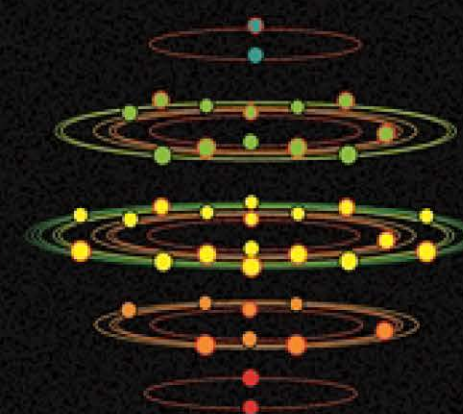
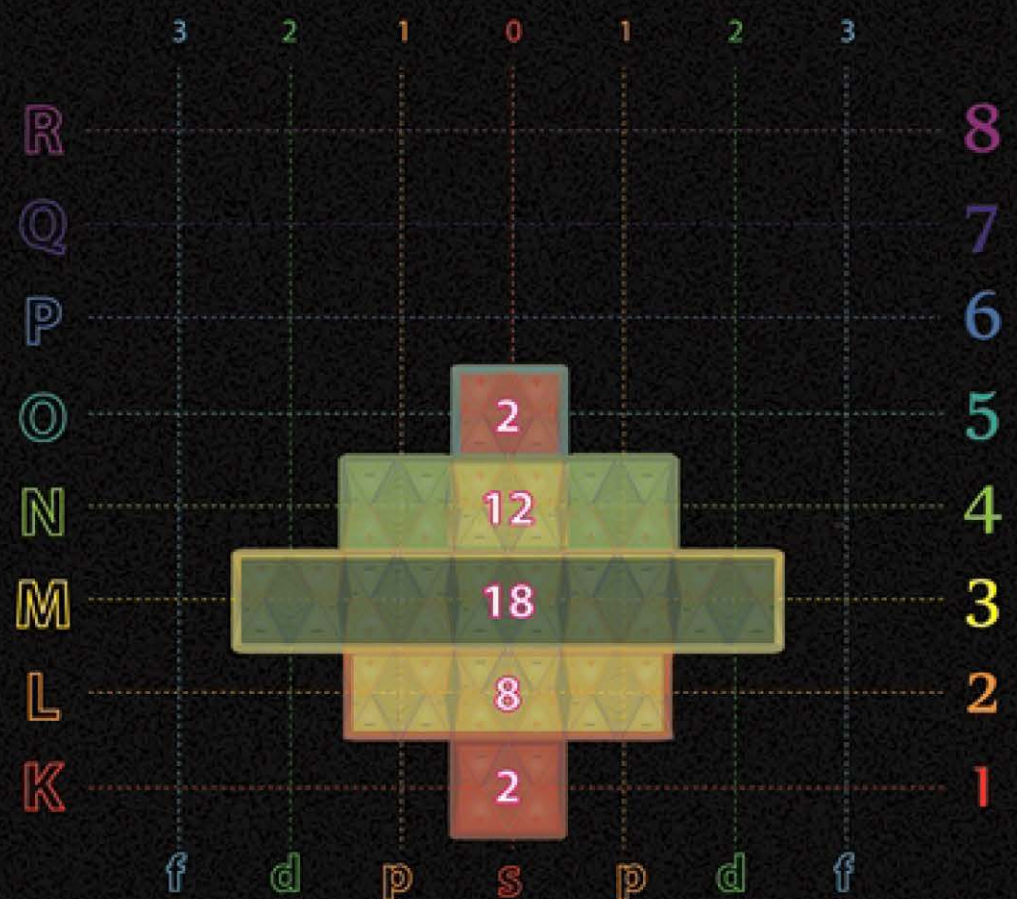
Azimuthal & Magnetic numbers



elemental family geometry



electron configuration

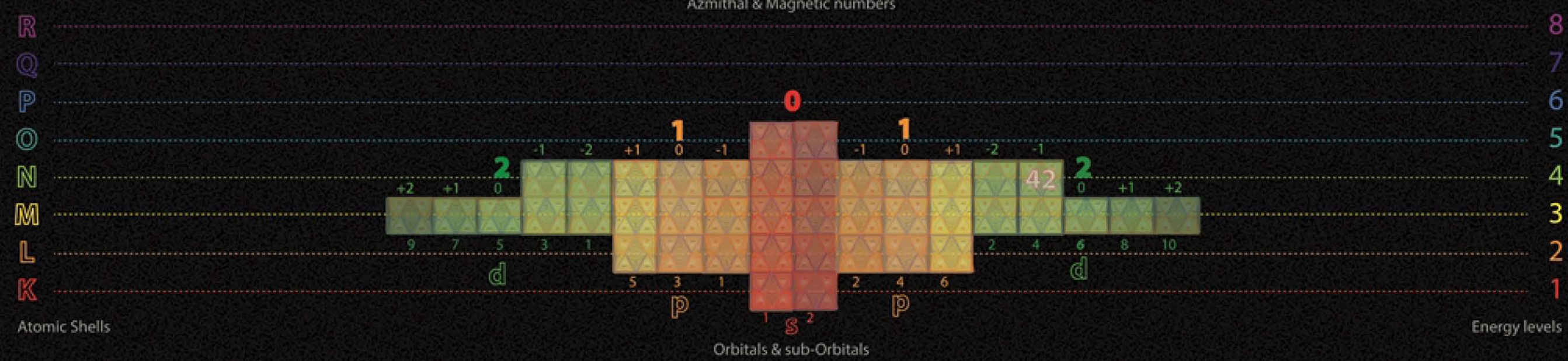


Molybdenum

$${}^o_{\text{K}} \Sigma_{\text{P}}^{29} \left[\underset{\substack{\text{Baryon rest quanta} \\ \text{nuclear mass-energy quanta per shell}}}{72(n^2)} \right] + \underset{\substack{\text{lepton rest quanta} \\ \text{}}}{12e19} + \underset{\substack{\text{KEM}}}{\left[\Delta v\right]_1} \bigg]_5^5$$



Azimuthal & Magnetic numbers

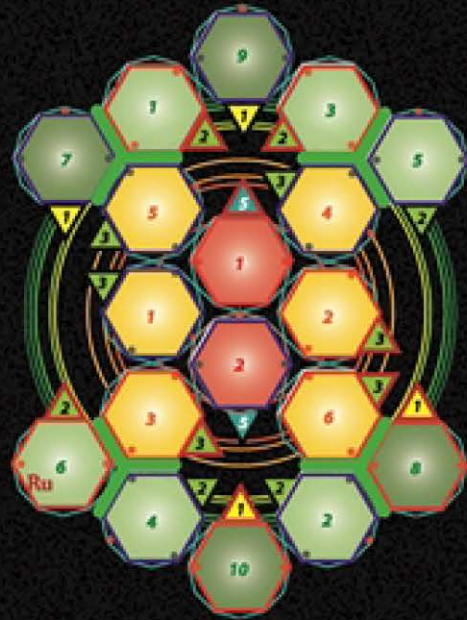


Atomic Shells

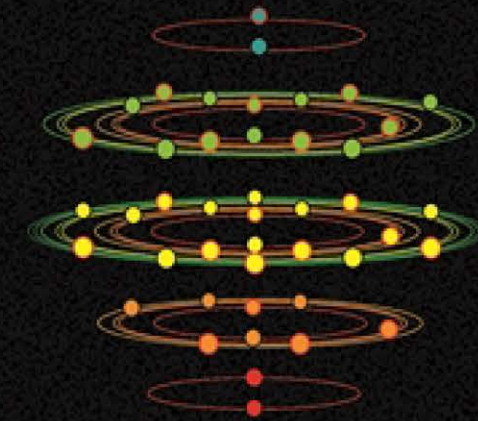
Energy levels

Tetryonics 53.42 - Molybdenum atomic config

elemental family geometry



electron configuration



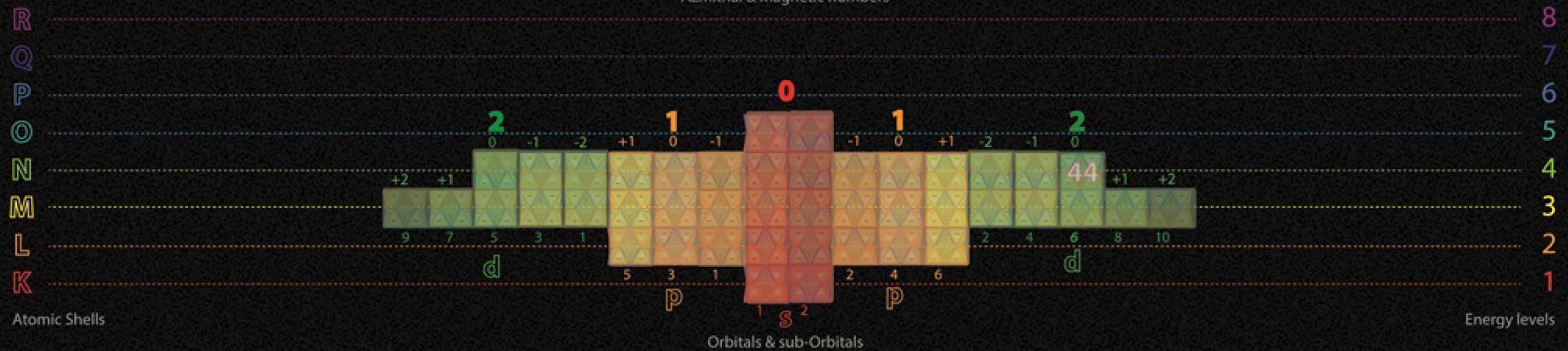
Ruthenium

$${}_{\text{K}}^{\text{O}}\text{P}\Sigma_{25}^{29} \left[\overset{\text{Baryon rest quanta}}{72(m^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^5$$

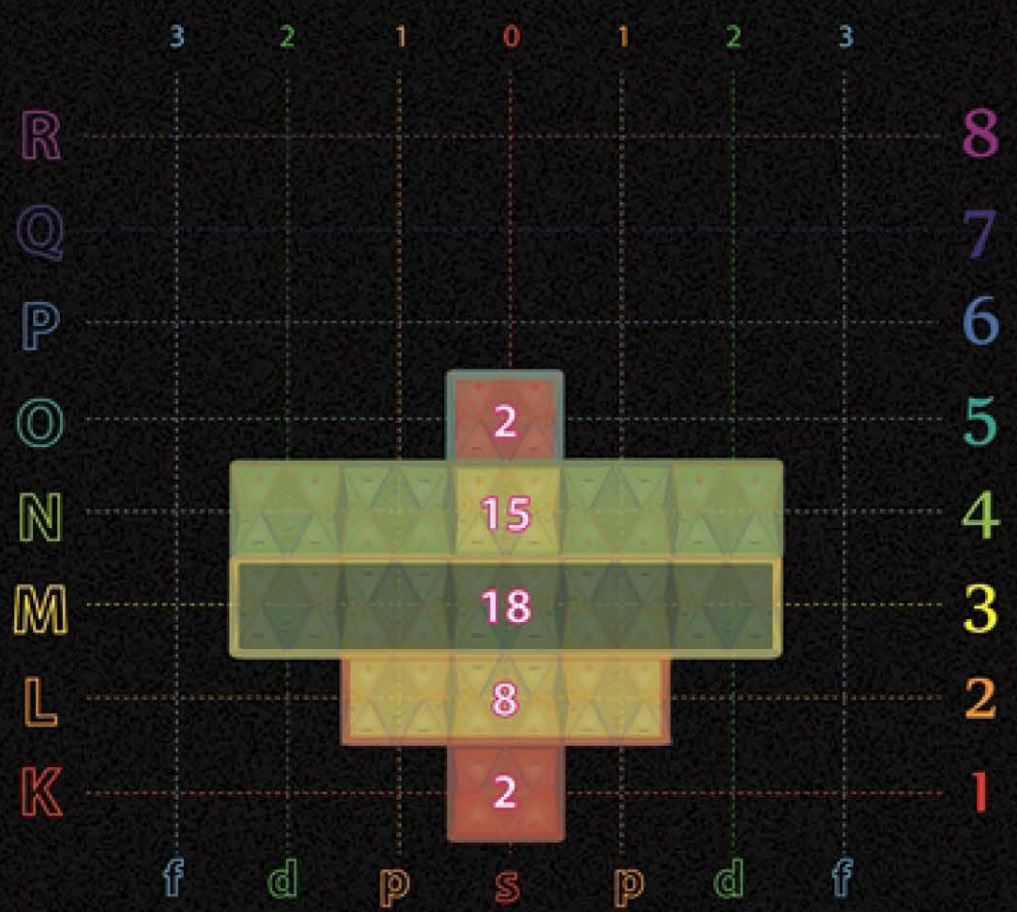
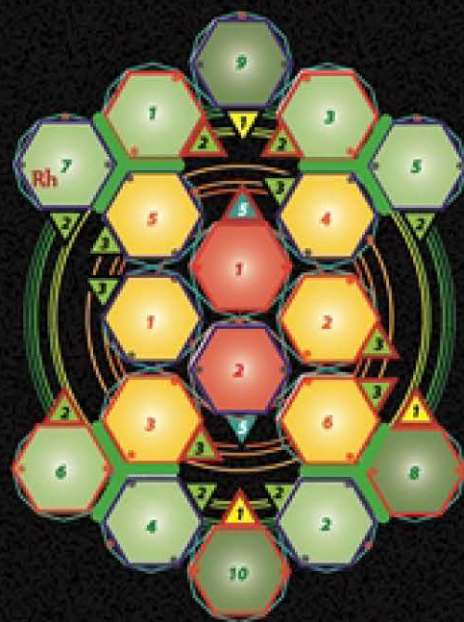
nuclear mass-energy quanta per shell

[Kr] 5s² 4d⁶
Transition Metal

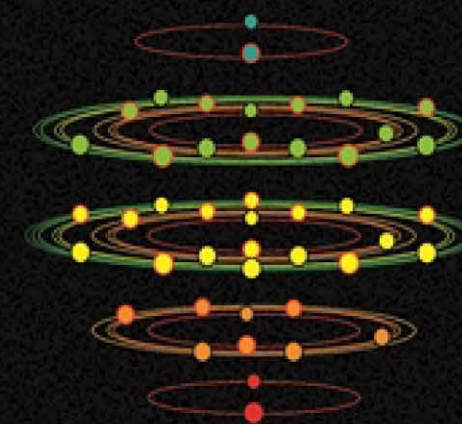
Azimuthal & Magnetic numbers



elemental family geometry



electron configuration

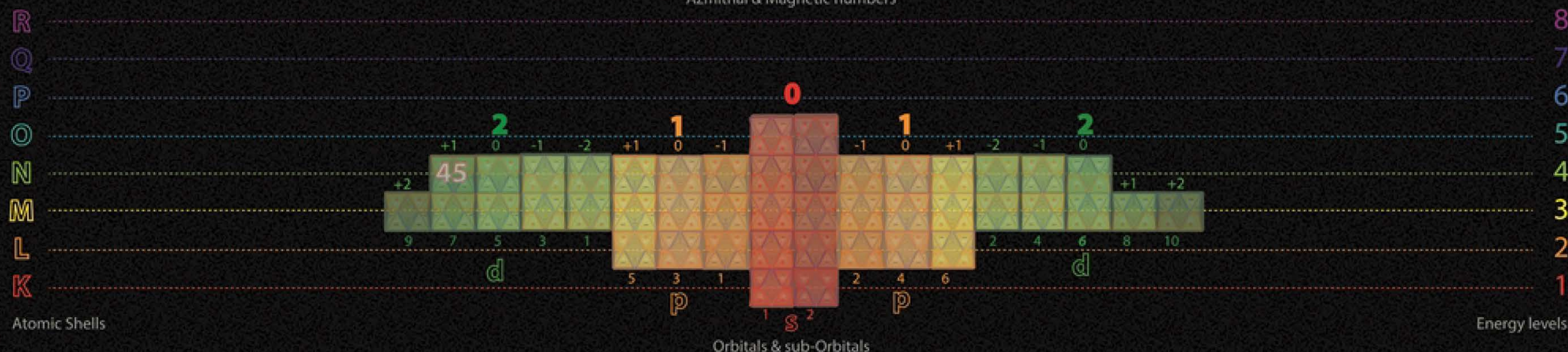


Rhodium

$${}_{\text{K}}^{\text{O}}\text{P}\Sigma_{25}^{29} \left[\begin{array}{ccc} \text{Baryon rest quanta} & \text{lepton rest quanta} & \text{KEM} \\ [72(\text{m}^2)] & + [12\text{e}19] & + [\Delta\text{v}]_1^5 \\ \text{nuclear mass-energy quanta per shell} & & \end{array} \right]$$

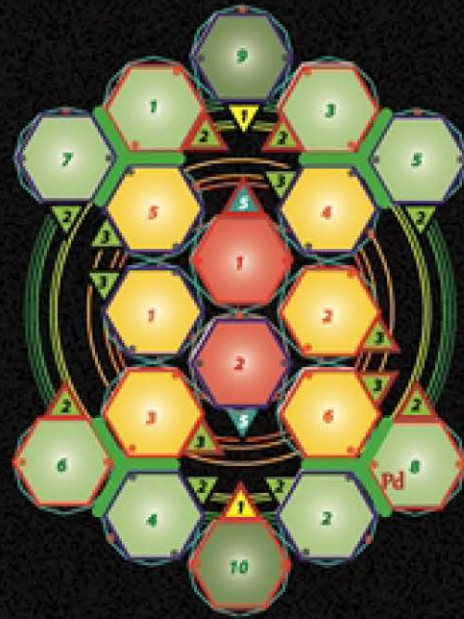
[Kr] 5s² 4d⁷
Transition Metal

Azmithal & Magnetic numbers

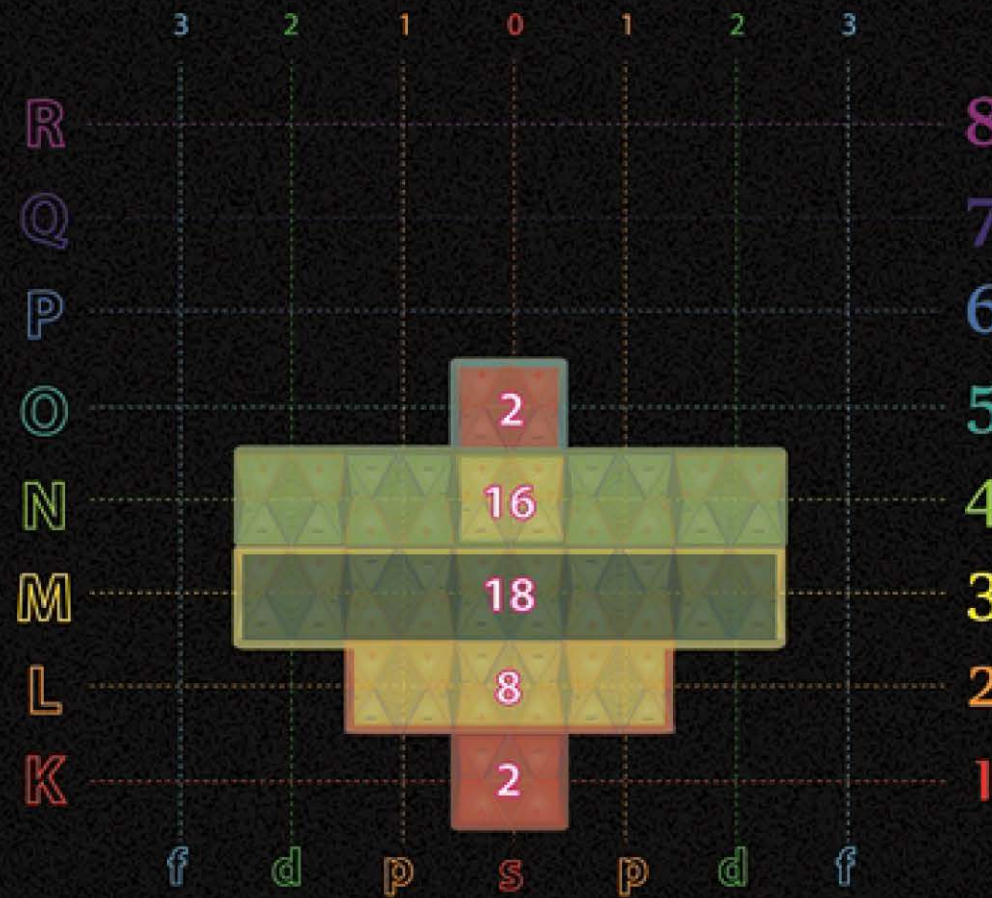
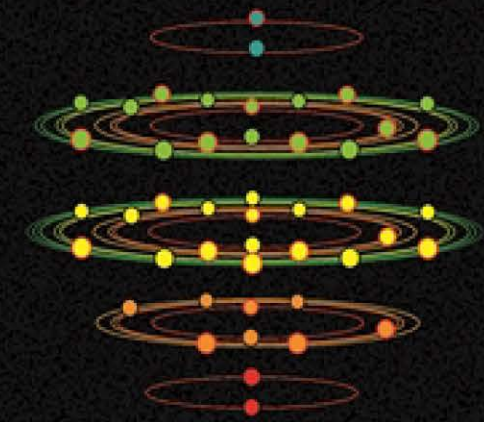


Tetryonics 53.45 - Rhodium atomic config

elemental family geometry



electron configuration

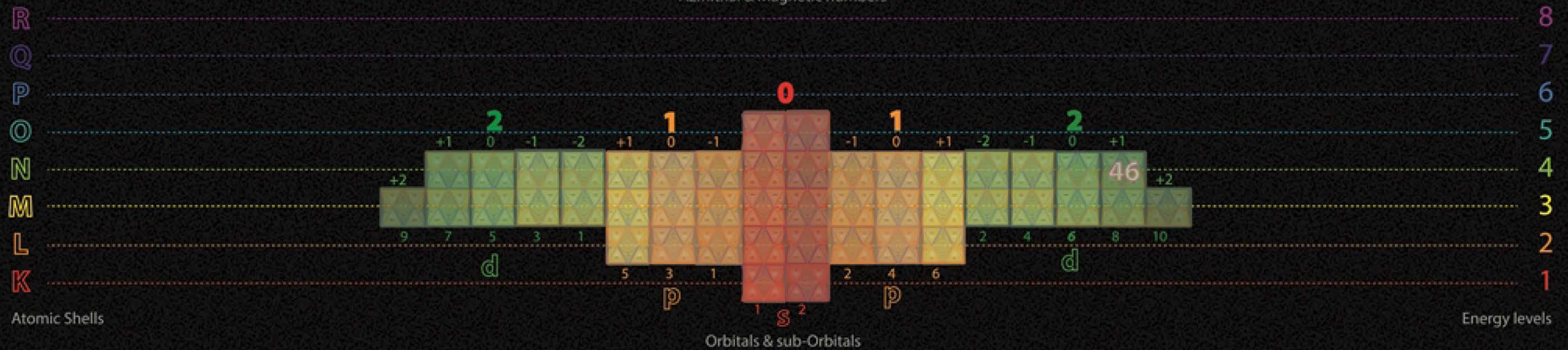


Palladium

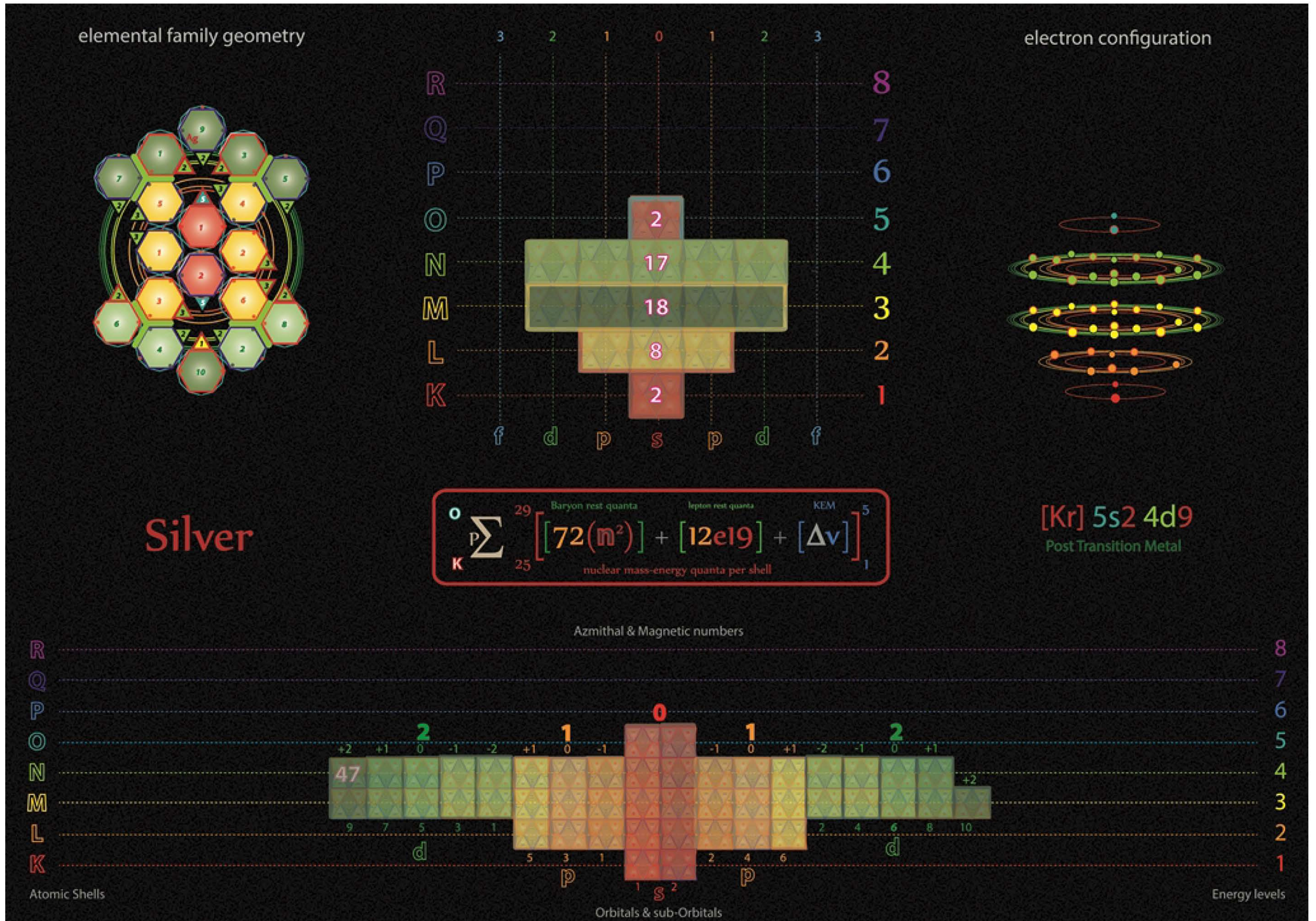
$${}^0_{\text{K}}\text{P}\Sigma_{25}^{29} \left[\underset{\text{nuclear mass-energy quanta per shell}}{72(m^2)} \right] + \underset{\text{lepton rest quanta}}{12e19} + \underset{\text{KEM}}{[\Delta v]}_1^5$$

[Kr] 5s² 4d⁸
Transition Metal

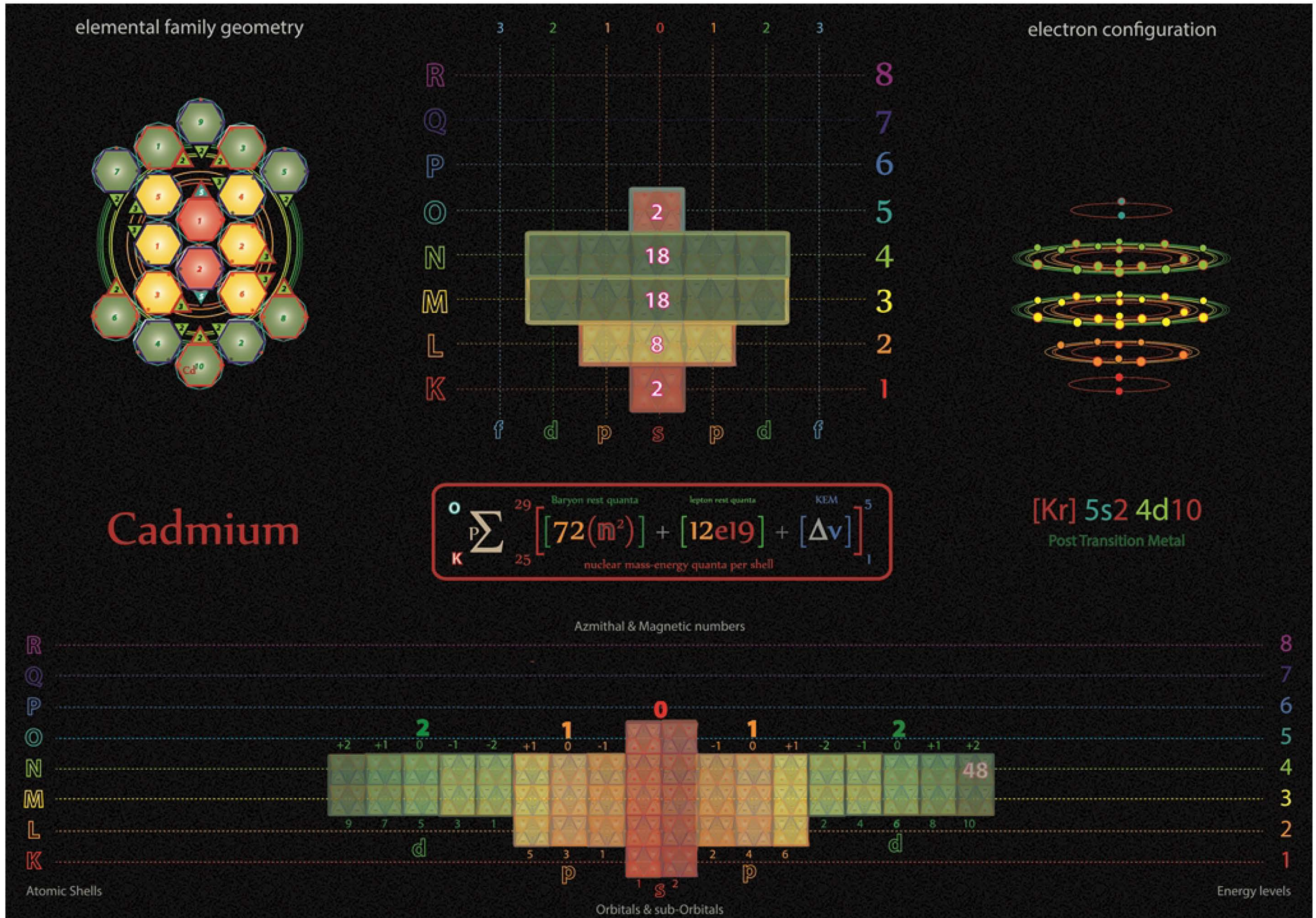
Azimuthal & Magnetic numbers



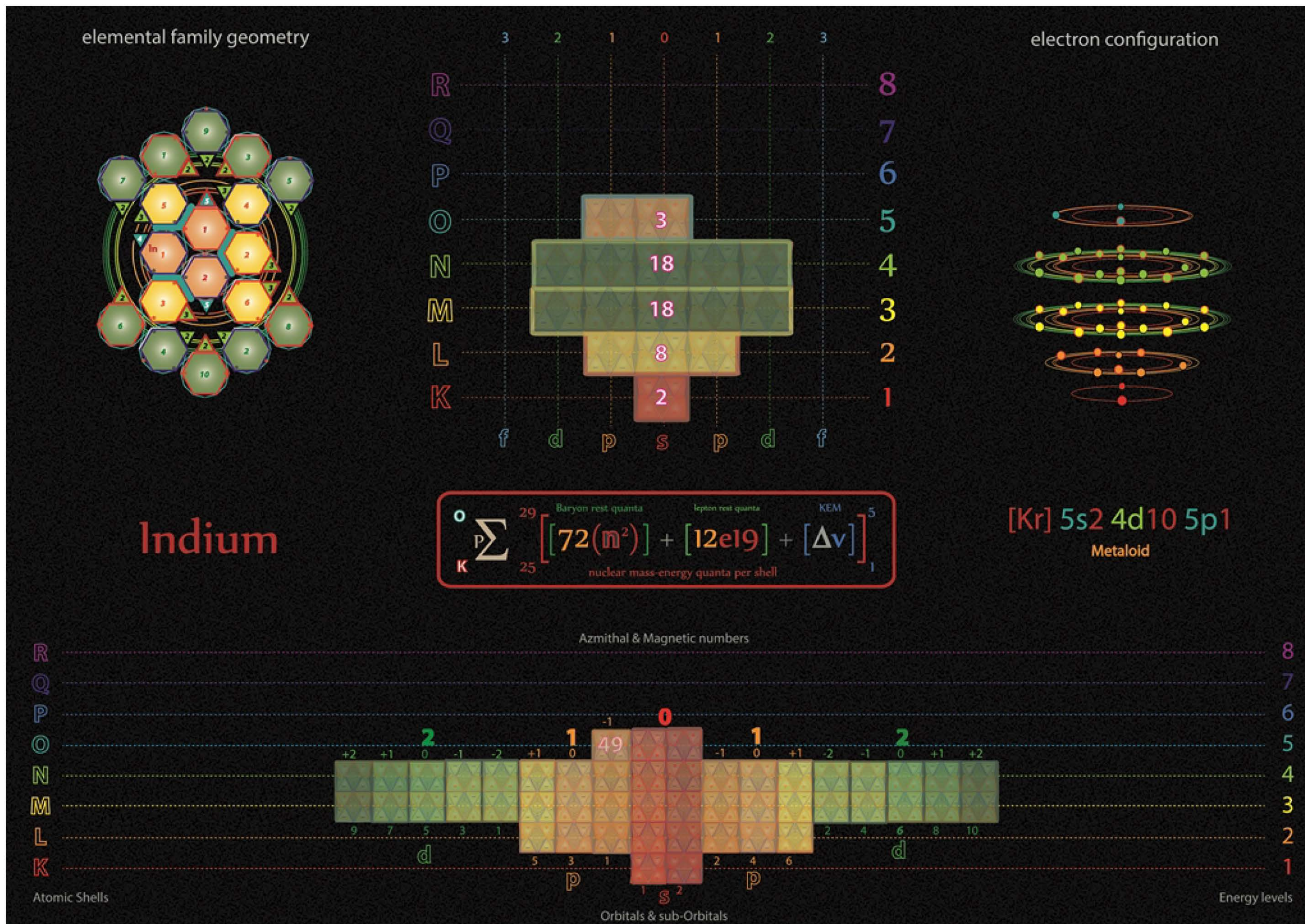
Tetryonics 53.46 - Palladium atomic config



Tetryonics 53.47 - Silver atomic config

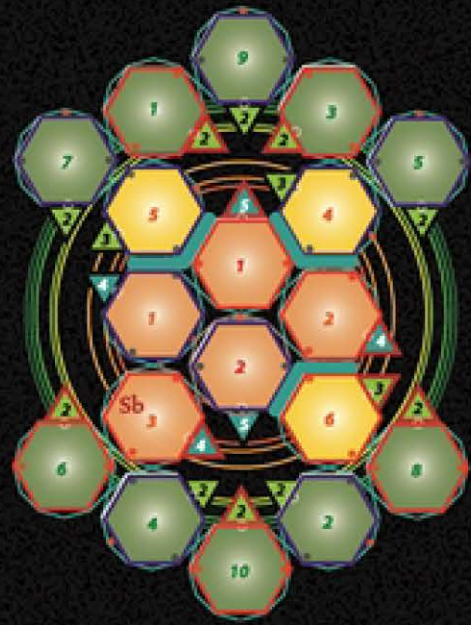


Tetryonics 53.48 - Cadmium atomic config

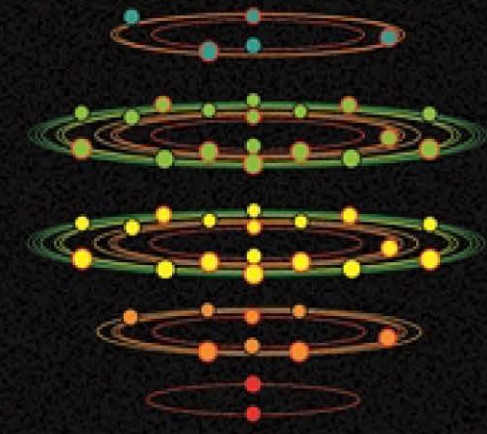
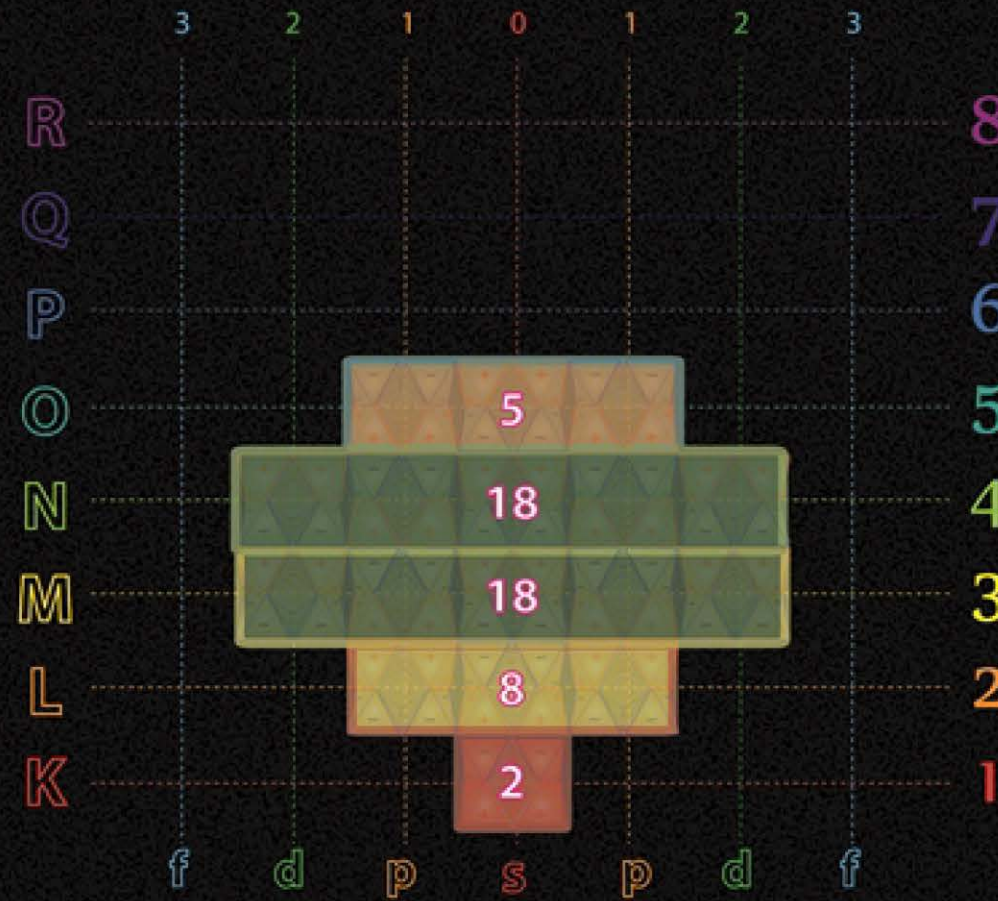


Tetryonics 53.49 - Indium atomic config

elemental family geometry



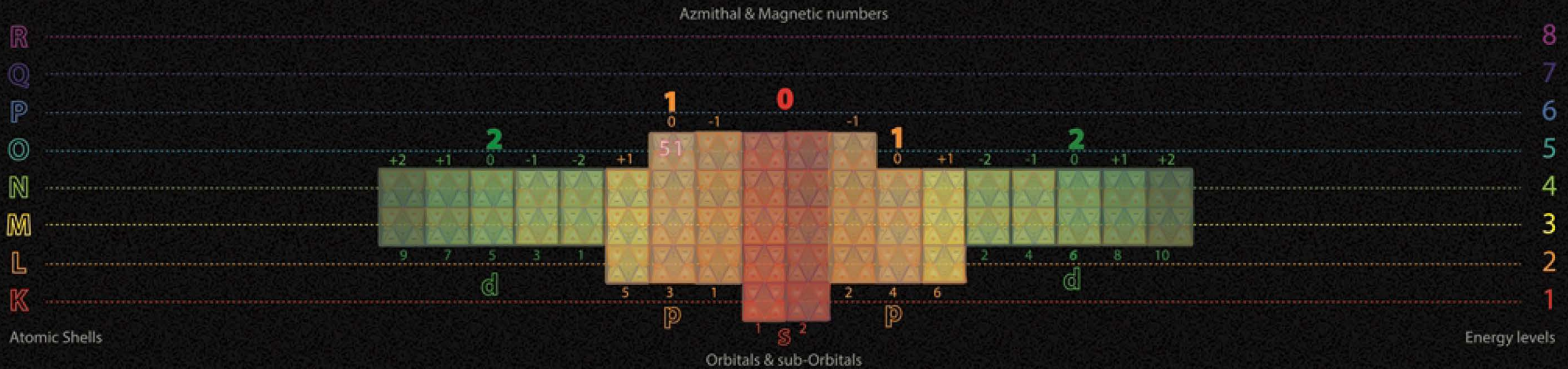
electron configuration



Antimony

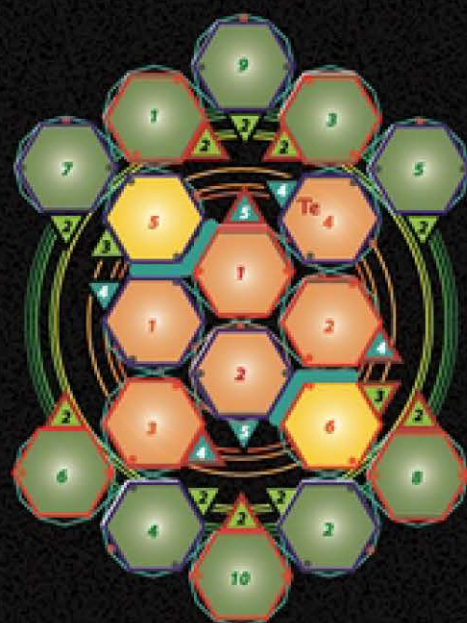
$${}_{\text{K}}^{\text{O}}\text{P}\Sigma_{\text{K}}^{29} \left[\begin{matrix} \text{Baryon rest quanta} \\ [72(n^2)] \\ \text{nuclear mass-energy quanta per shell} \end{matrix} \right] + \left[\begin{matrix} \text{lepton rest quanta} \\ 12e19 \\ \end{matrix} \right] + \left[\begin{matrix} \text{KEM} \\ \Delta v \\ \end{matrix} \right]_1^5$$

[Kr] 5s2 4d10 5p3
Metaloid

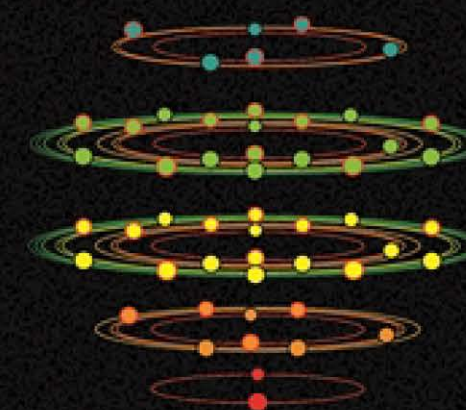
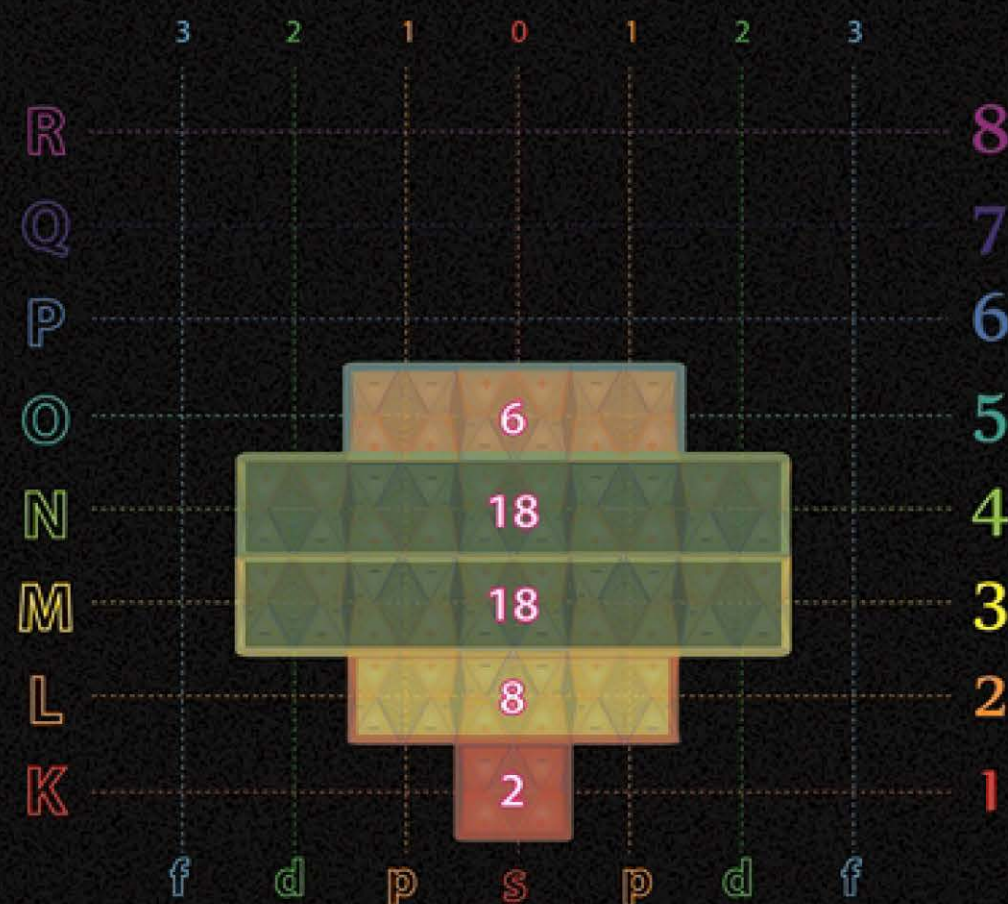


Tetryonics 53.51 - Antimony atomic config

elemental family geometry



electron configuration

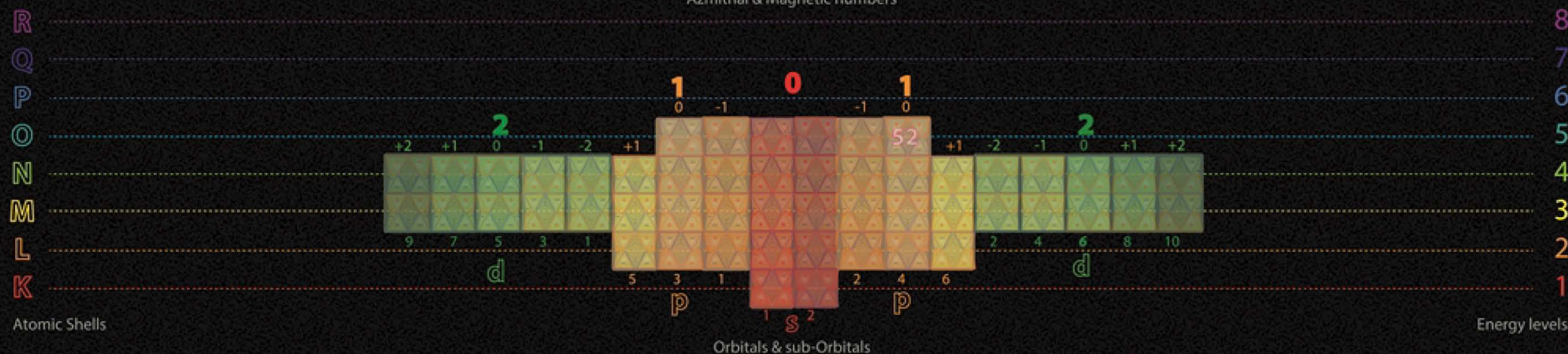


Tellurium

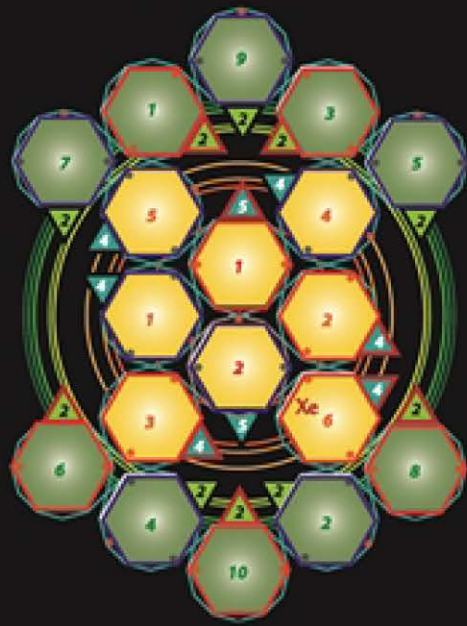
$${}_{\text{K}}^{\text{O}}\text{P}\Sigma_{\text{K}}^{29} \left[\begin{matrix} \text{Baryon rest quanta} & \text{lepton rest quanta} & \text{KEM} \\ [72(\text{m}^2)] & + [12\text{e}19] & + [\Delta\text{v}] \\ \text{nuclear mass-energy quanta per shell} & & \end{matrix} \right]_1^5$$

[Kr] 5s² 4d¹⁰ 5p⁴
Metalloid

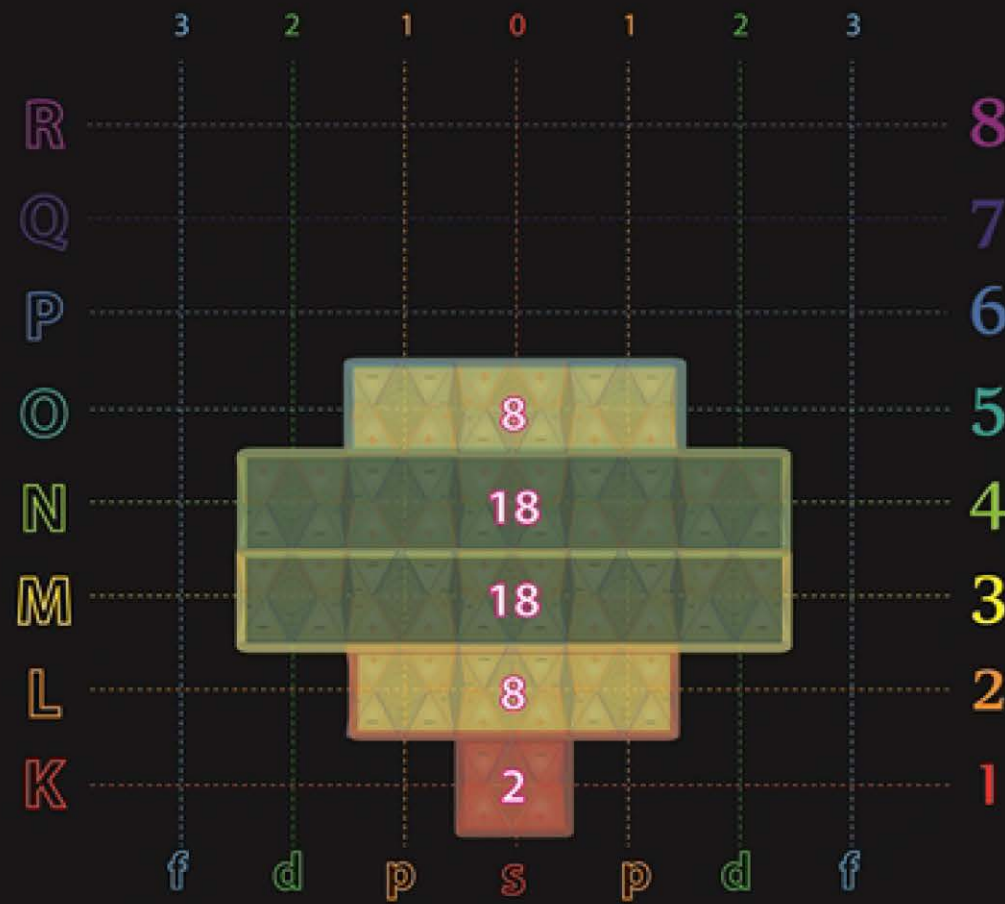
Azimuthal & Magnetic numbers



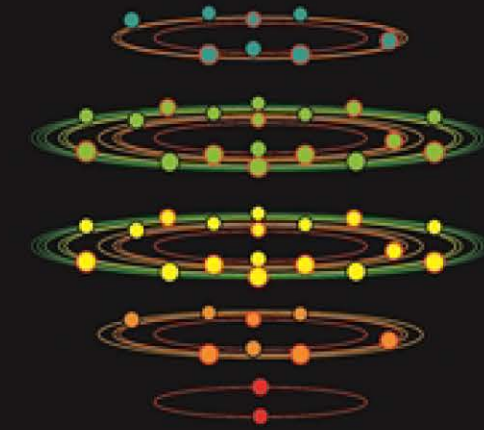
elemental family geometry



Xenon



electron configuration



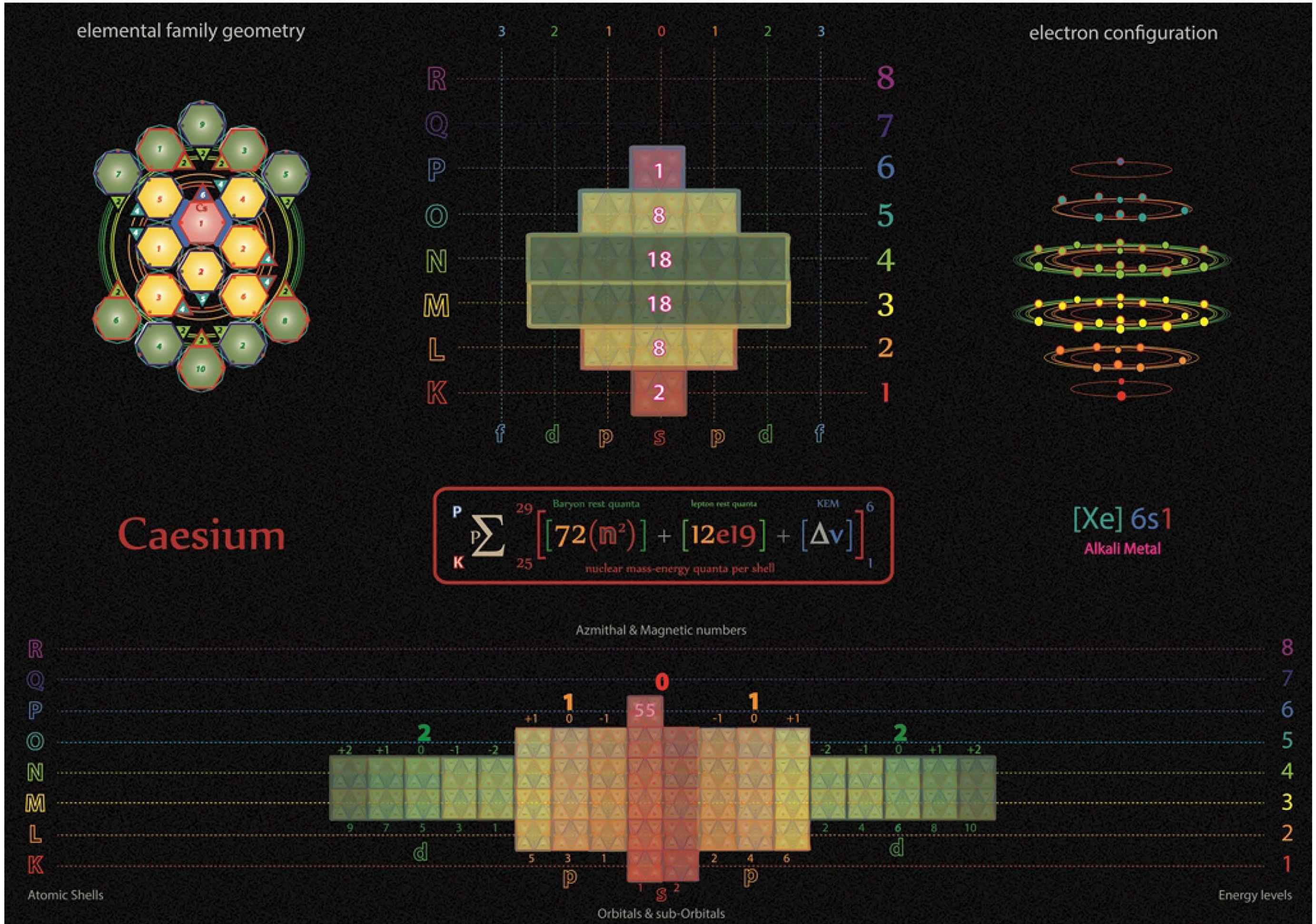
$${}^{\circ}_{\text{K}} \sum_{\text{P}}^{29} \left[\overset{\text{Baryon rest quanta}}{72(\text{m}^2)} + \overset{\text{lepton rest quanta}}{12\text{e}19} + \overset{\text{KEM}}{[\Delta v]} \right]_1^5$$

nuclear mass-energy quanta per shell

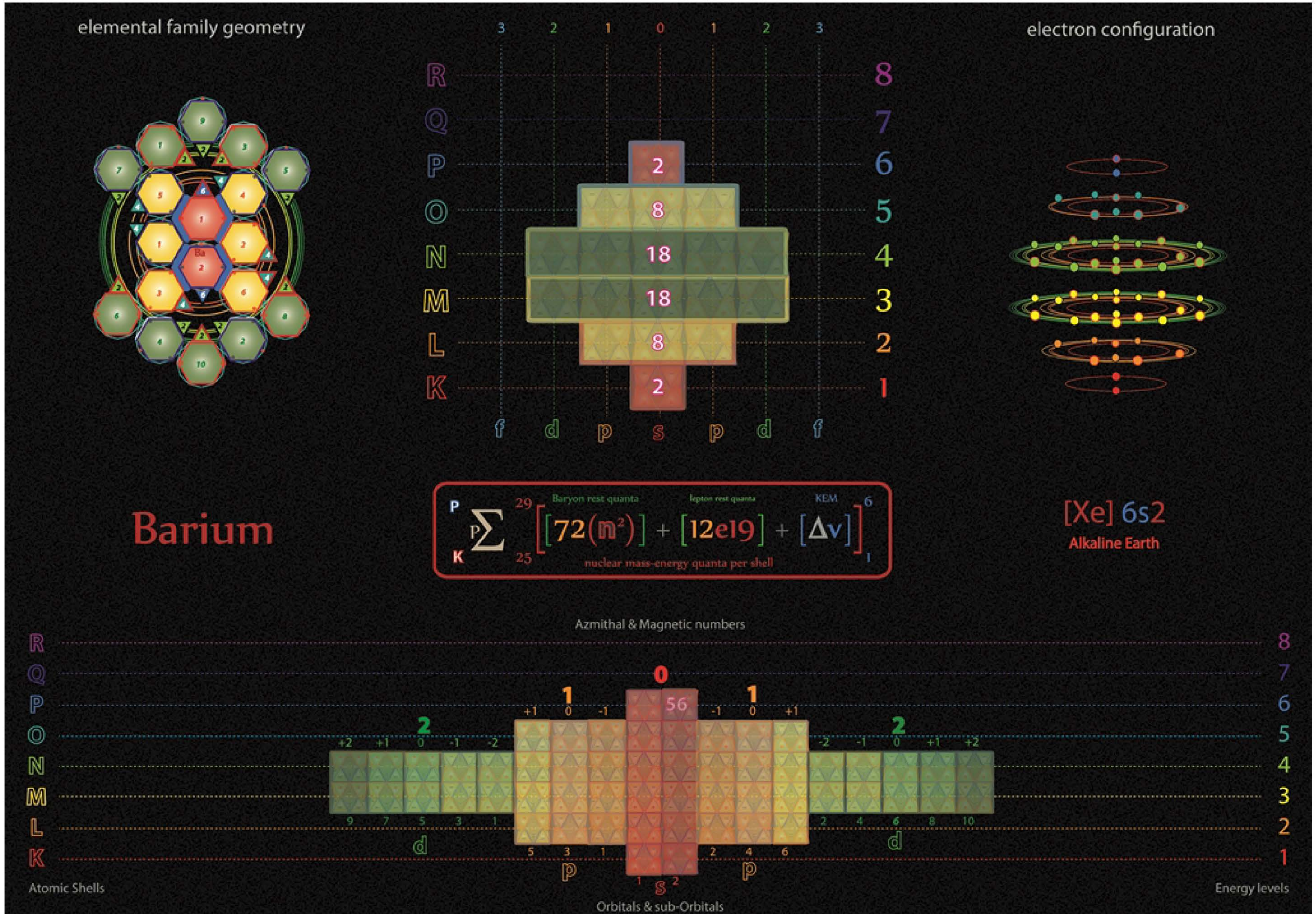


Azimuthal & Magnetic numbers

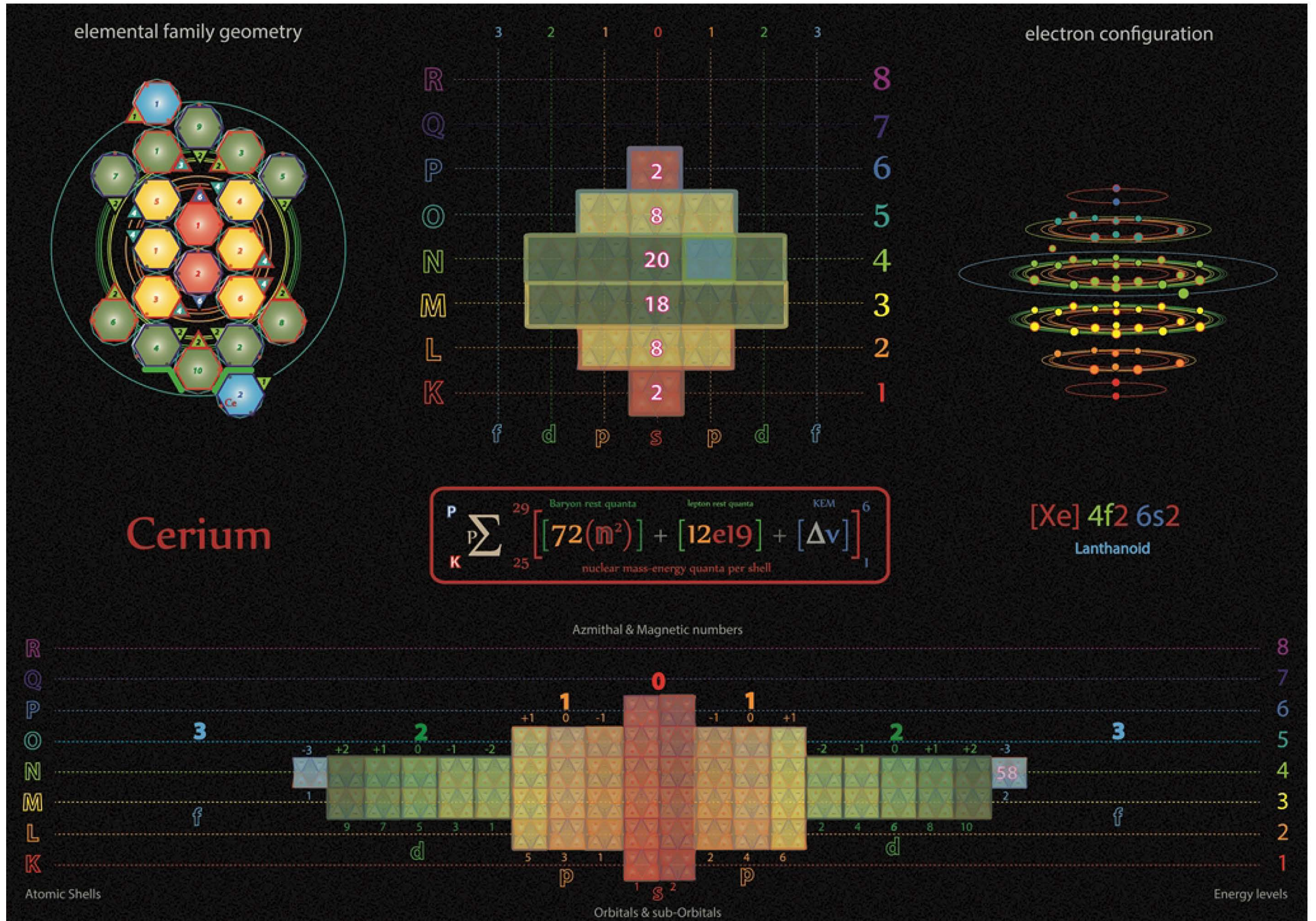




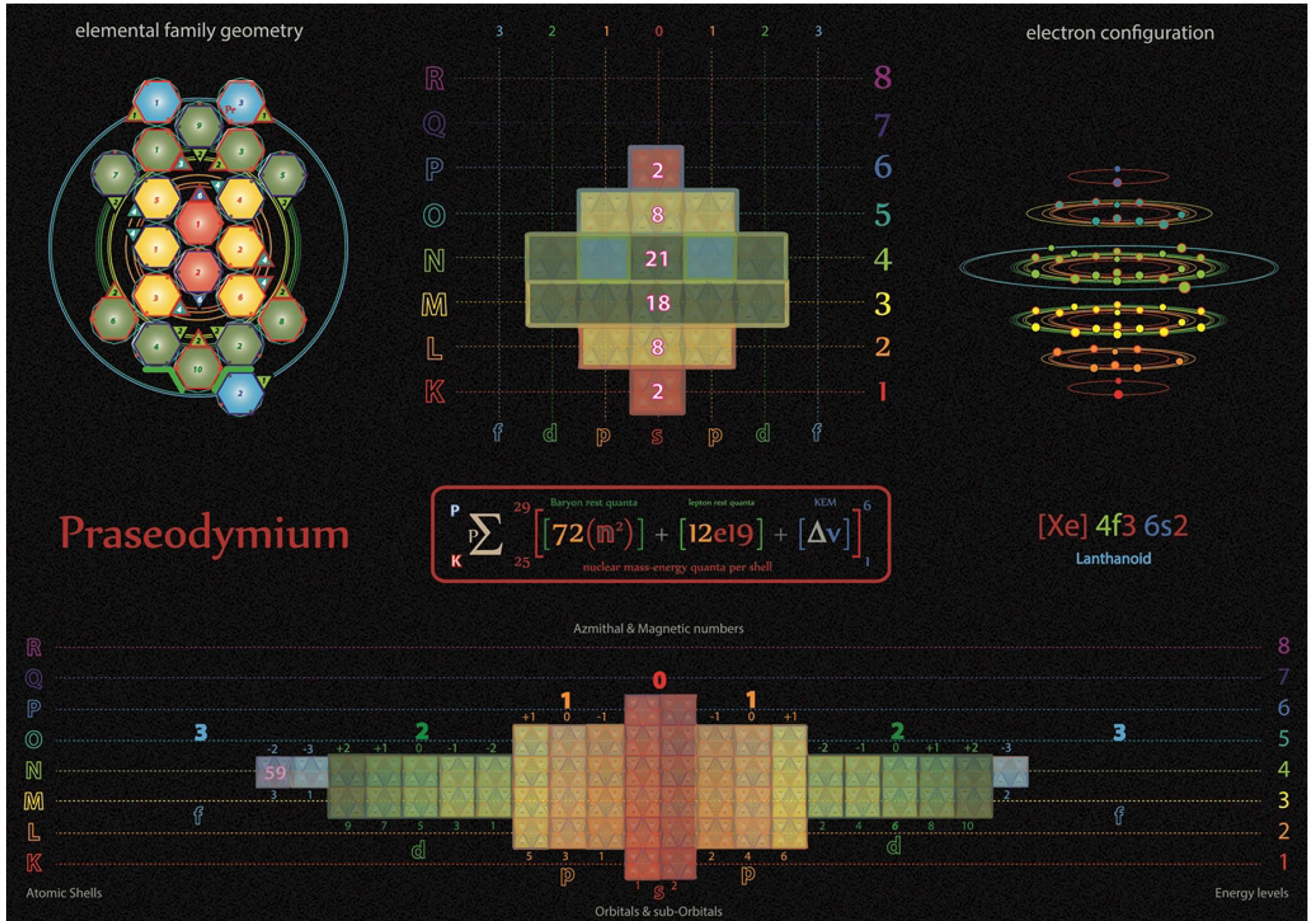
Tetryonics 53.55 - Caesium atomic config



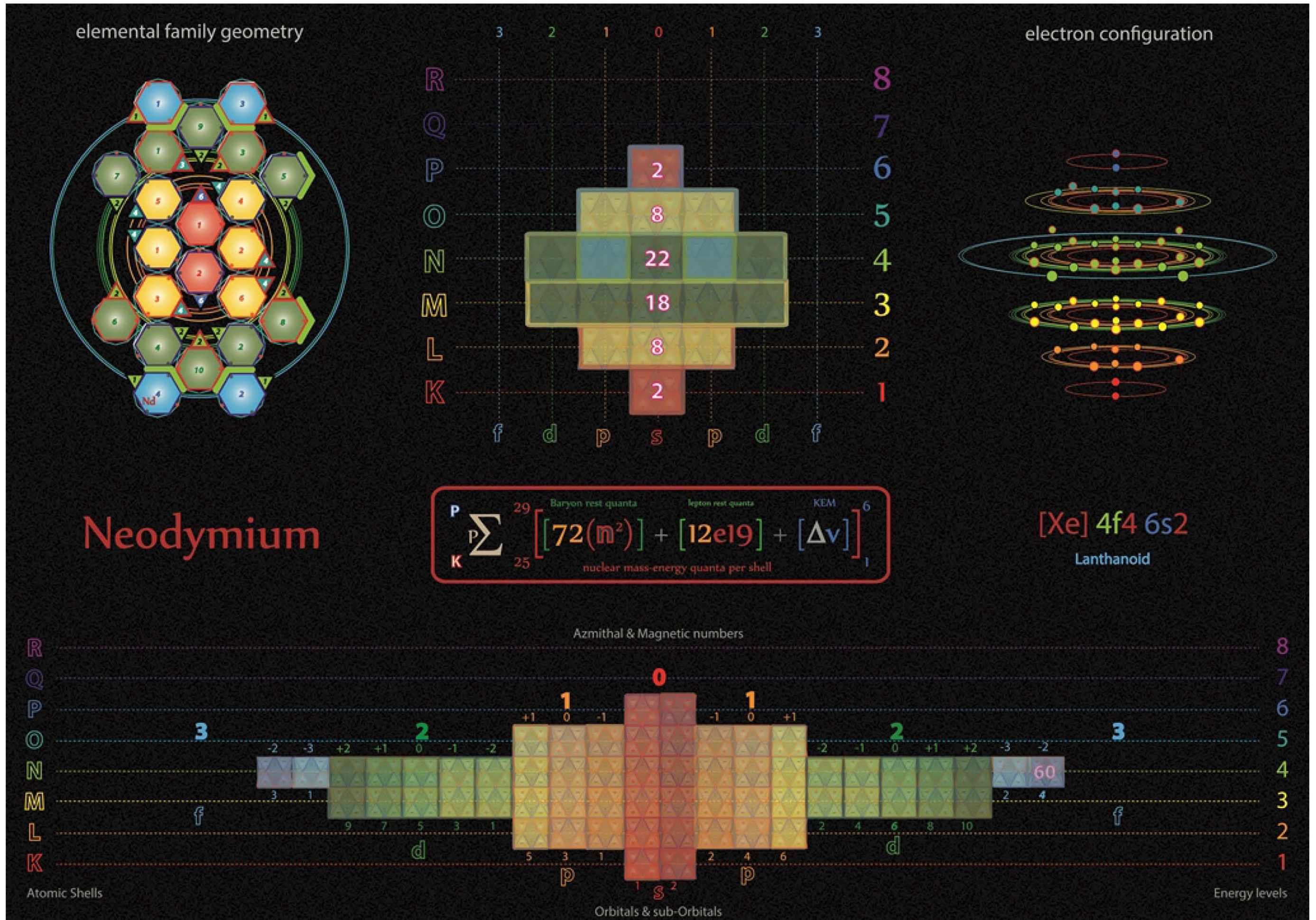
Tetryonics 53.56 - Barium atomic config



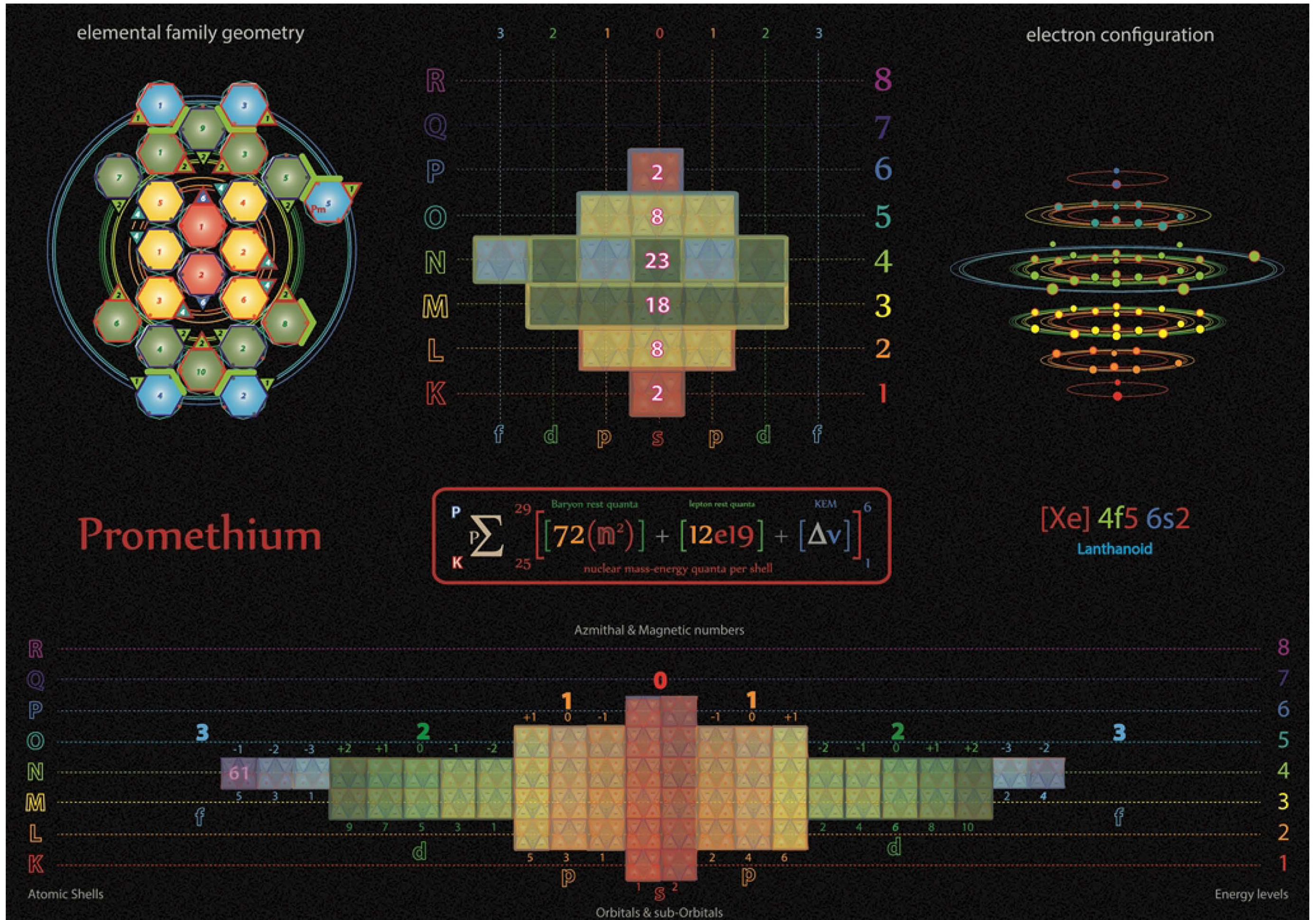
Tetryonics 53.58 - Cerium atomic config



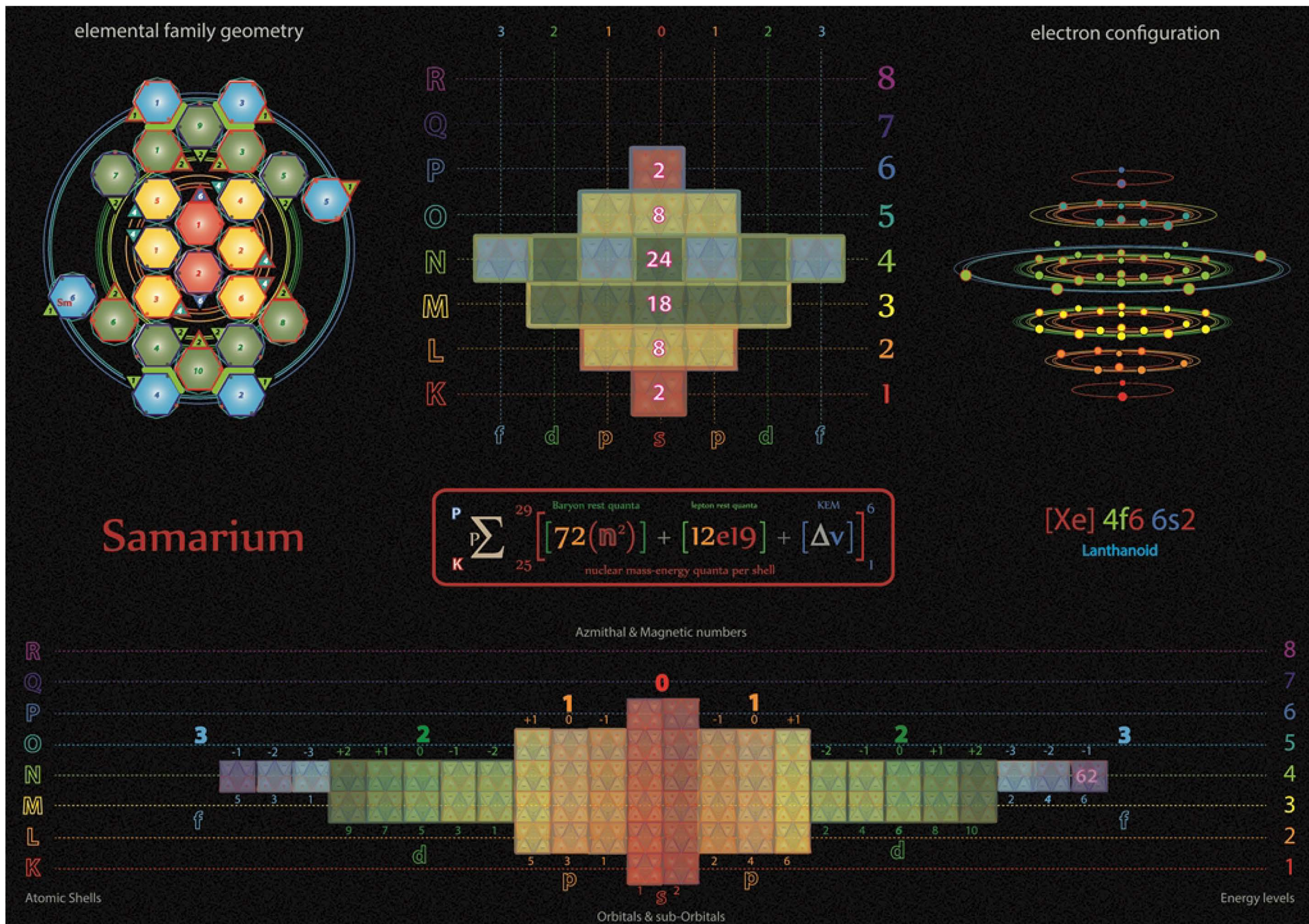
Tetryonics 53.59 - Praseodymium atomic config



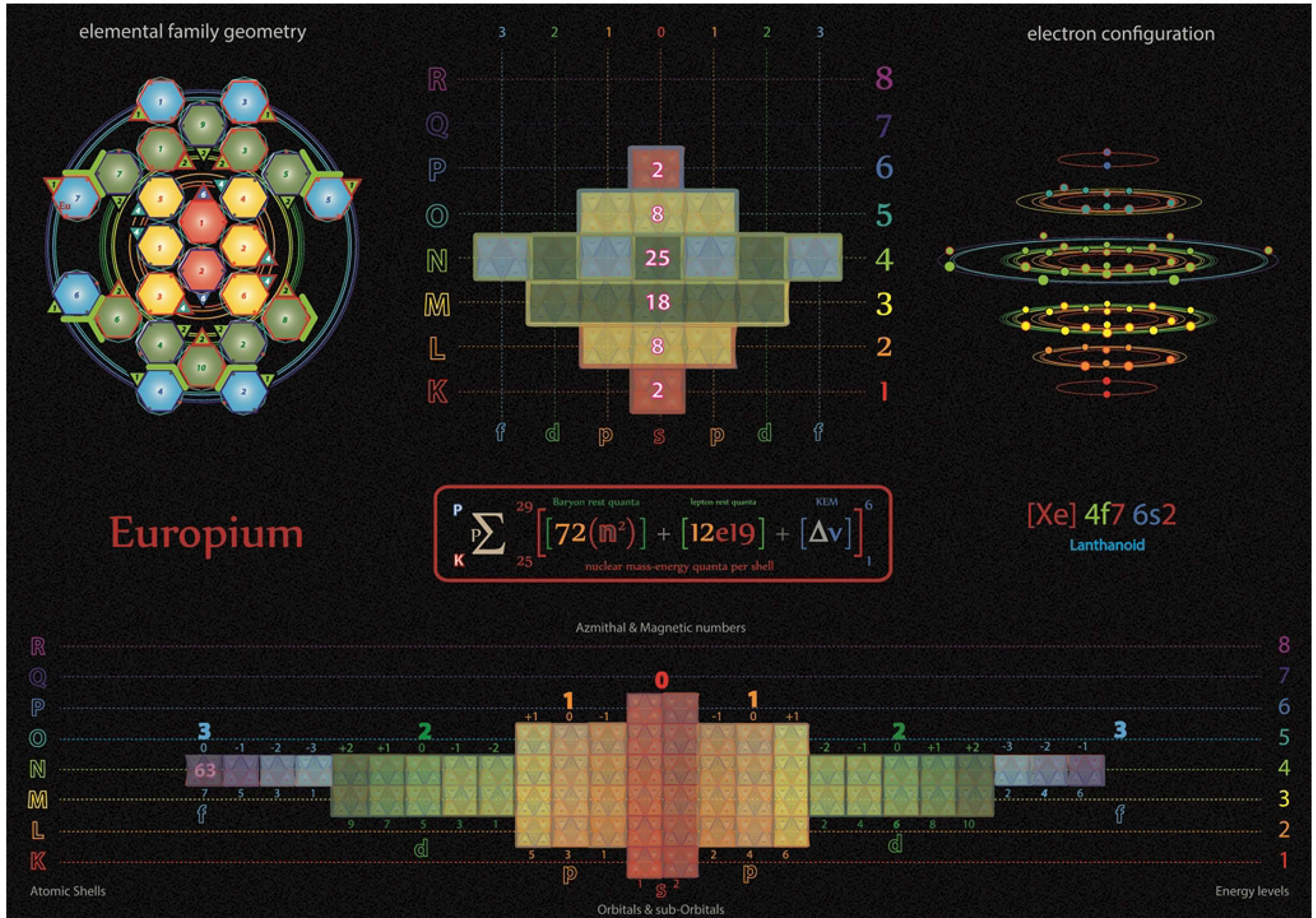
Tetryonics 53.60 - Neodymium atomic config



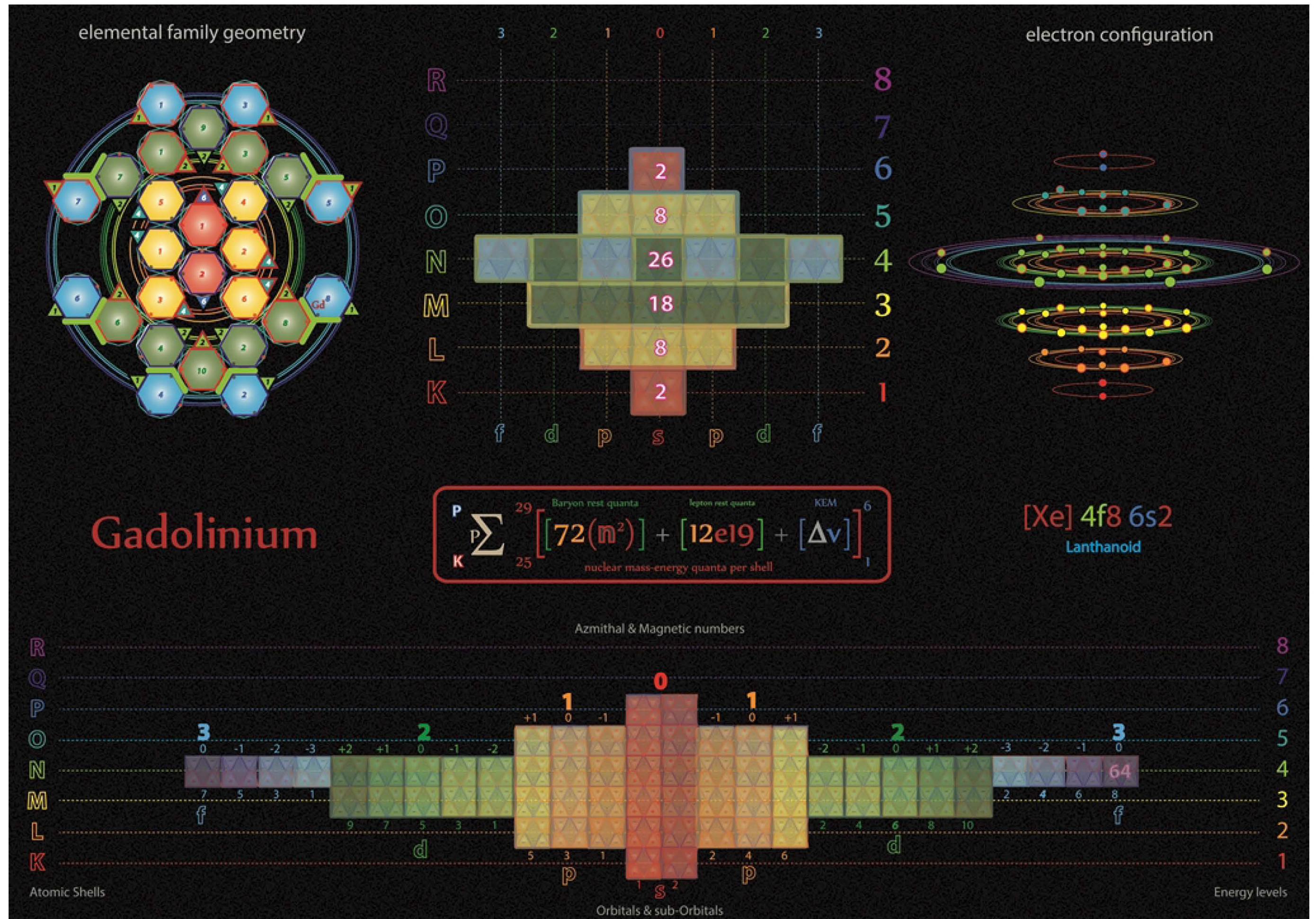
Tetryonics 53.61 - Promethium atomic config



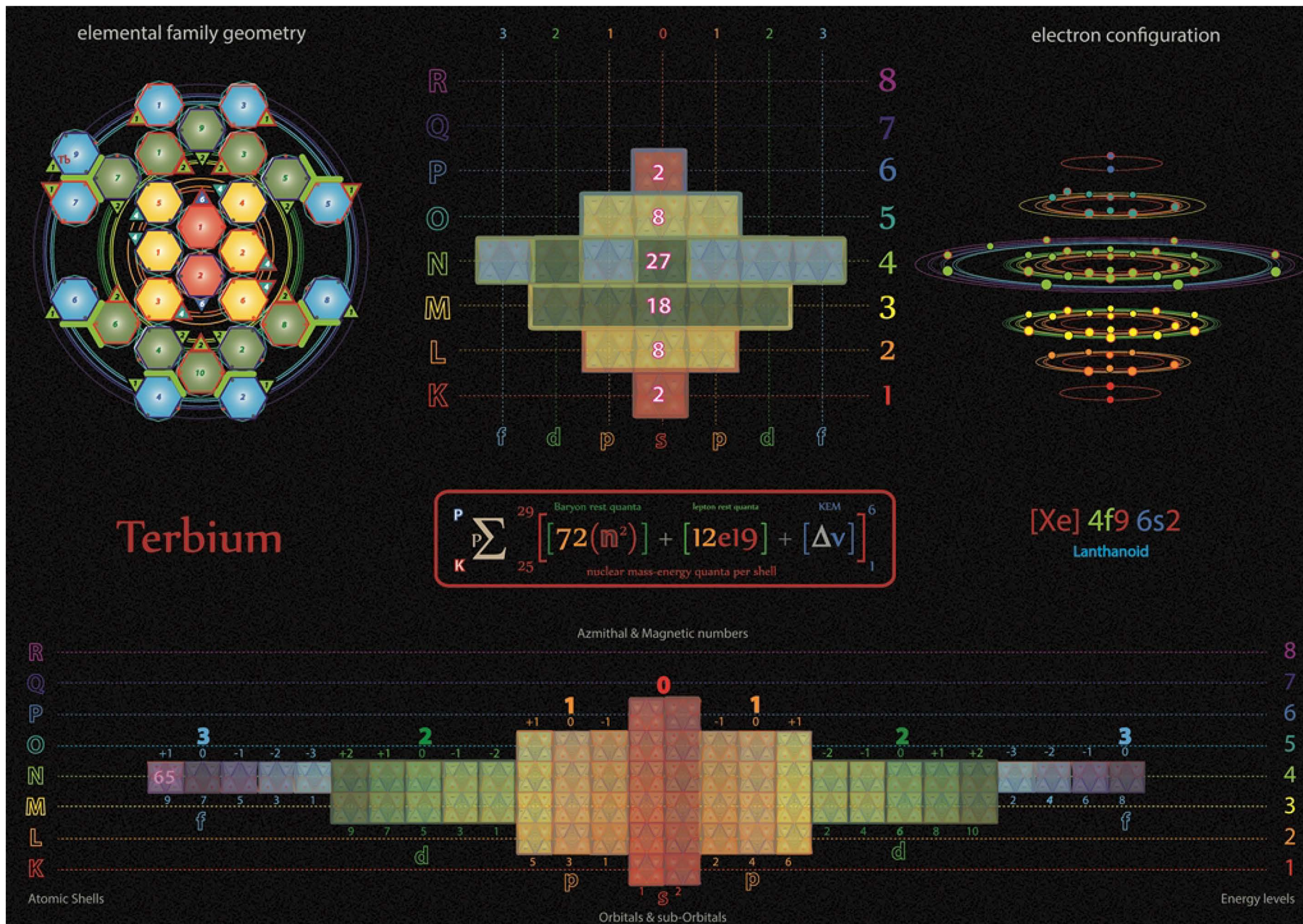
Tetryonics 53.62 - Samarium atomic config



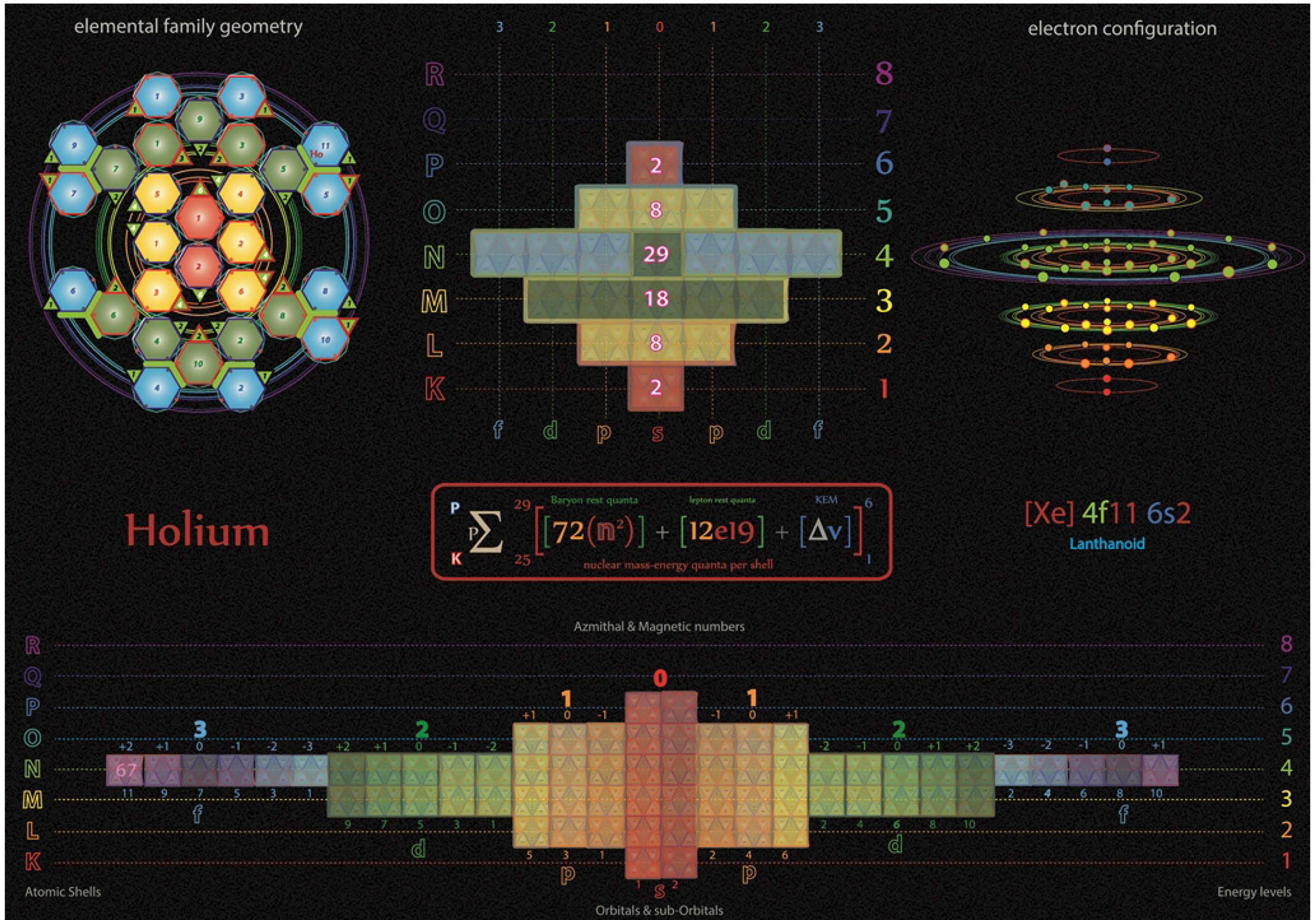
Tetryonics 53.63 - Europium atomic config



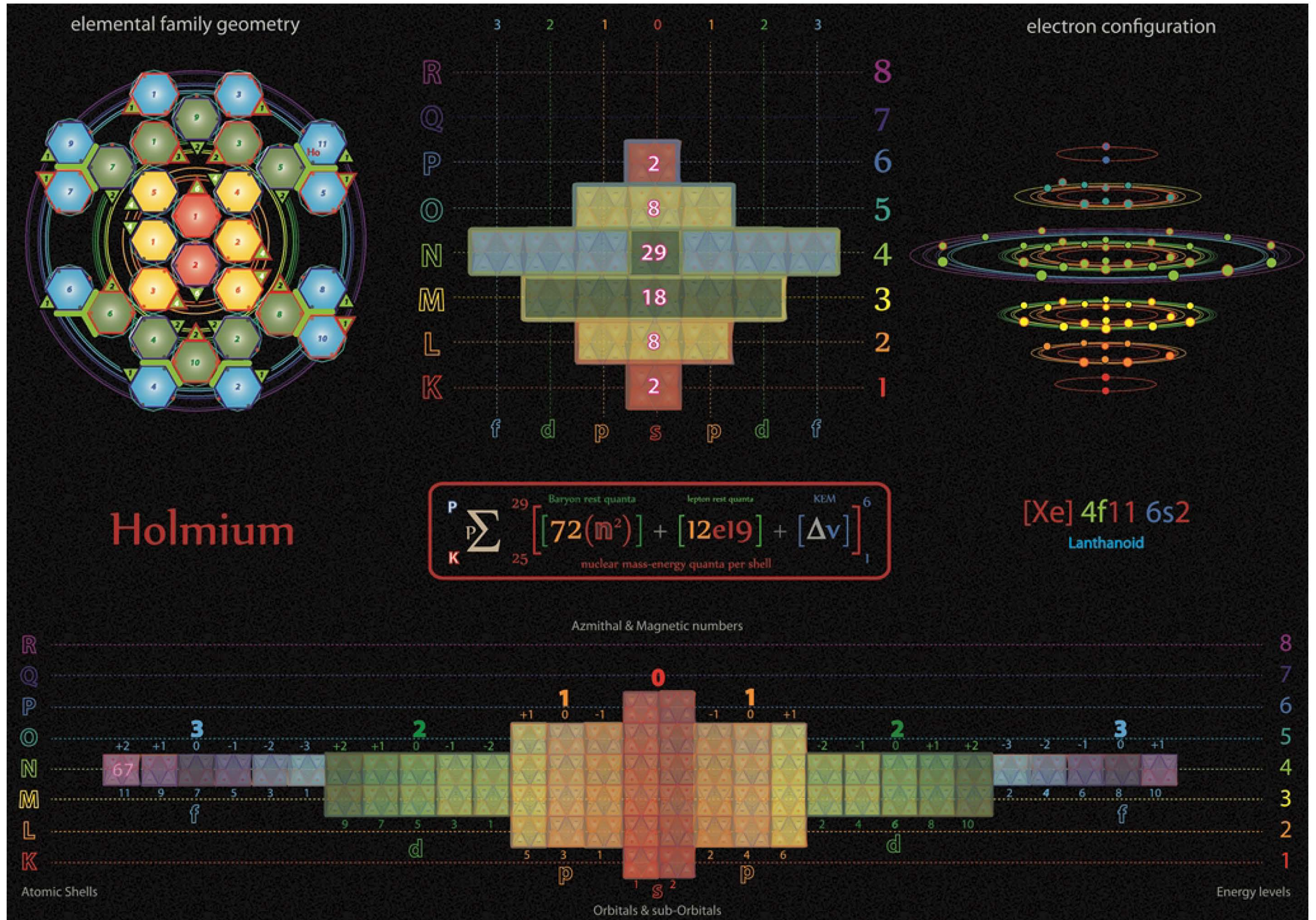
Tetryonics 53.64 - Gadolinium atomic config



Tetryonics 53.65 - Terbium atomic config

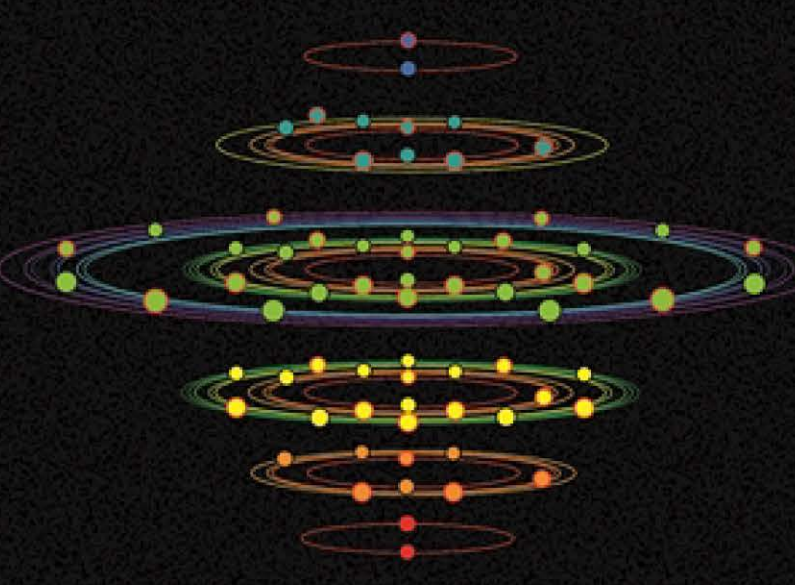
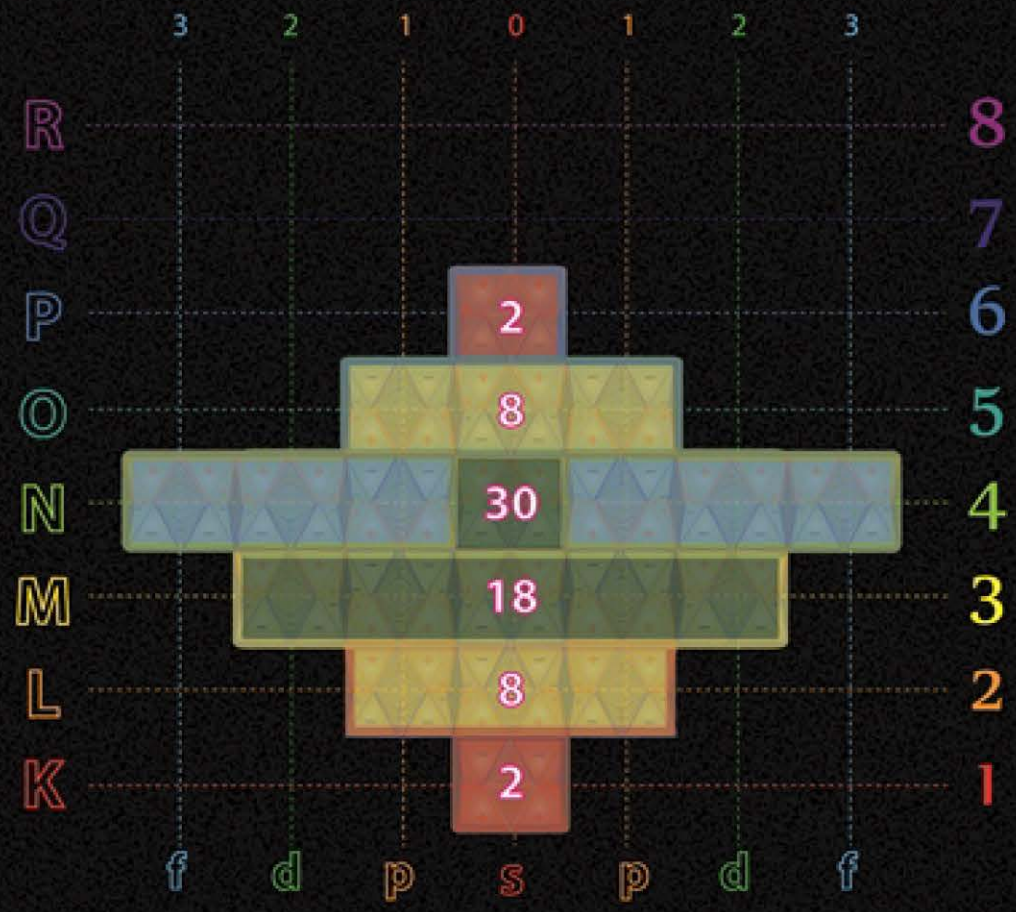



Tetryonics 53.67 - Holium atomic config



Tetryonics 53.67 - Holmium atomic config

elemental family geometry **electron configuration**



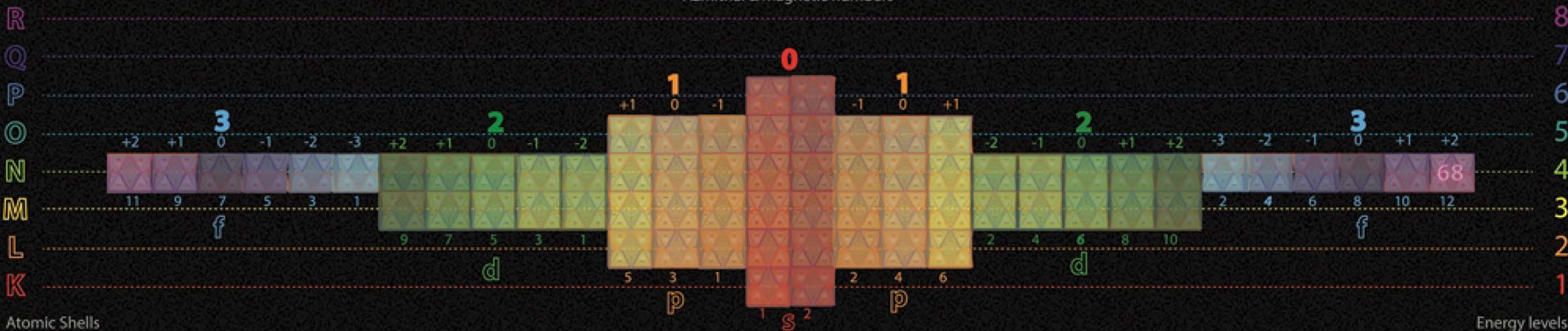
Erbium

$$\sum_{K=25}^P \left[\overset{\text{Baryon rest quanta}}{72(n^2)} + \overset{\text{lepton rest quanta}}{12e19} + \overset{\text{KEM}}{\Delta v} \right]_1^6$$

nuclear mass-energy quanta per shell

[Xe] 4f¹² 6s²
Lanthanoid

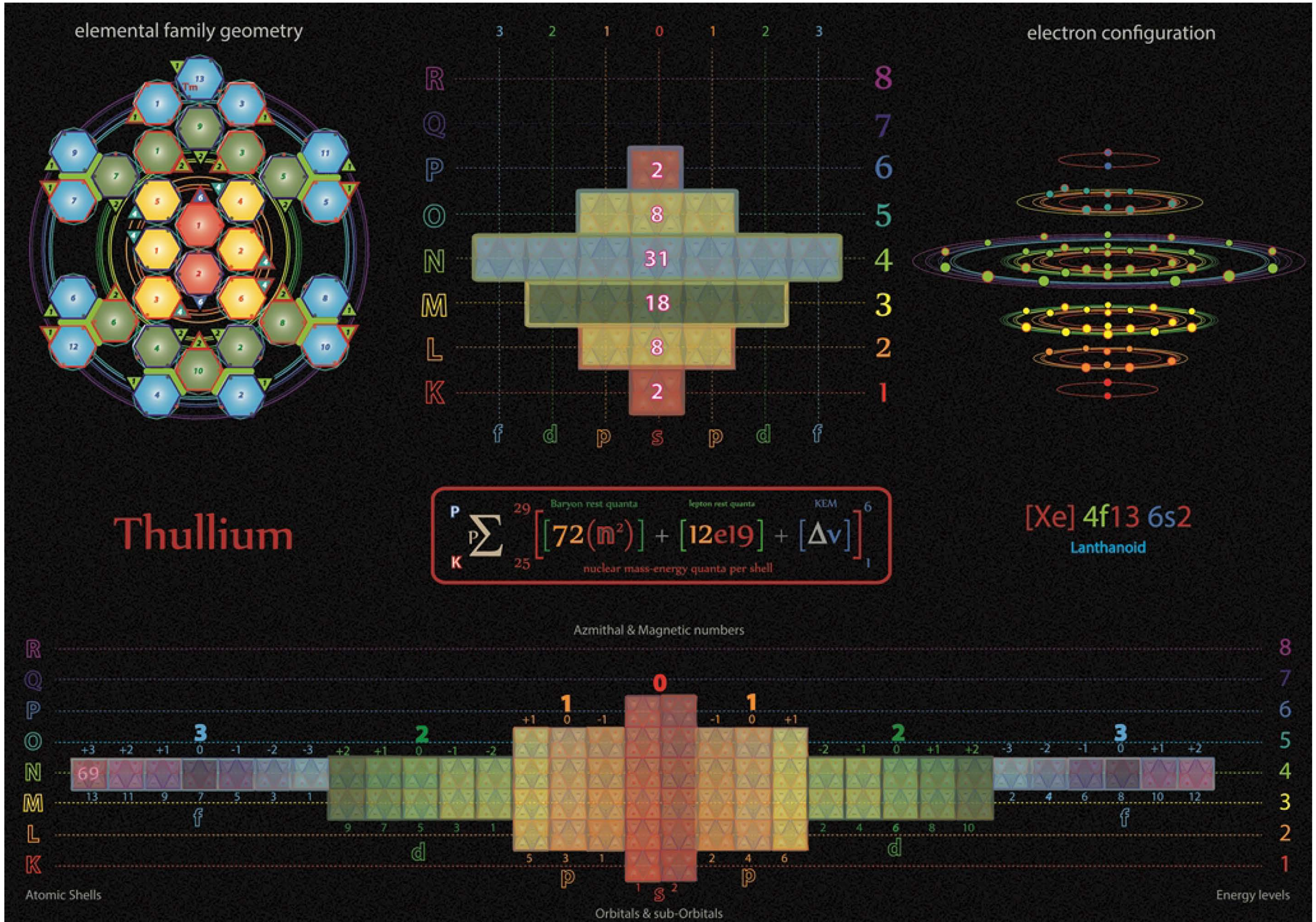
Azimuthal & Magnetic numbers



Orbitals & sub-Orbitals

Atomic ShellsEnergy levels

Tetryonics 53.68 - Erbium atomic config



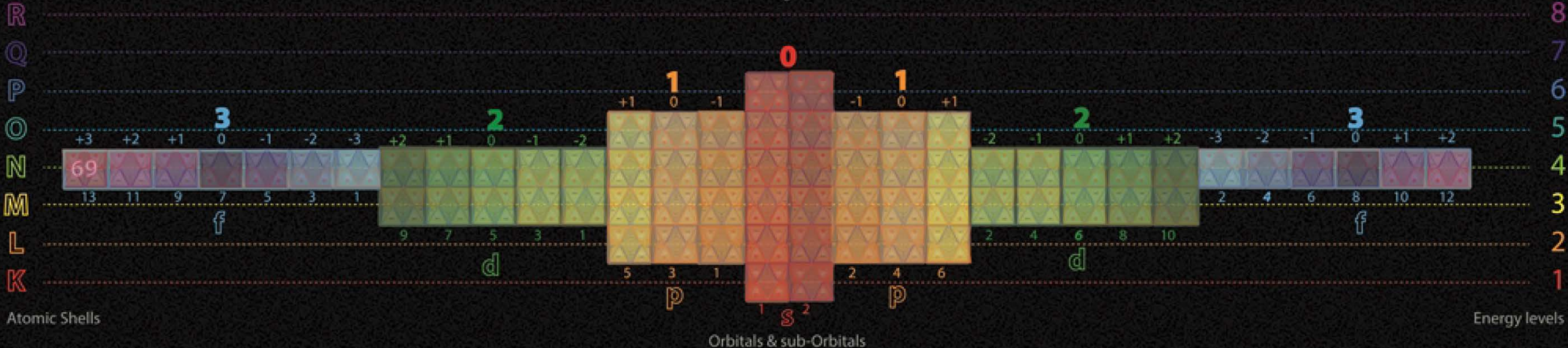
Thullium



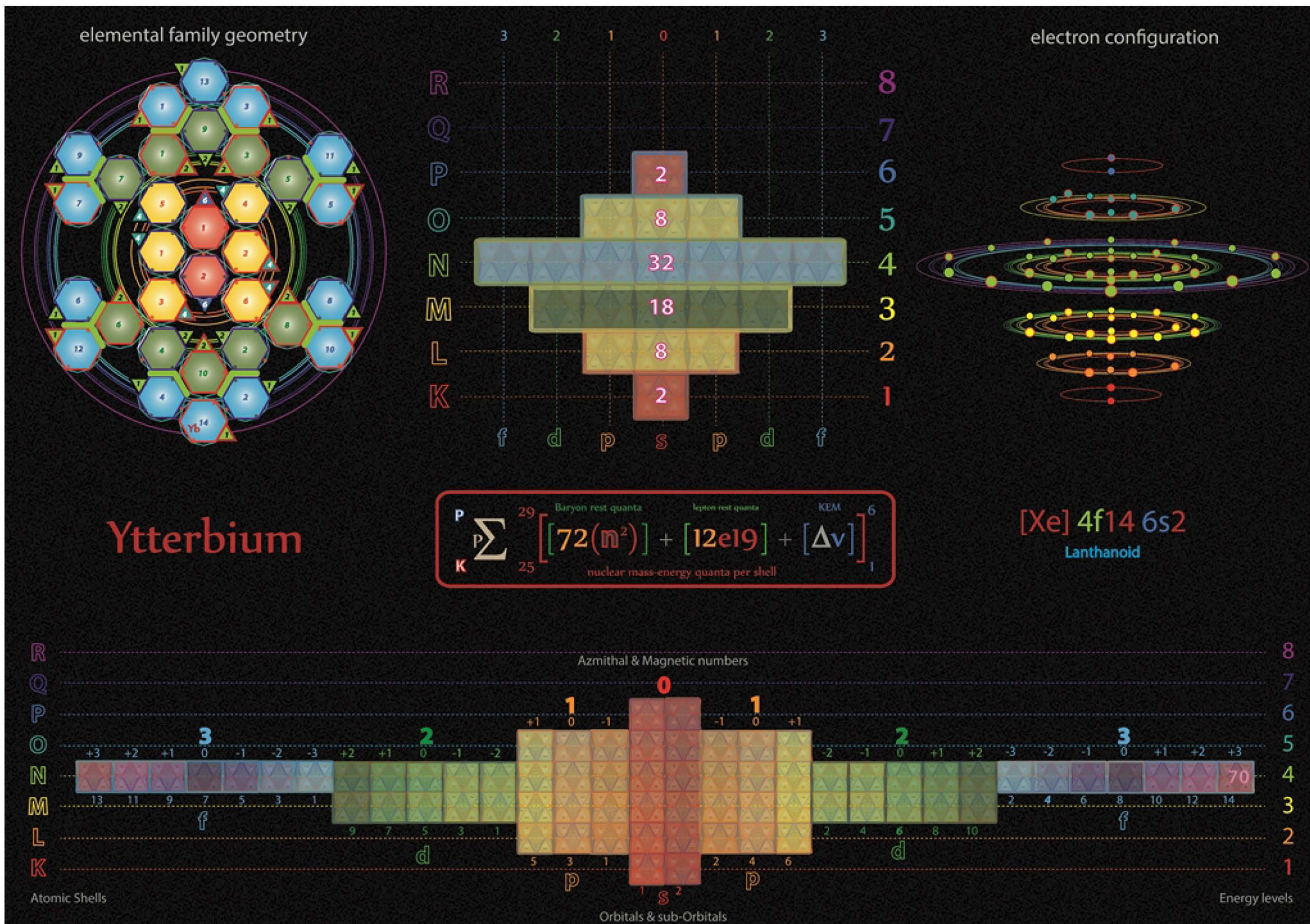
$$P \sum_K^{29} \left[72(n^2) + [12e19] + [\Delta v] \right]_1^6$$

Baryon rest quanta lepton rest quanta KEM
nuclear mass-energy quanta per shell

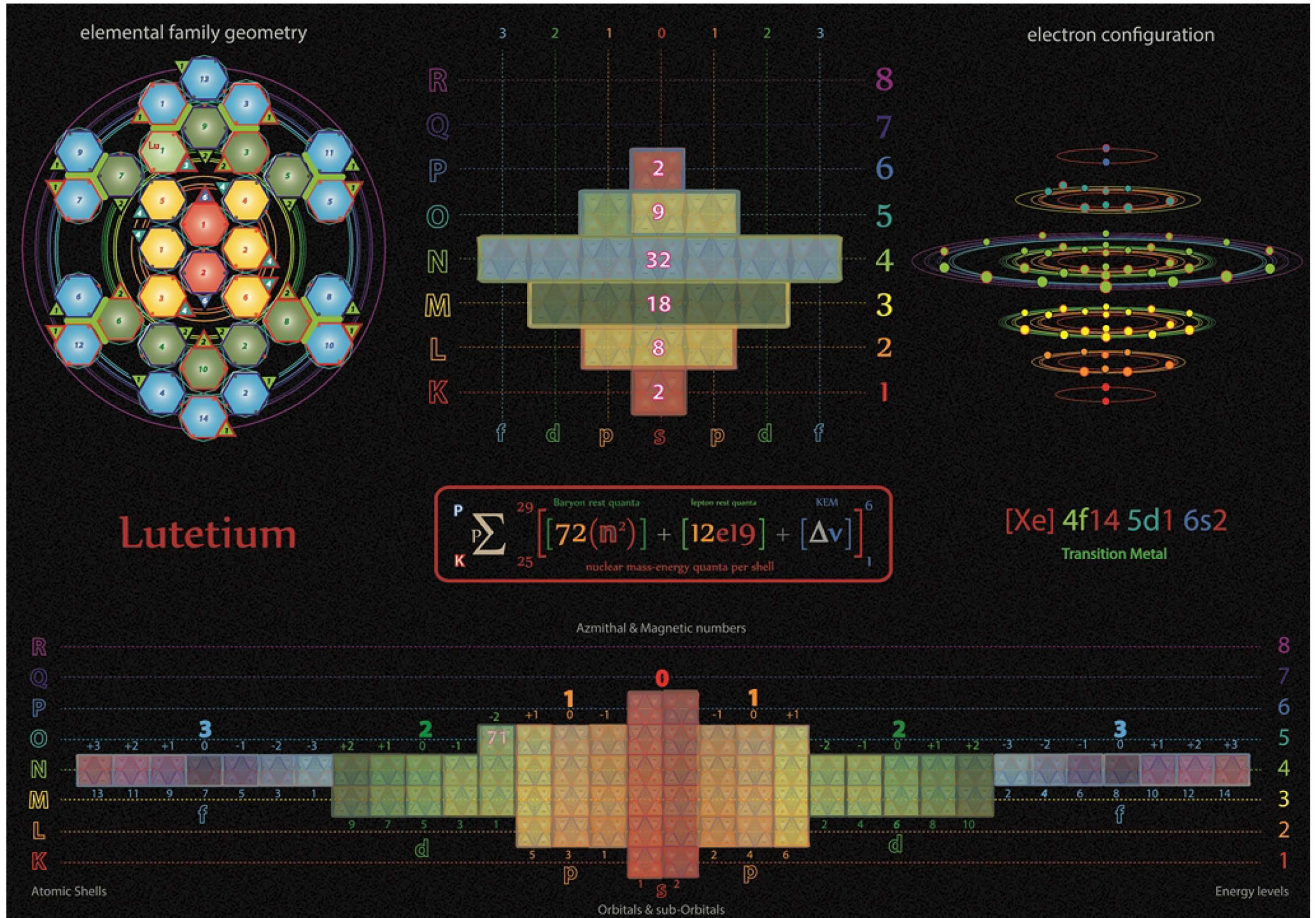
Azimuthal & Magnetic numbers



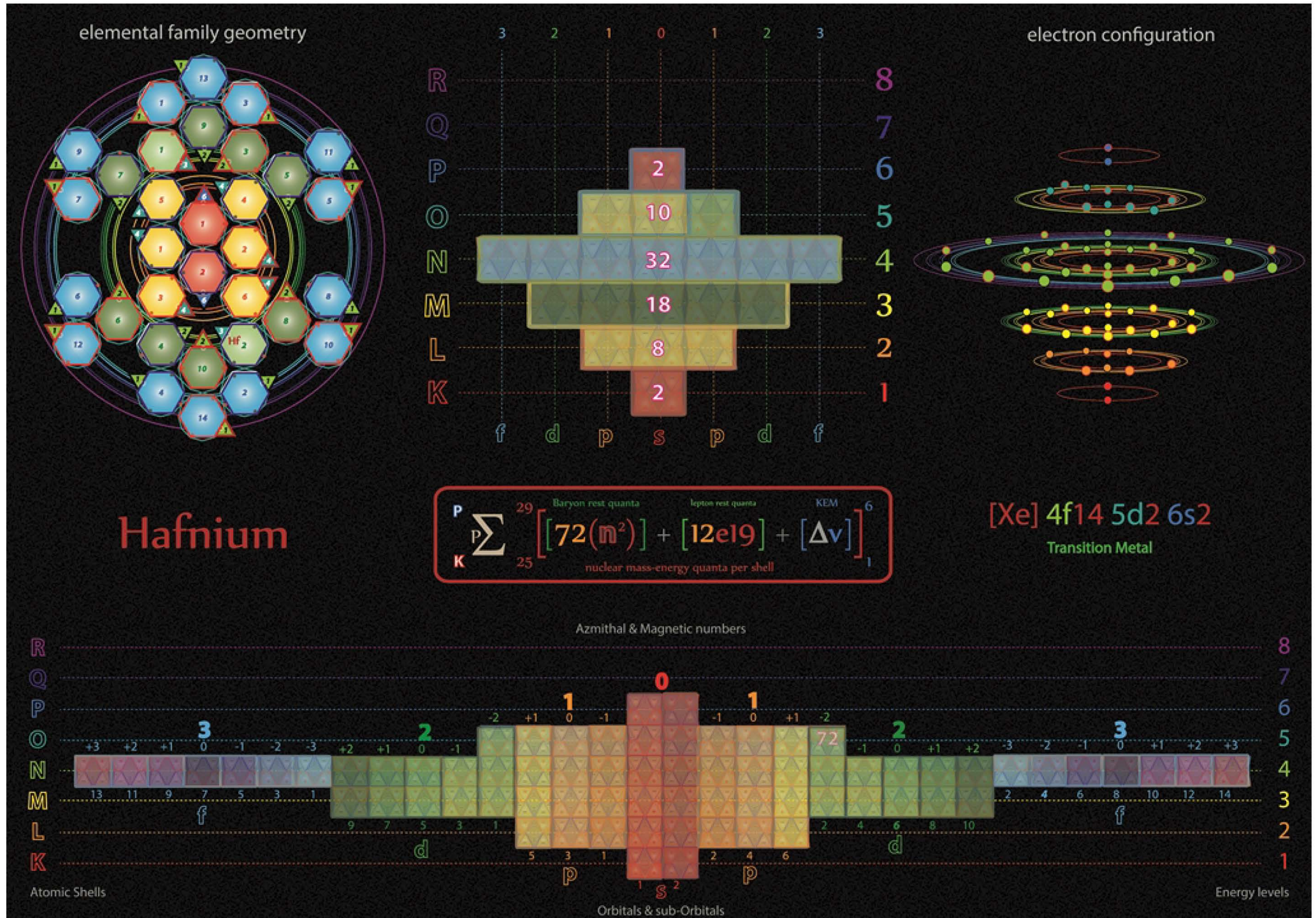
Tetryonics 53.69 - Thullium atomic config



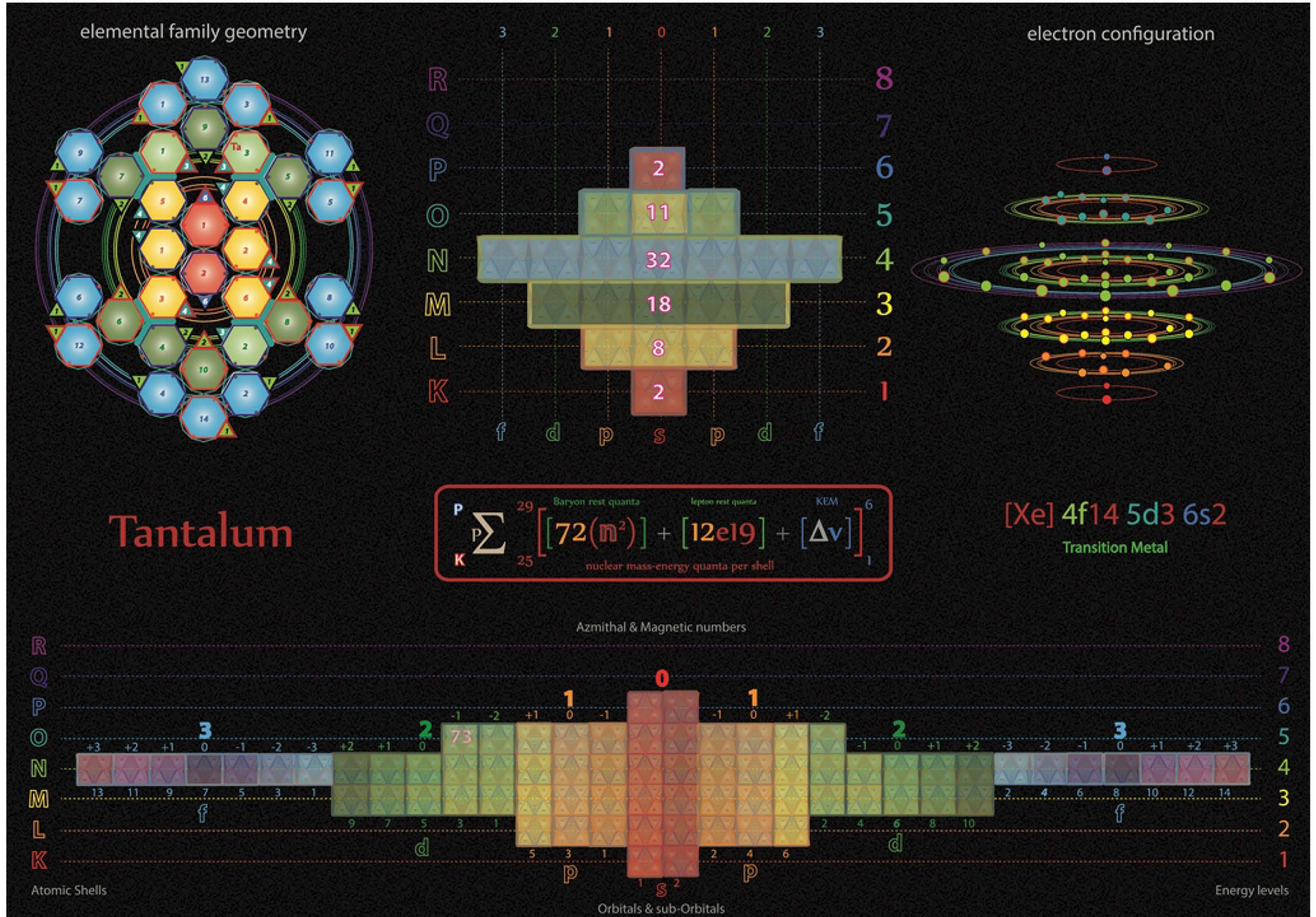
Tetryonics 53.70 - Ytterbium atomic config



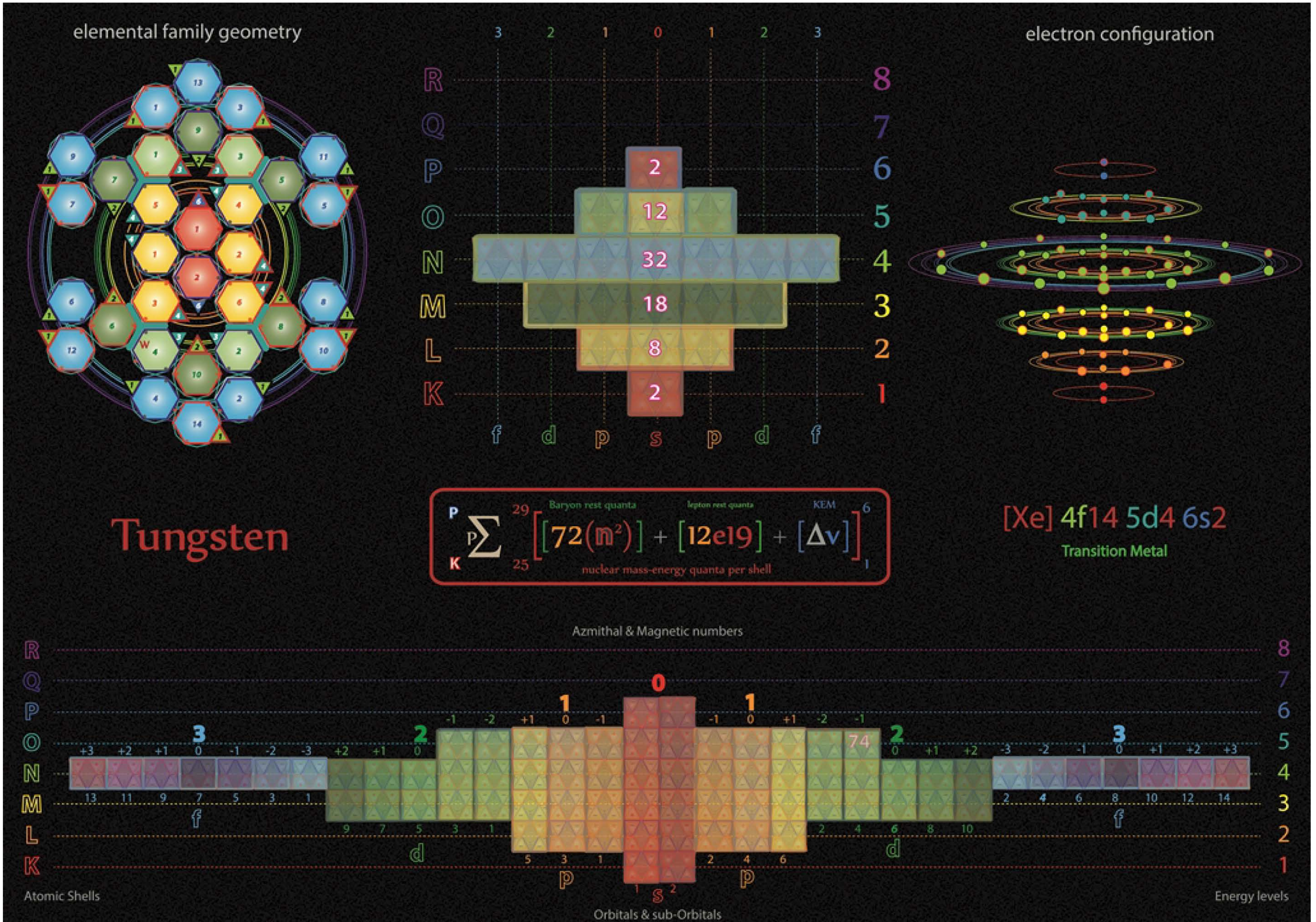
Tetryonics 53.71 - Lutetium atomic config



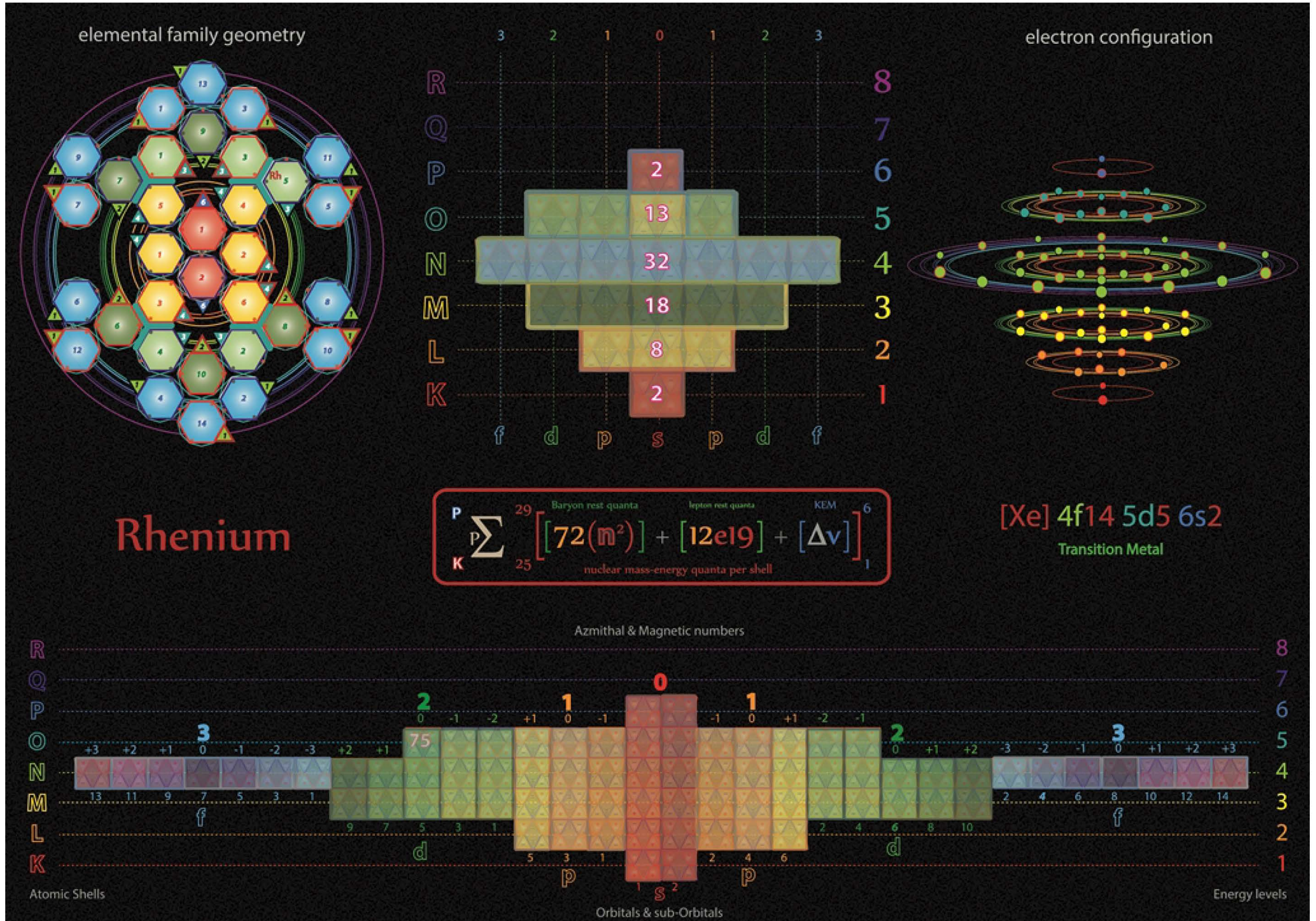
Tetryonics 53.72 - Hafnium atomic config



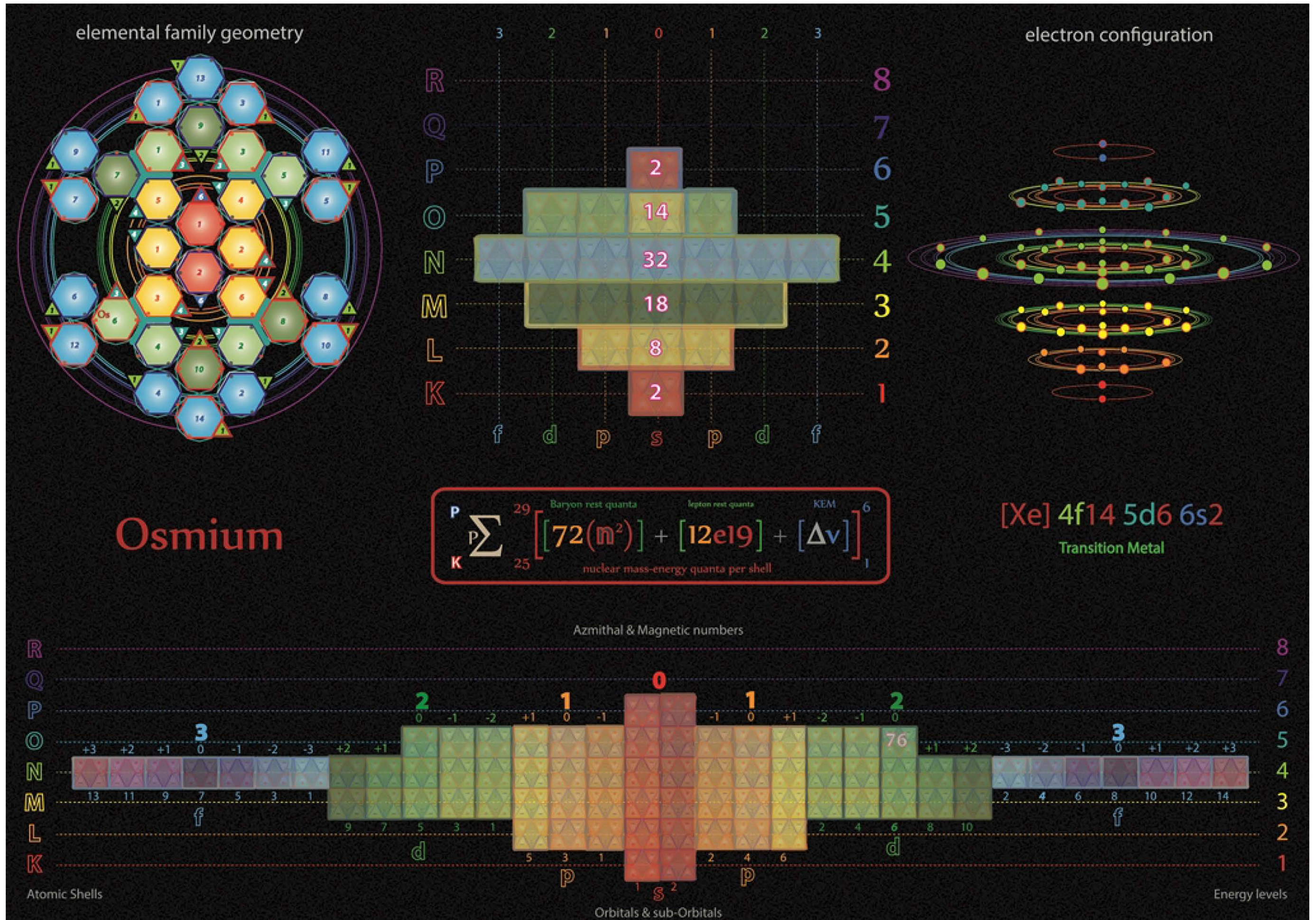
Tetryonics 53.73 - Tantalum atomic config



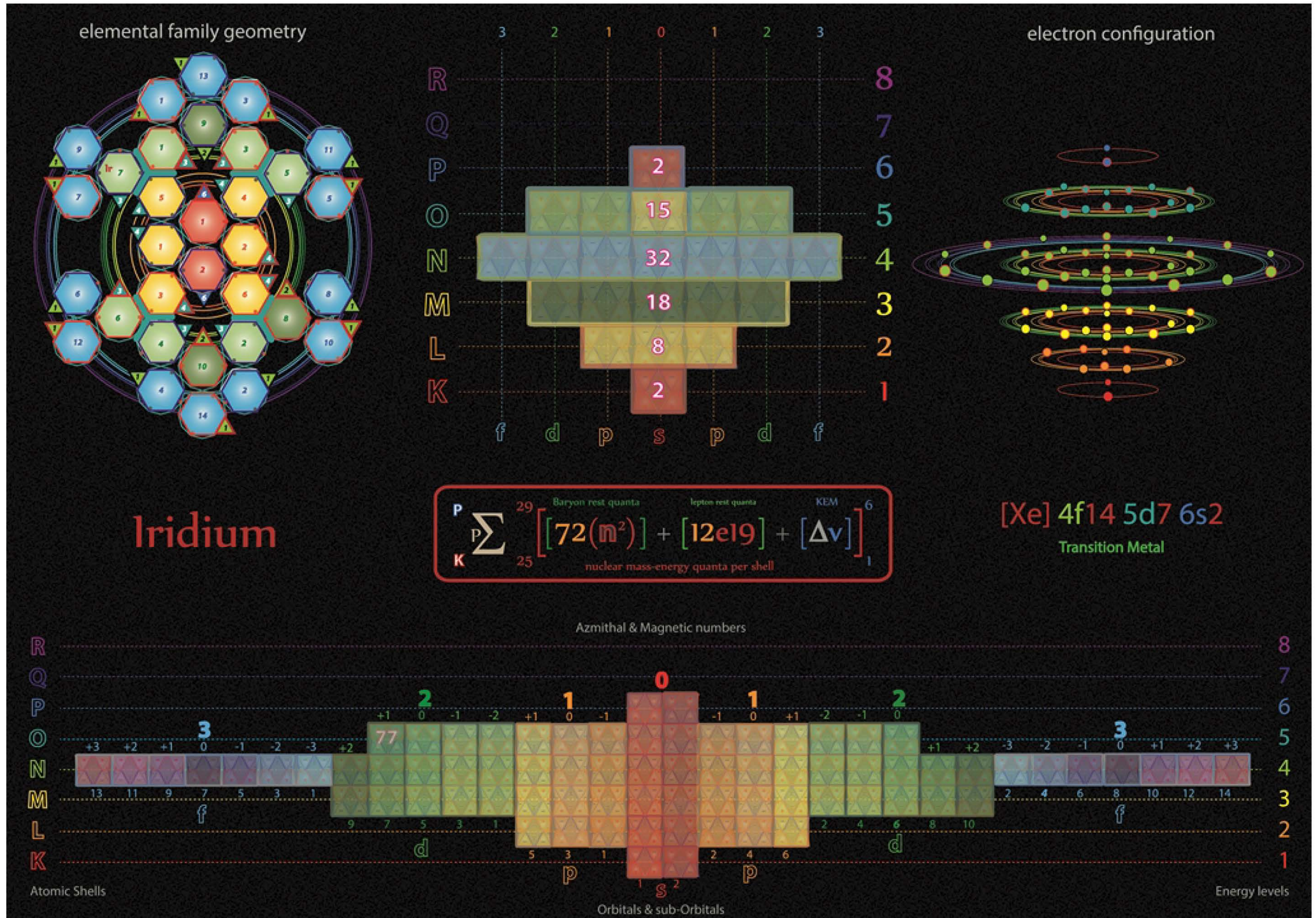
Tetryonics 53.74 - Tungsten atomic config



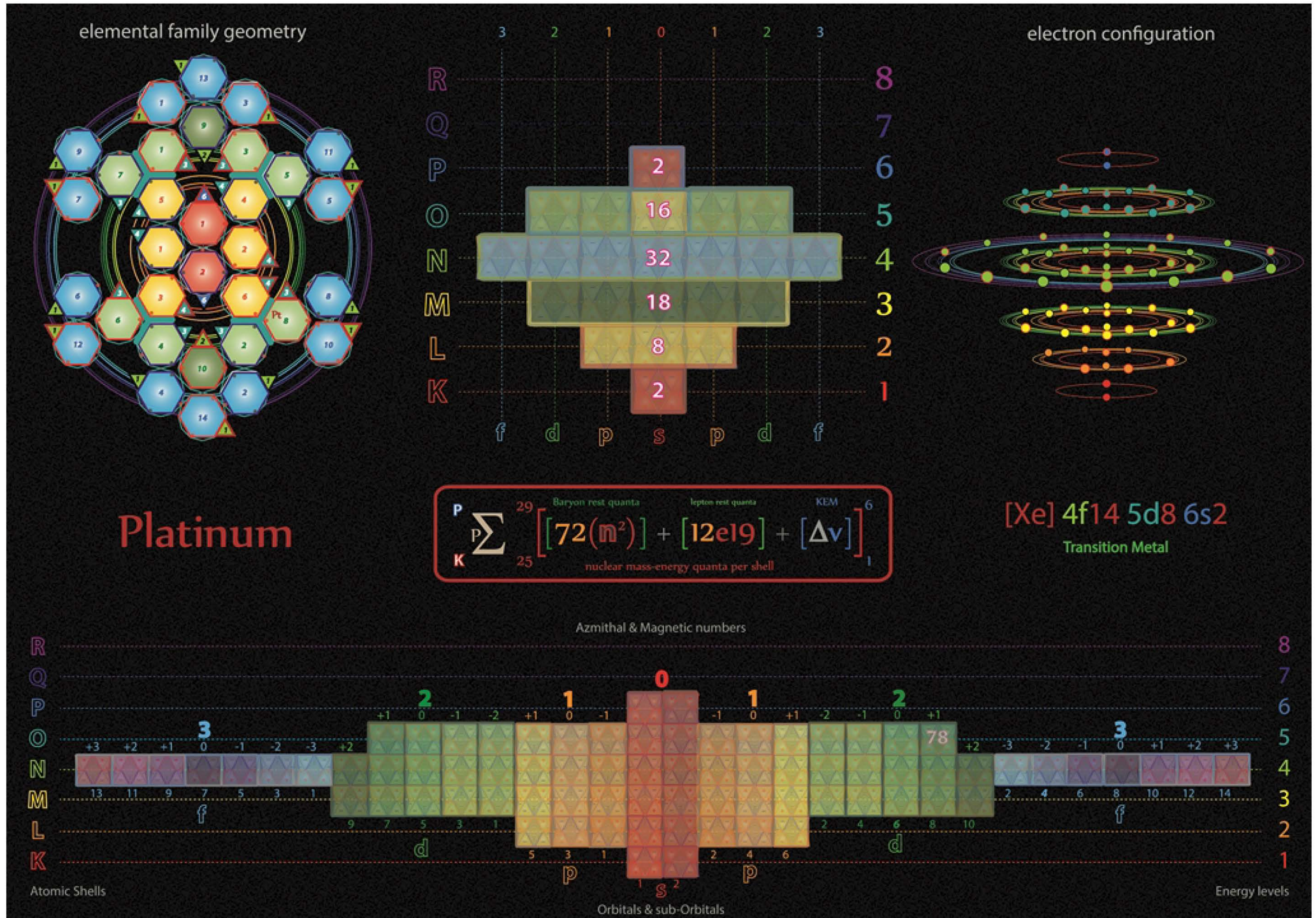
Tetryonics 53.75 - Rhenium atomic config



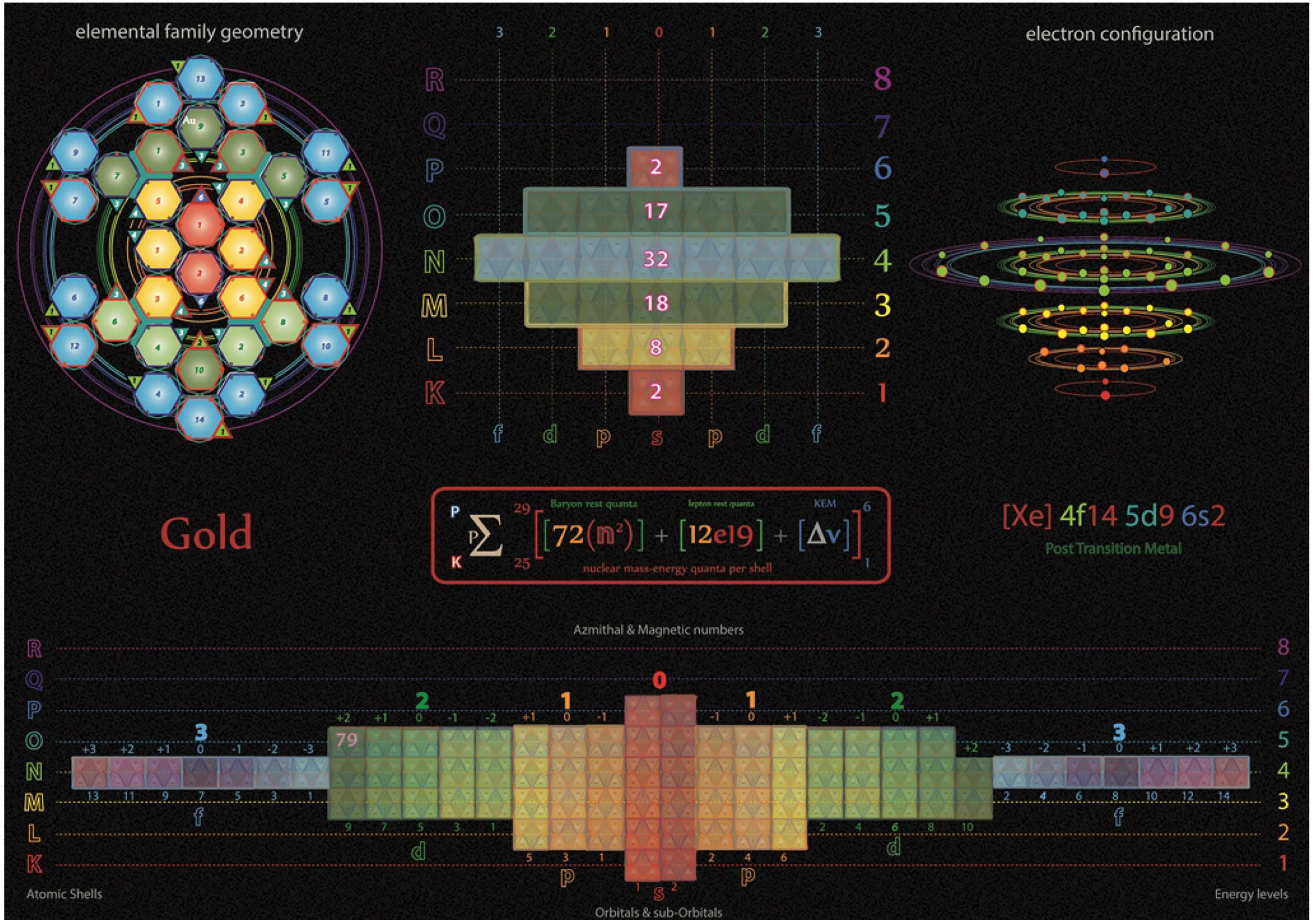
Tetryonics 53.76 - Osmium atomic config



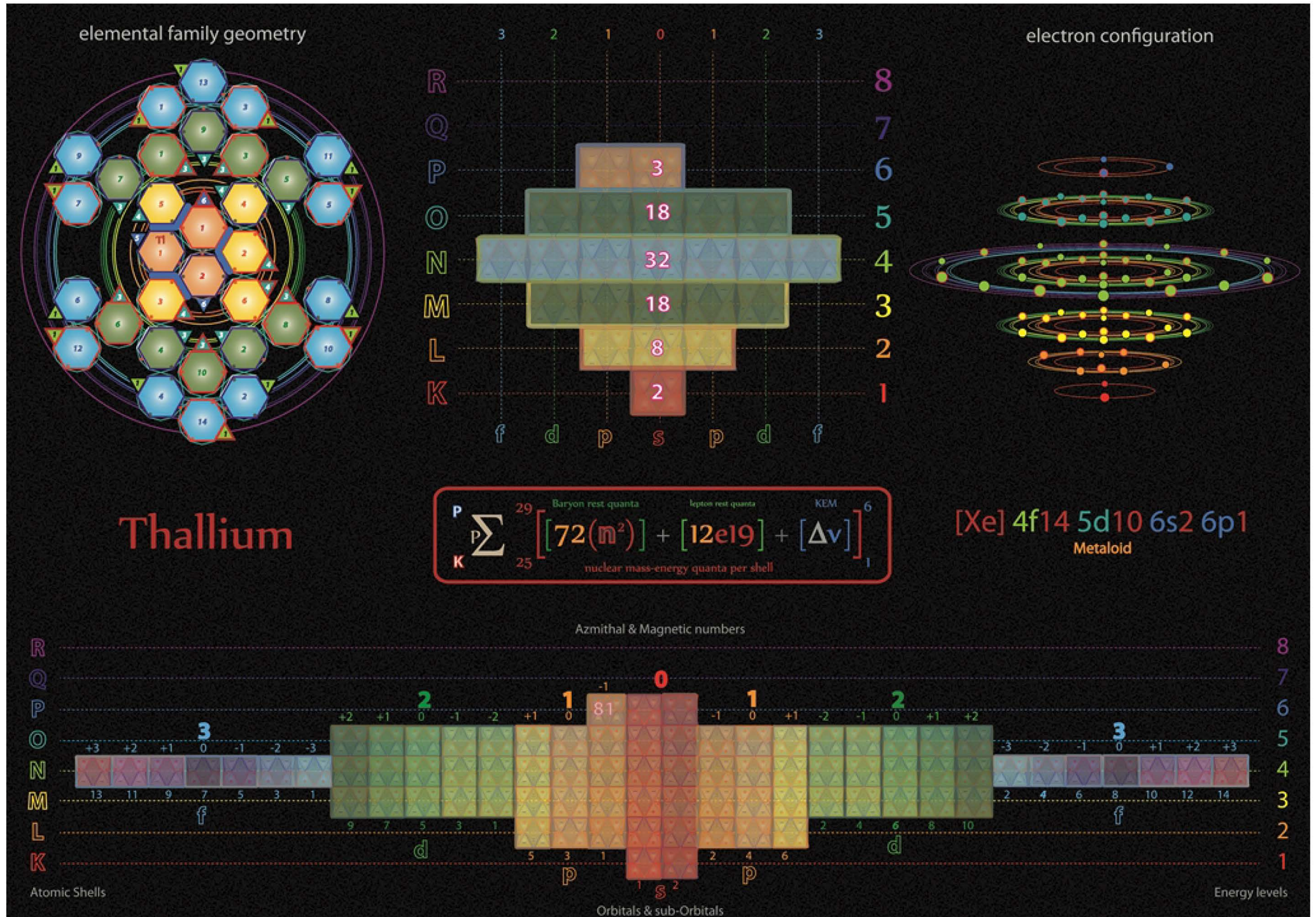
Tetryonics 53.77 - Iridium atomic config



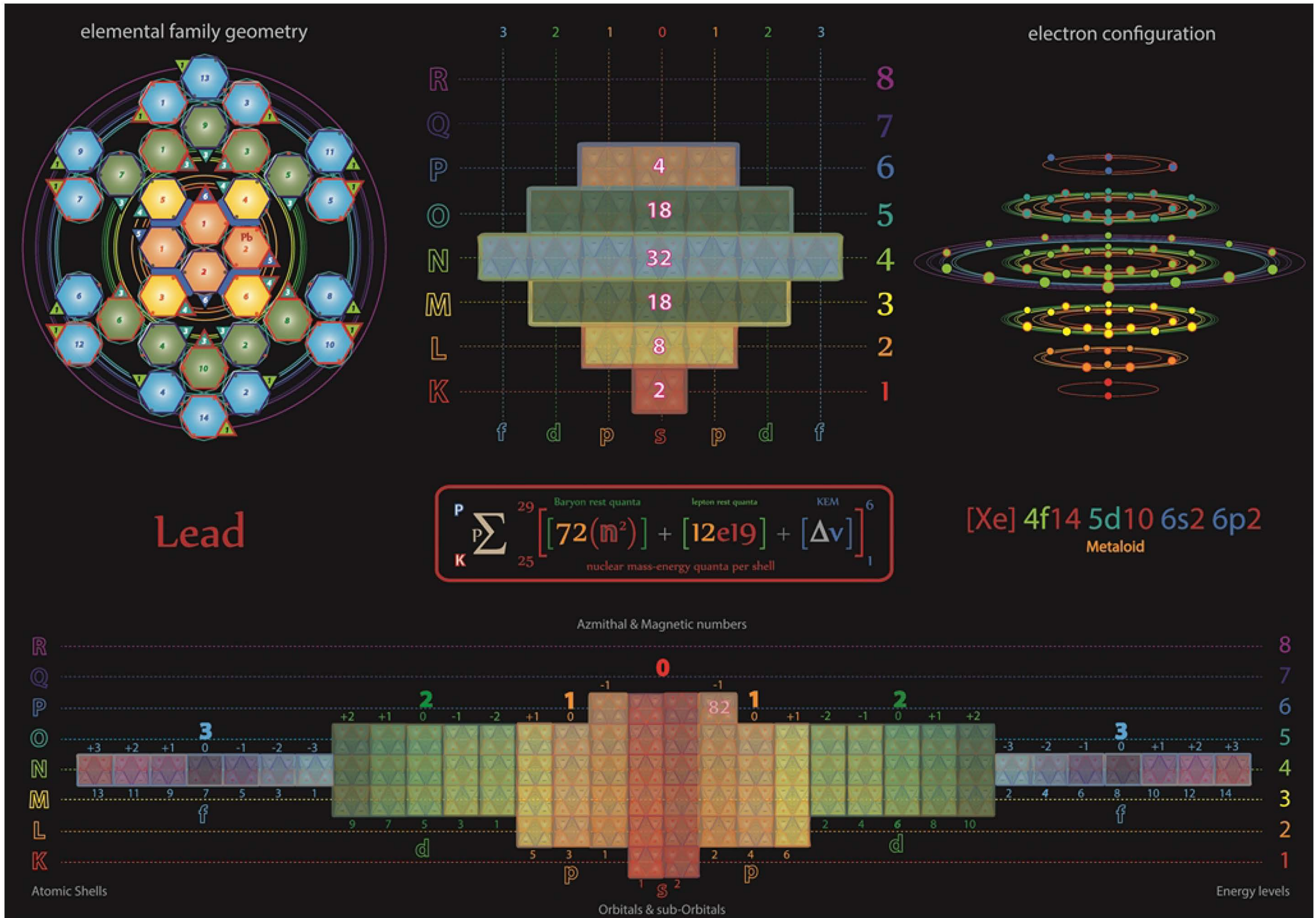
Tetryonics 53.78 - Platinum atomic config



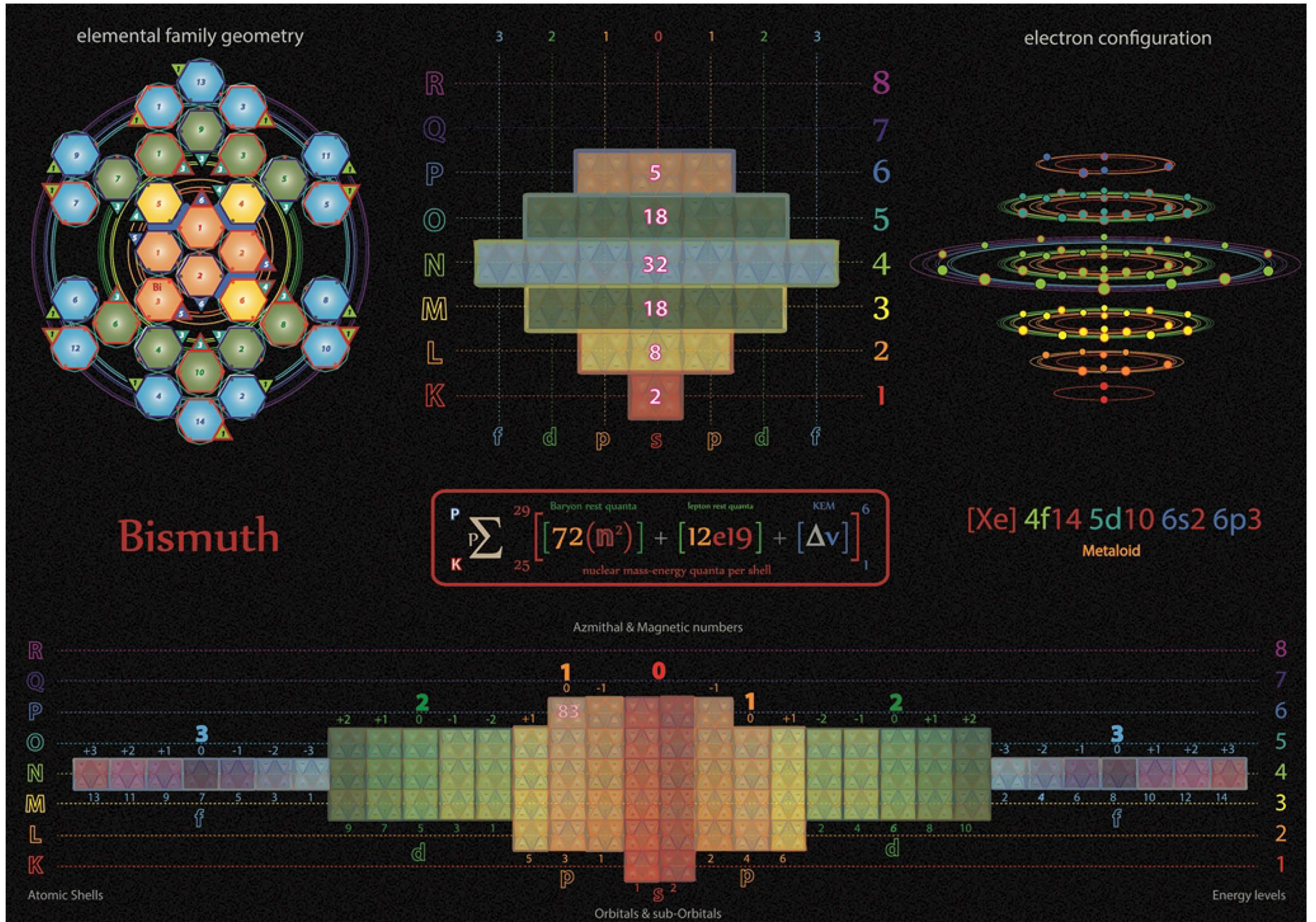
Tetryonics 53.79 - Gold atomic config



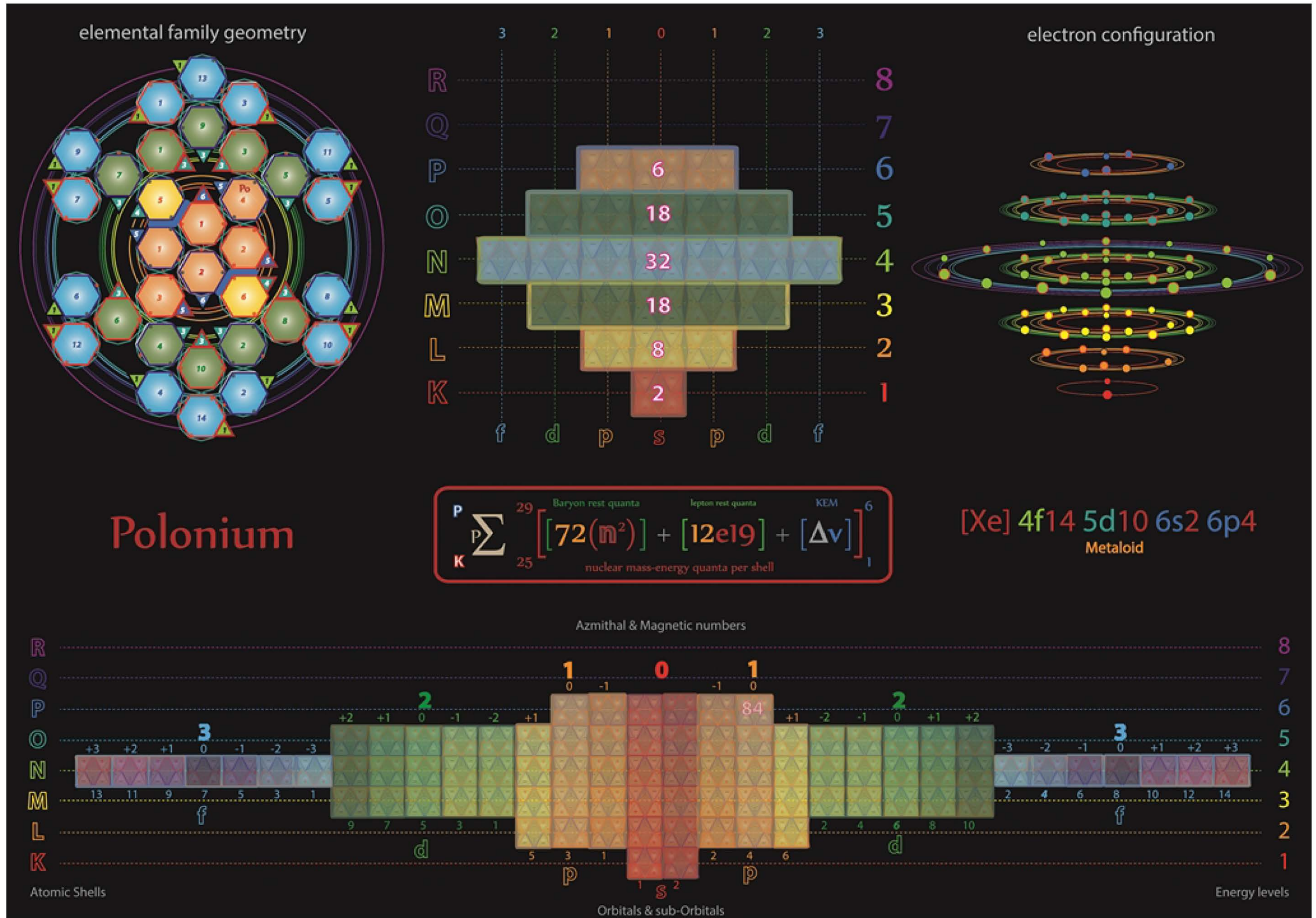
Tetryonics 53.81 - Thallium atomic config



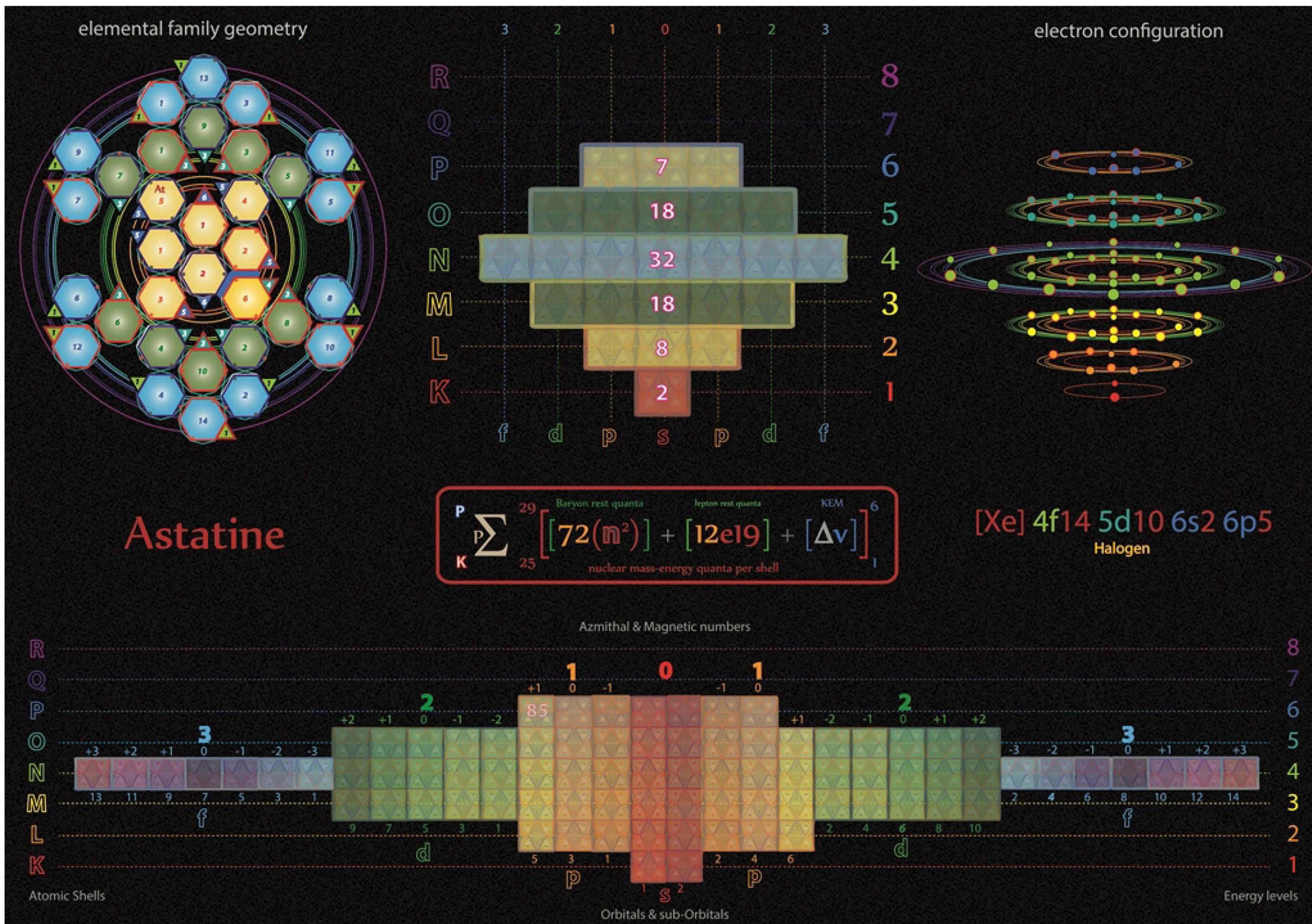
Tetryonics 53.82 - Lead atomic config



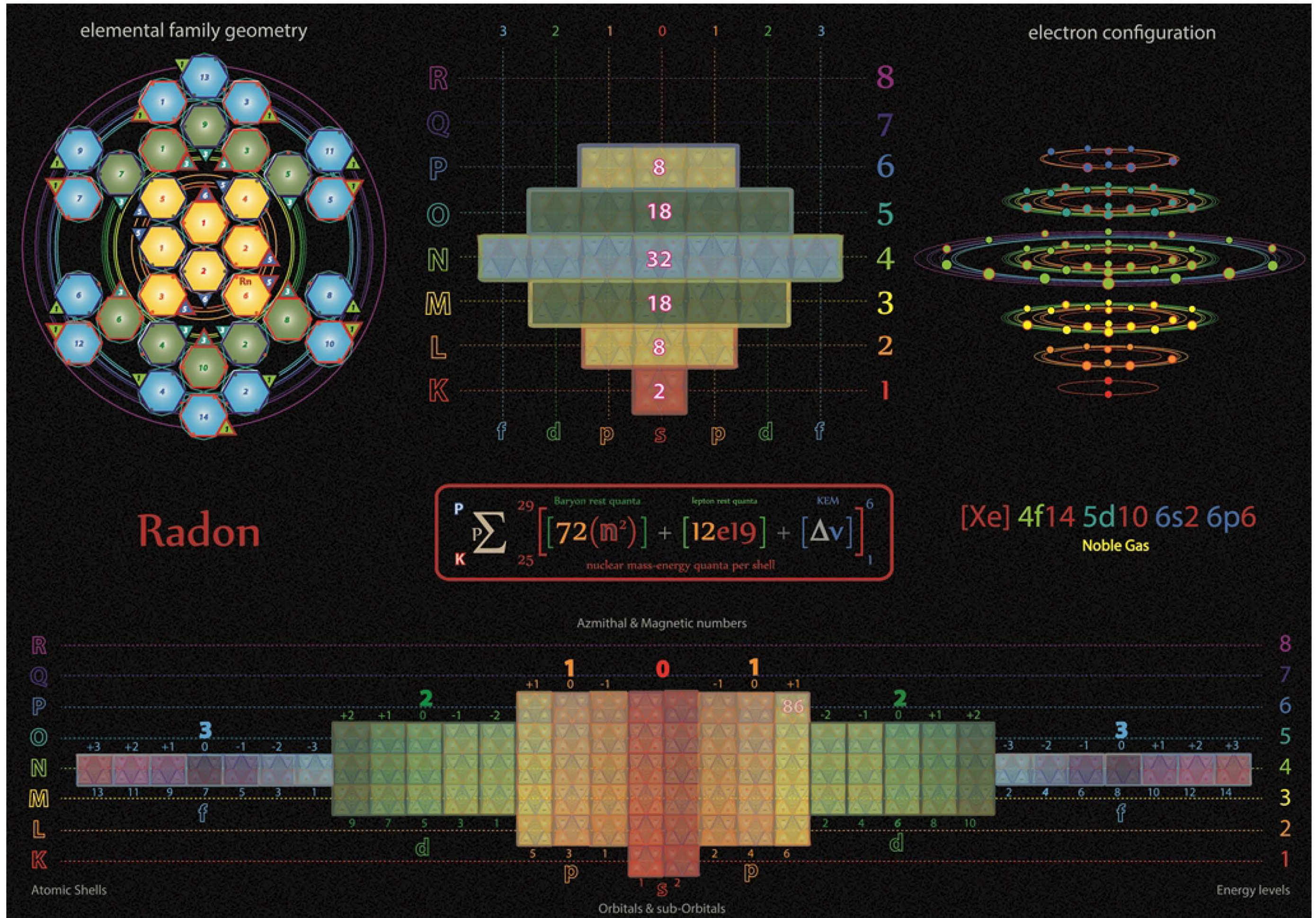
Tetryonics 53.83 - Bismuth atomic config



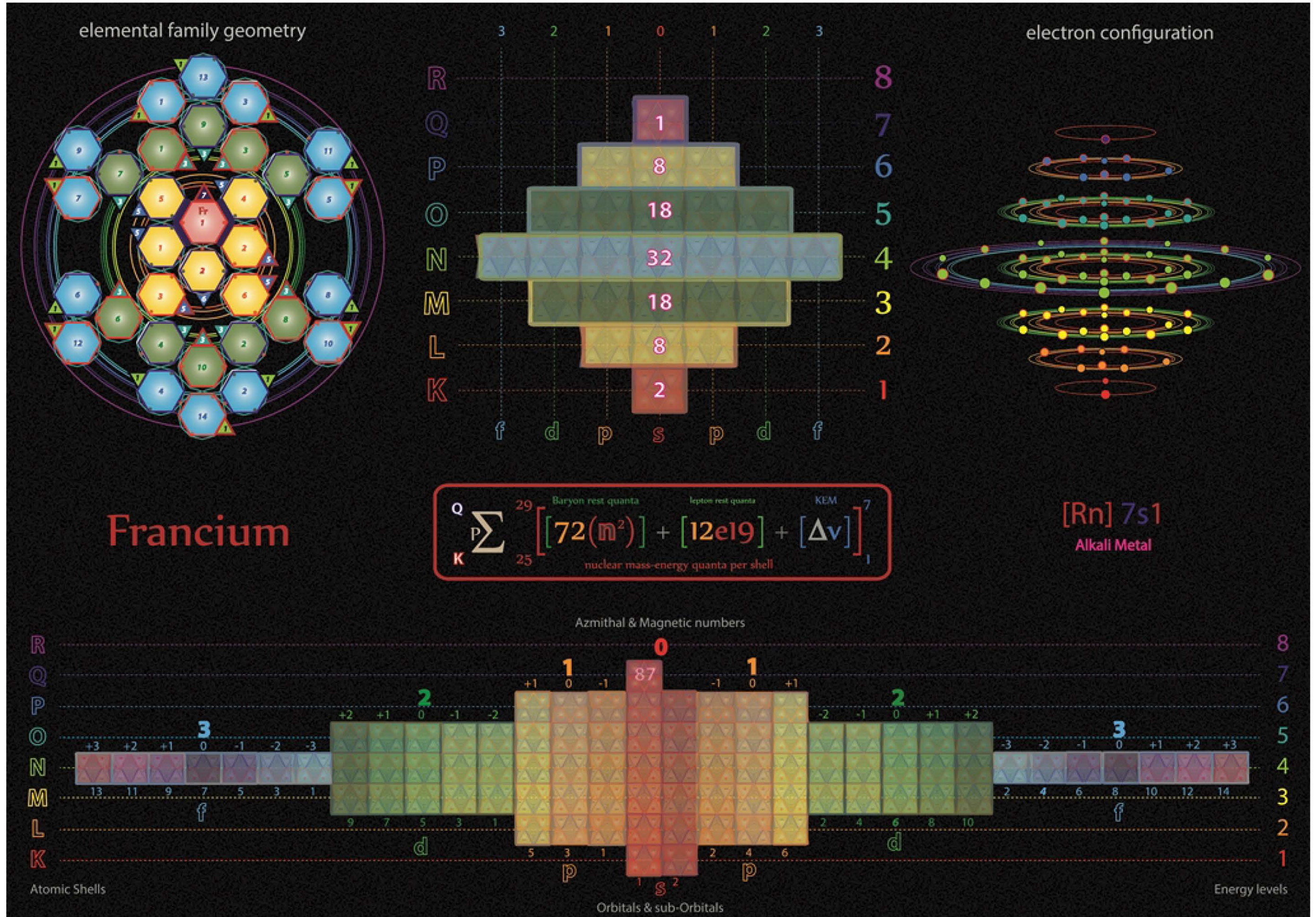
Tetryonics 53.84 - Polonium atomic config



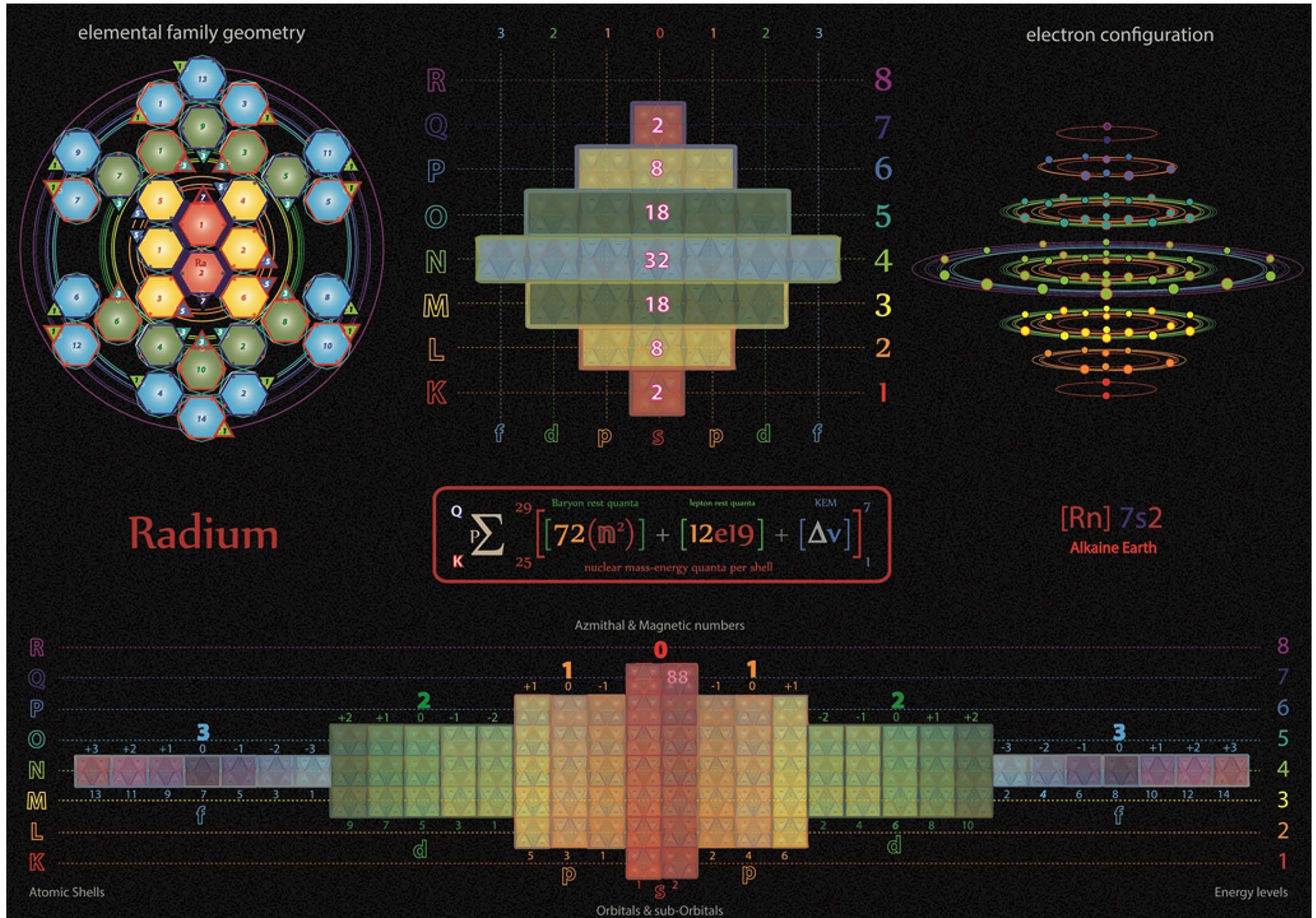
Tetryonics 53.85 - Astatine atomic config



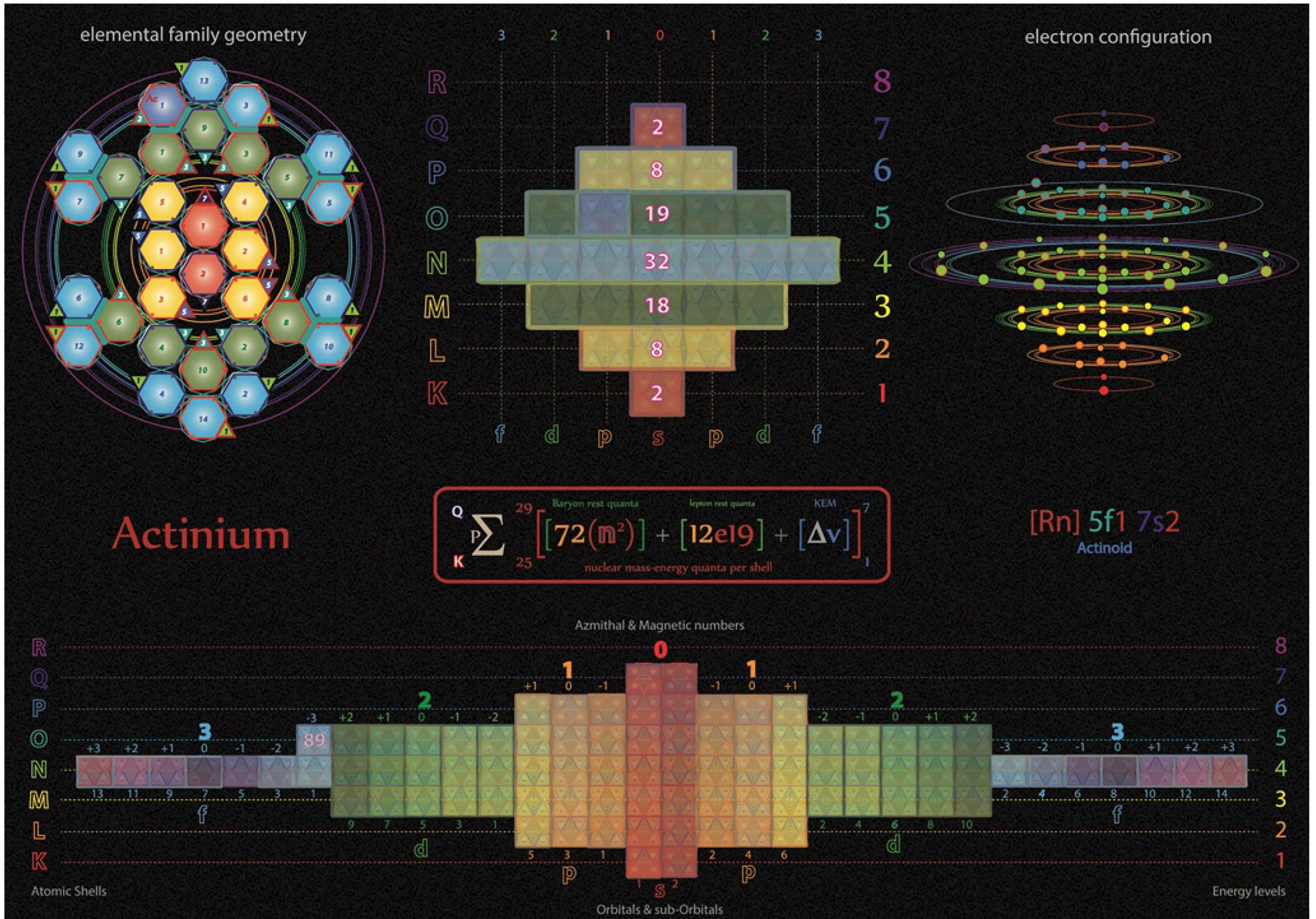
Tetryonics 53.86 - Radon atomic config



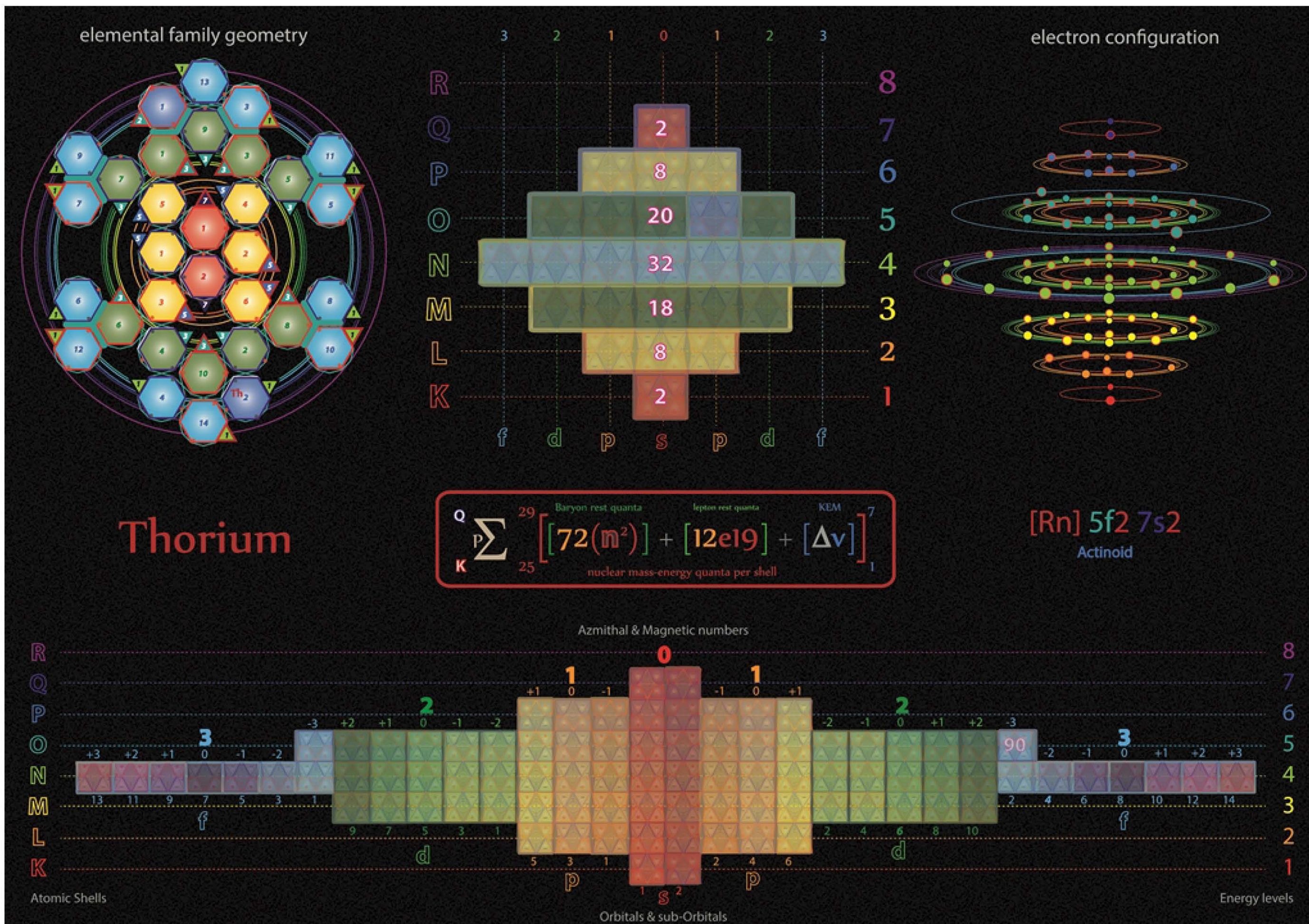
Tetryonics 53.87 - Francium atomic config



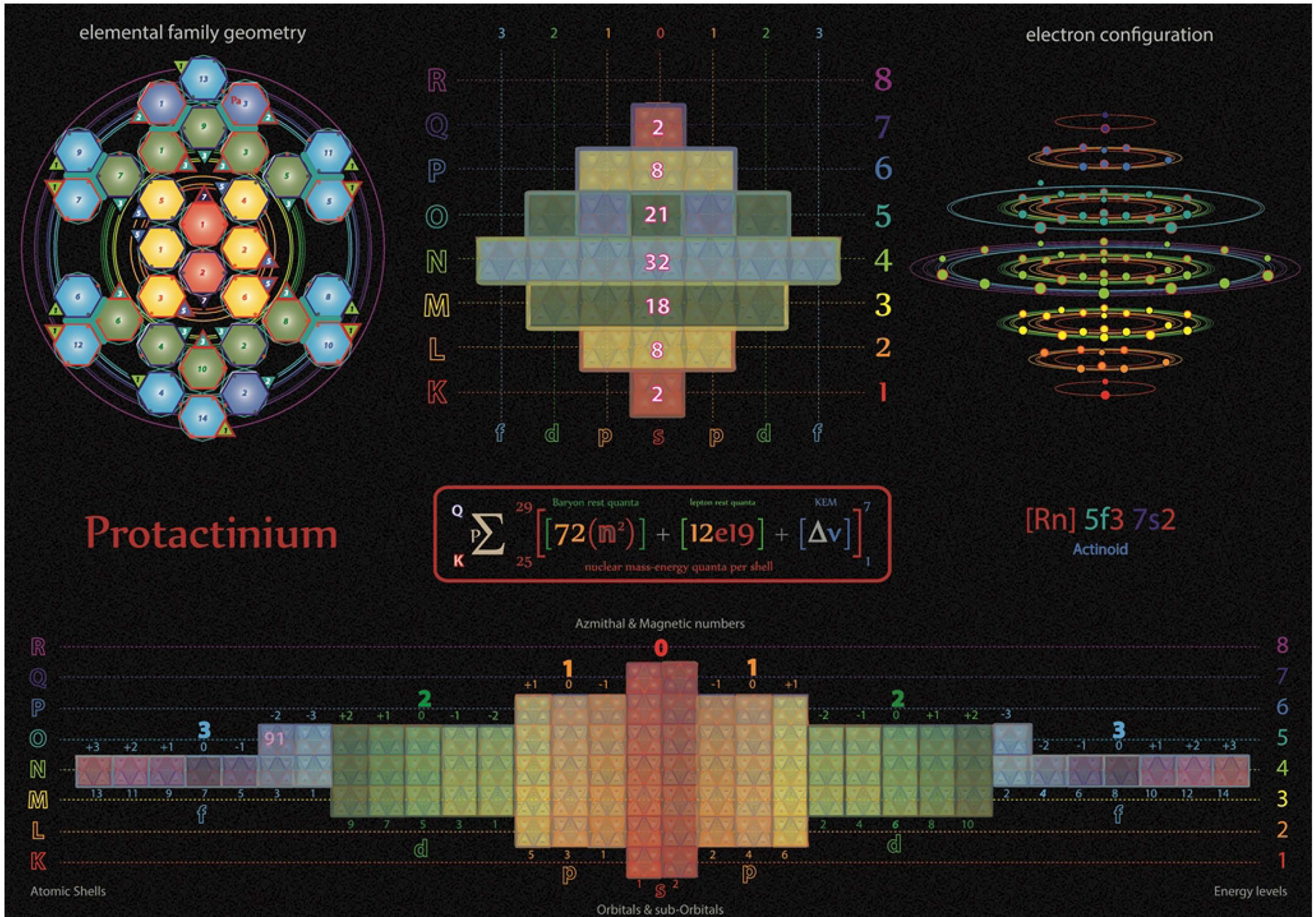
Tetryonics 53.88 - Radium atomic config



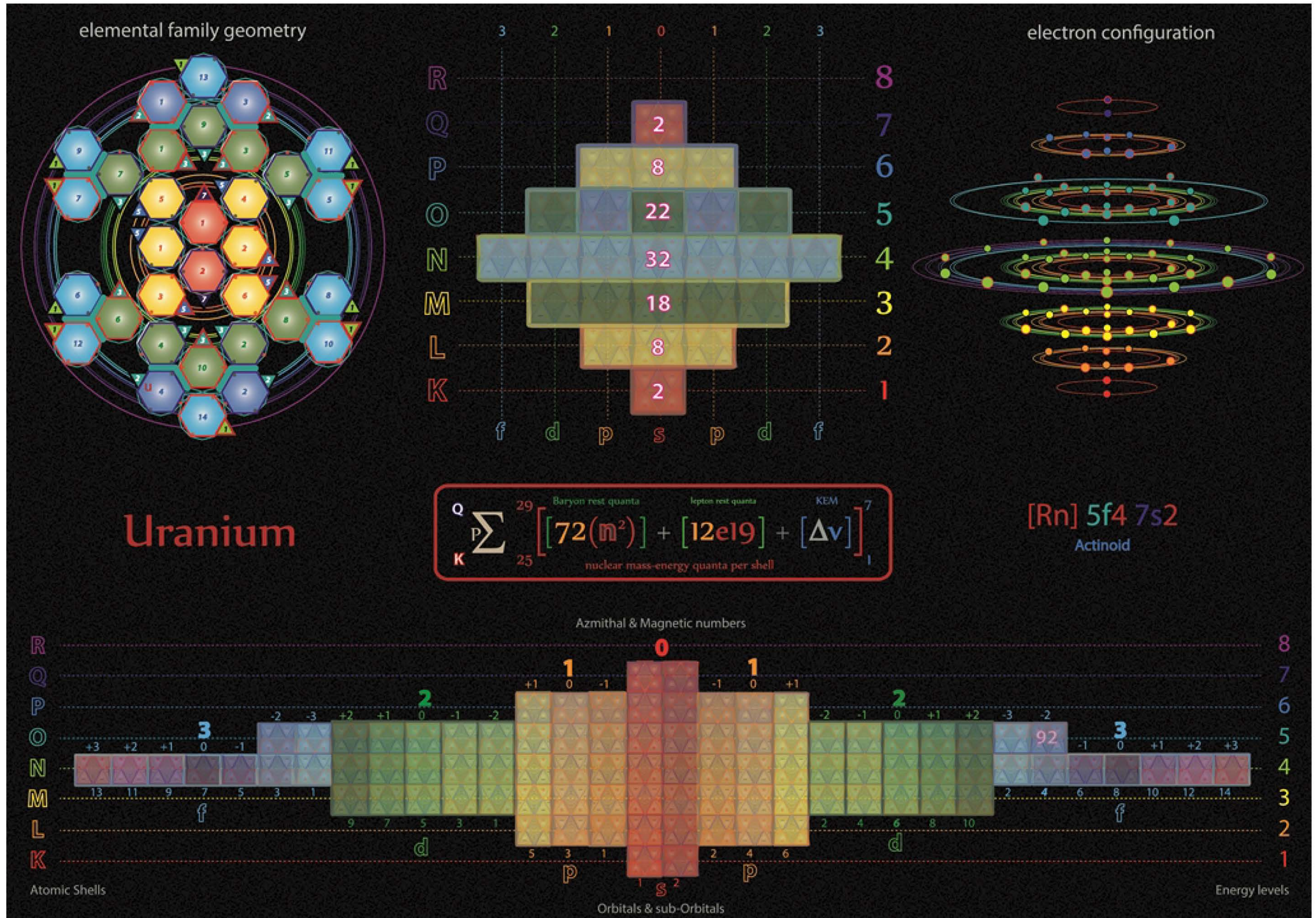
Tetryonics 53.89 - Actinium atomic config



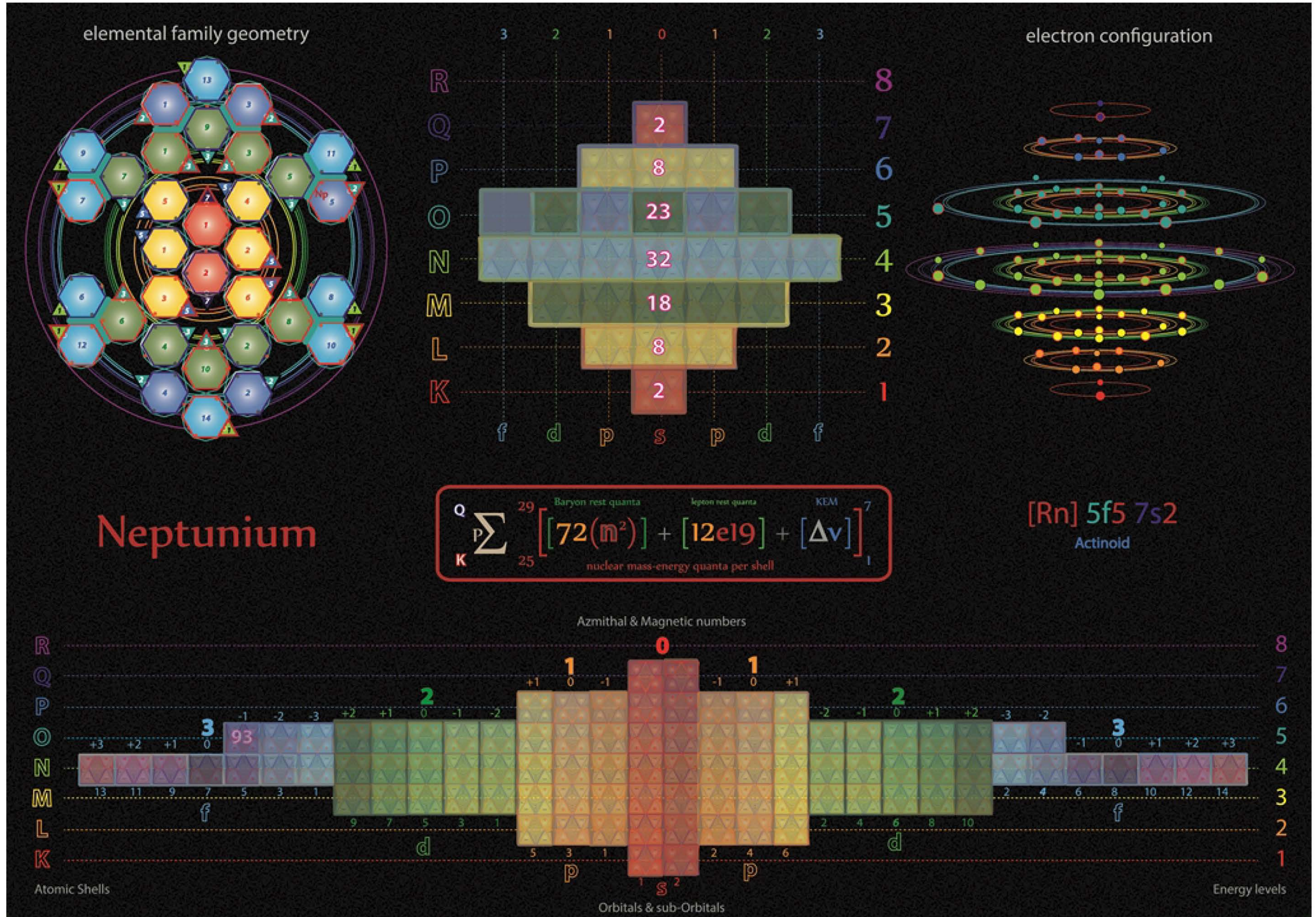
Tetryonics 53.90 - Thorium atomic config



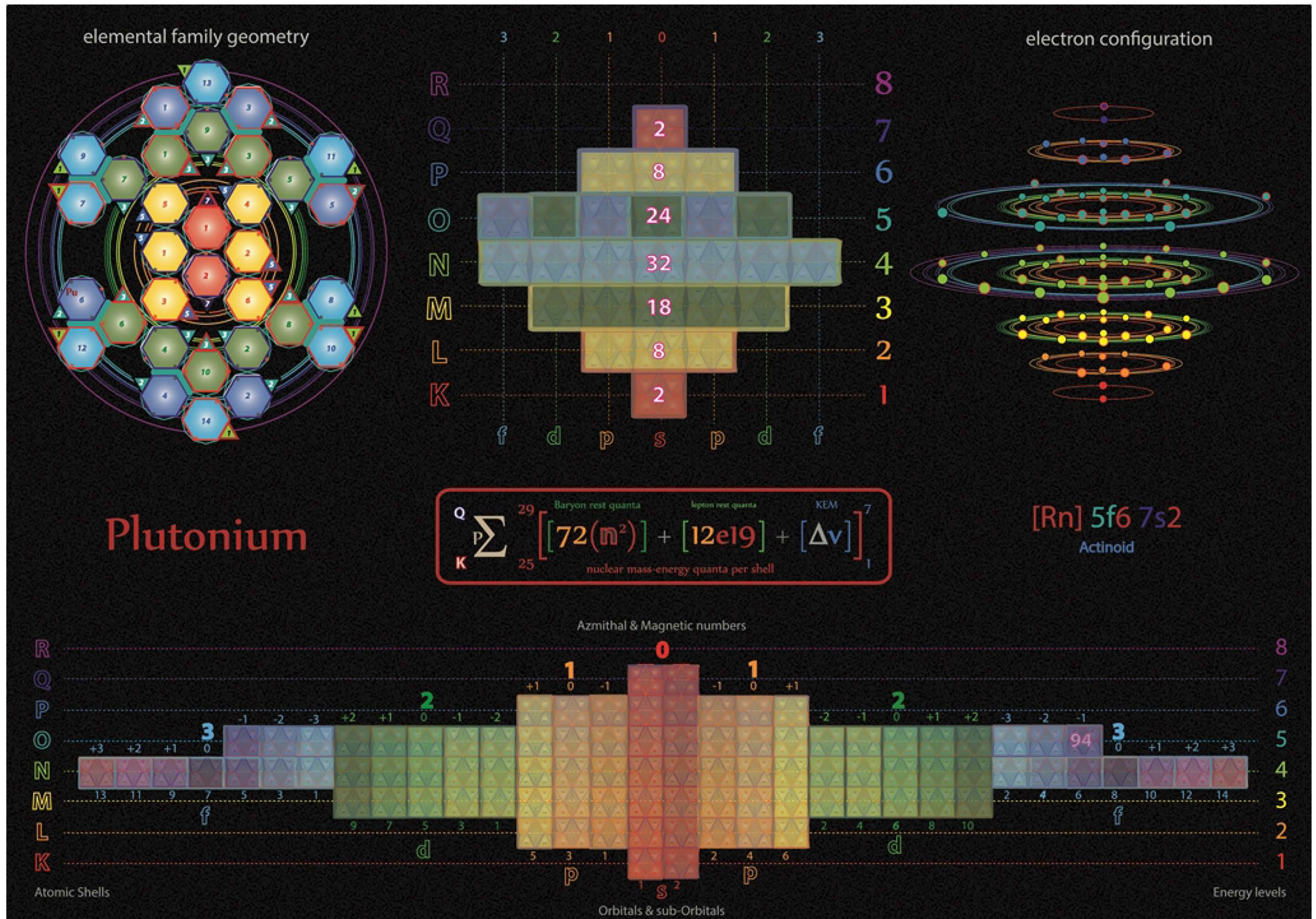
Tetryonics 53.91 - Protactinium atomic config



Tetryonics 53.92 - Uranium atomic config



Tetryonics 53.93 - Neptunium atomic config



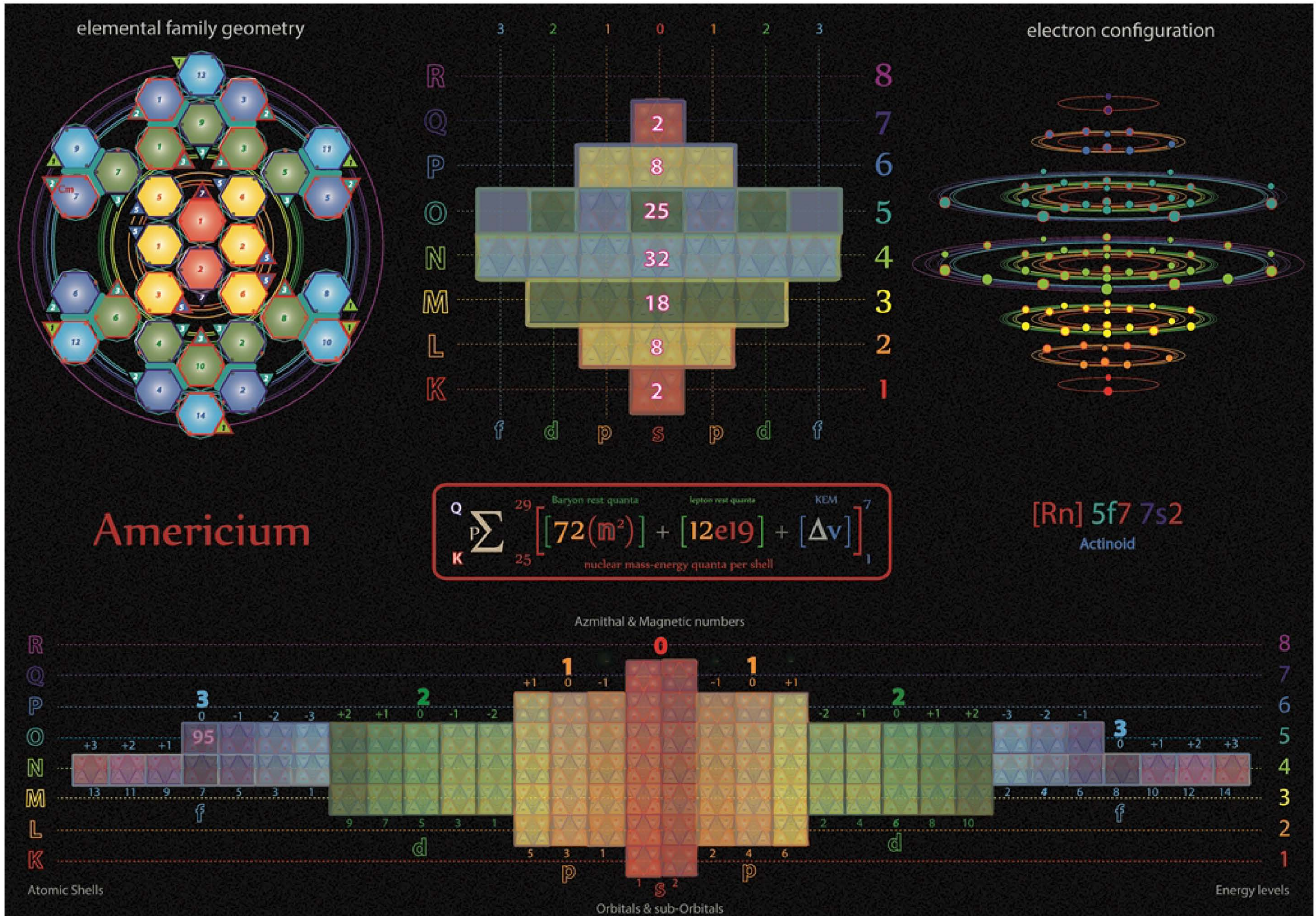
Plutonium

$$\sum_{K=25}^Q P \left[72(m^2) + [12e19] + [\Delta v]_I^7 \right]$$

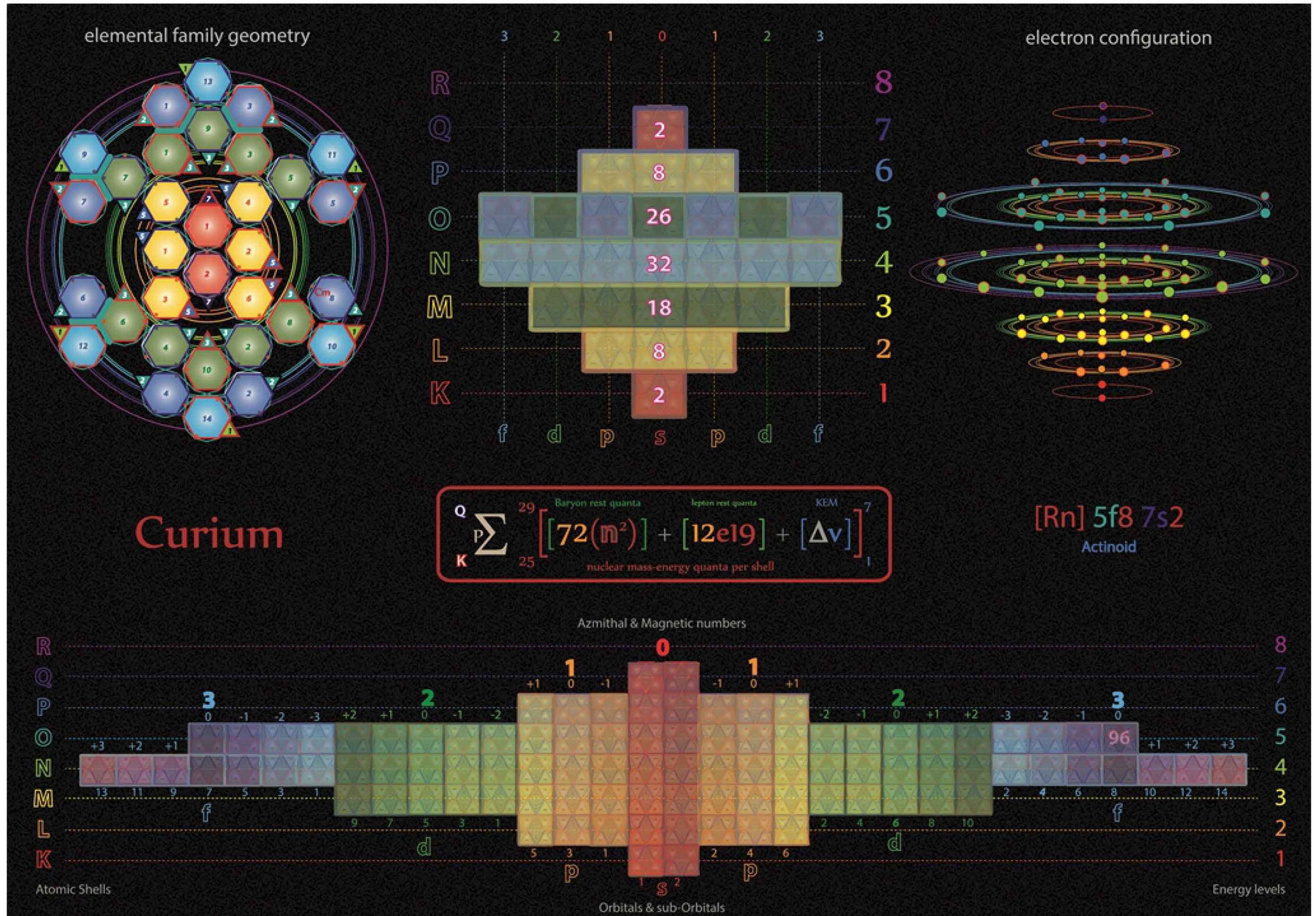
Baryon rest quanta Lepton rest quanta KEM nuclear mass-energy quanta per shell



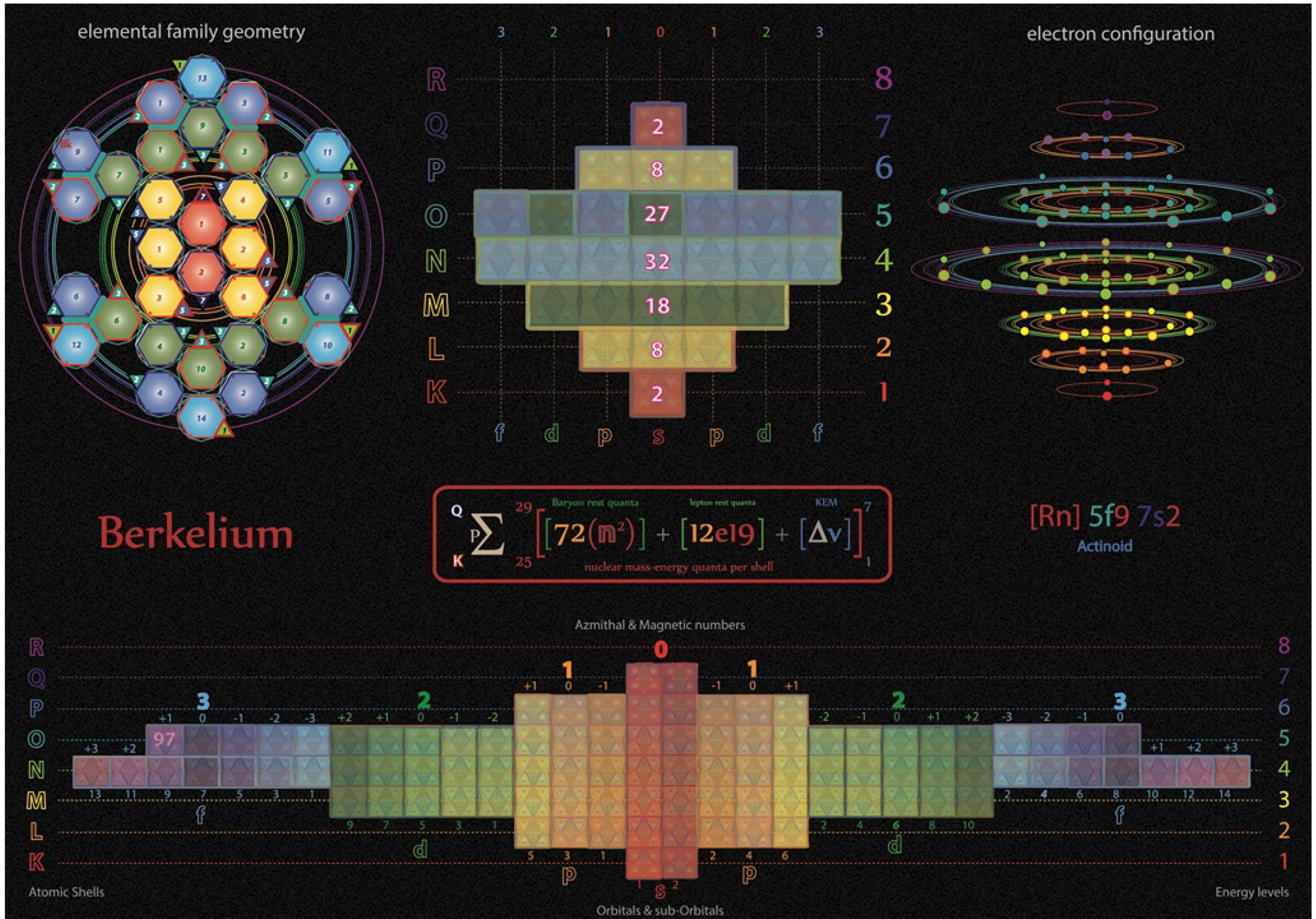
Tetryonics 53.94 - Plutonium atomic config



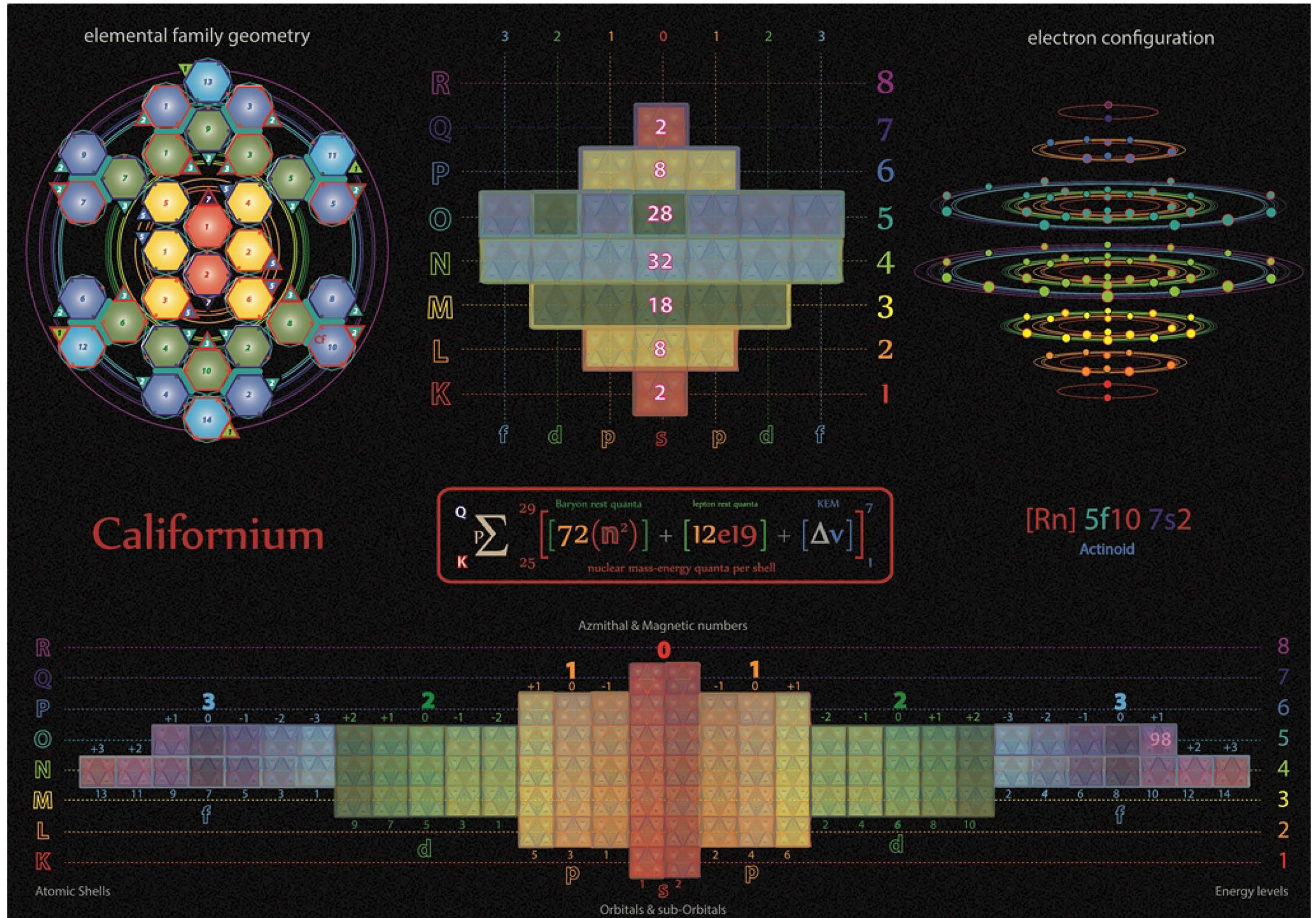
Tetryonics 53.95 - Americium atomic config



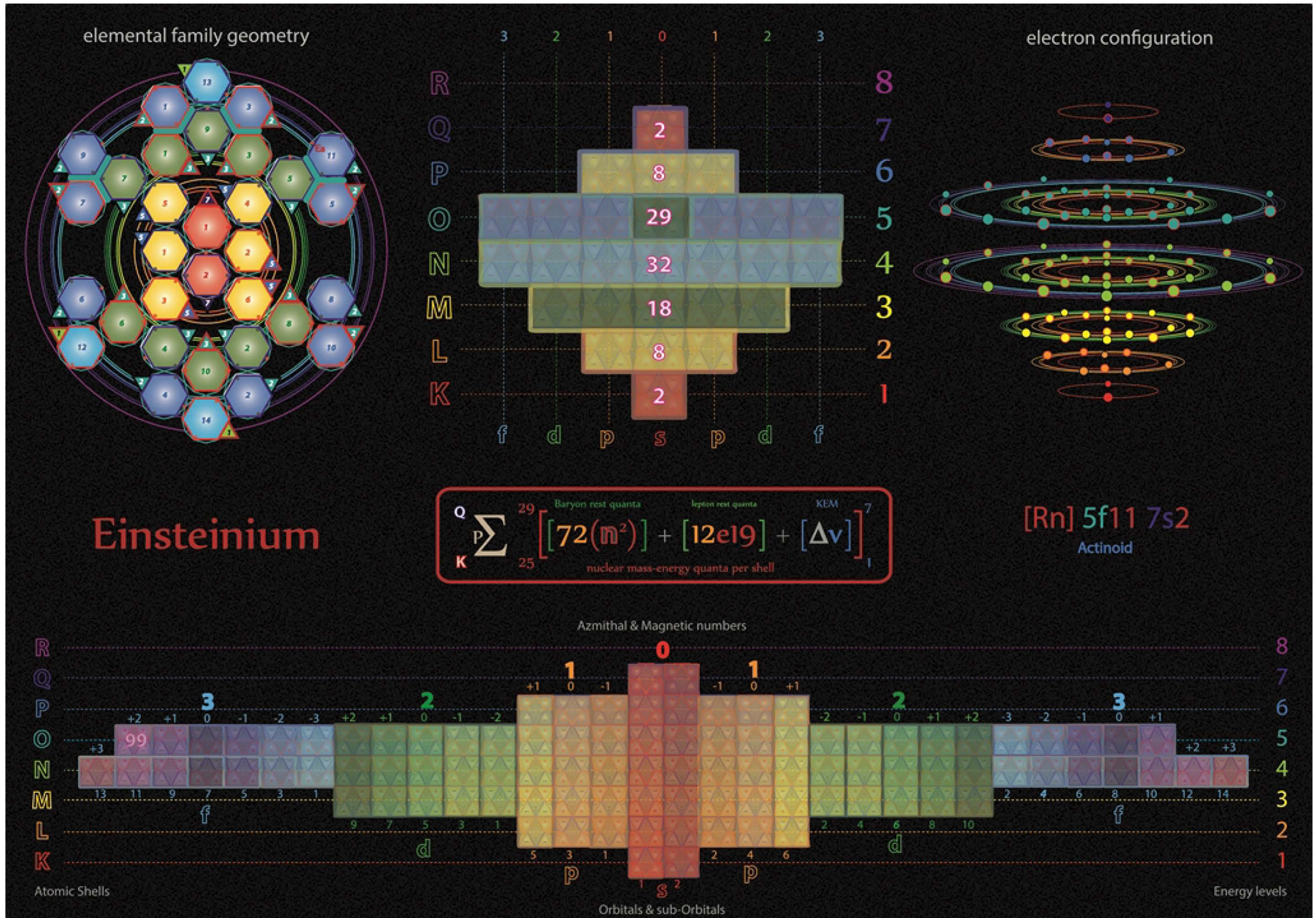
Tetryonics 53.96 - Curium atomic config



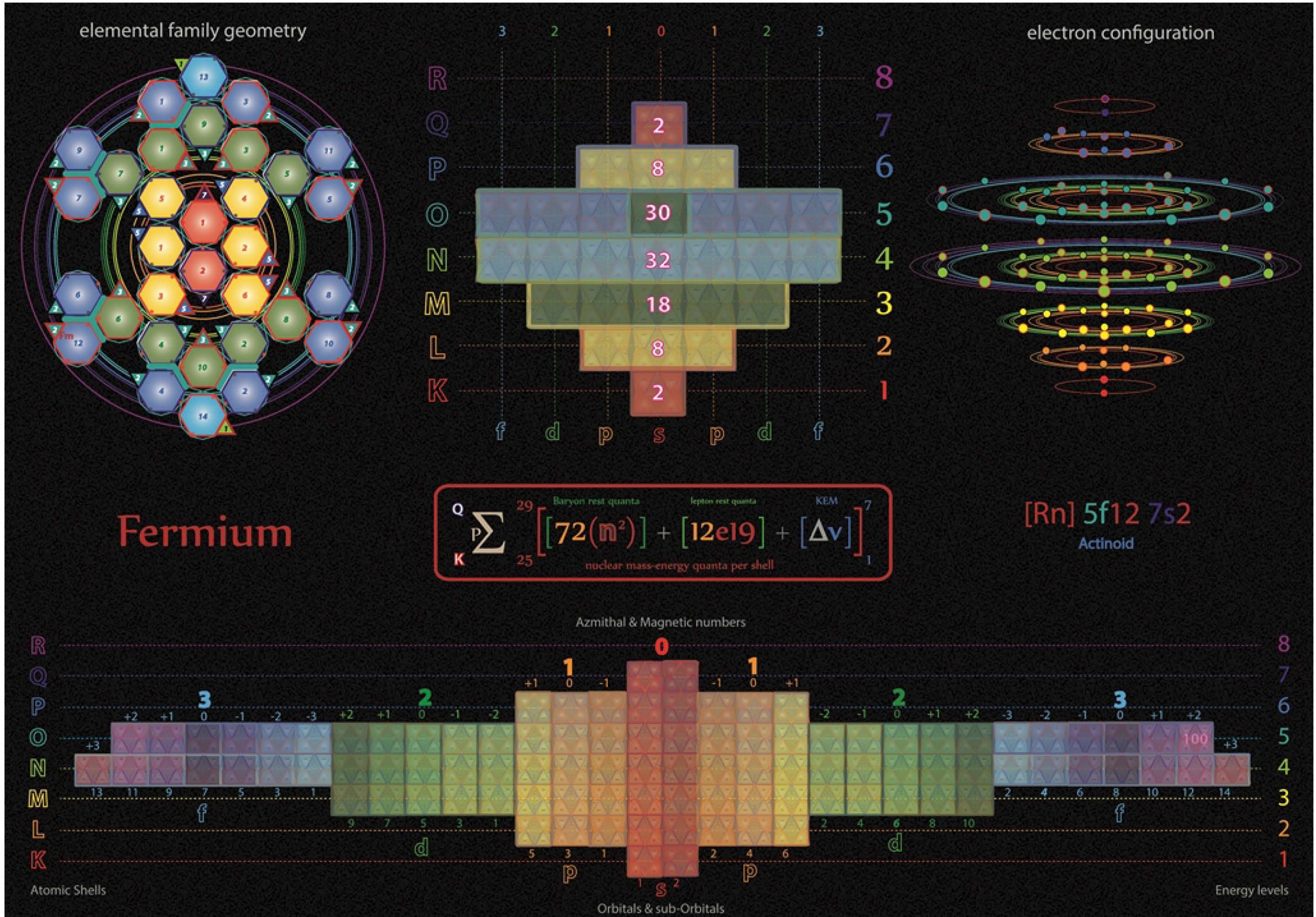
Tetryonics 53.97 - Berkelium atomic config



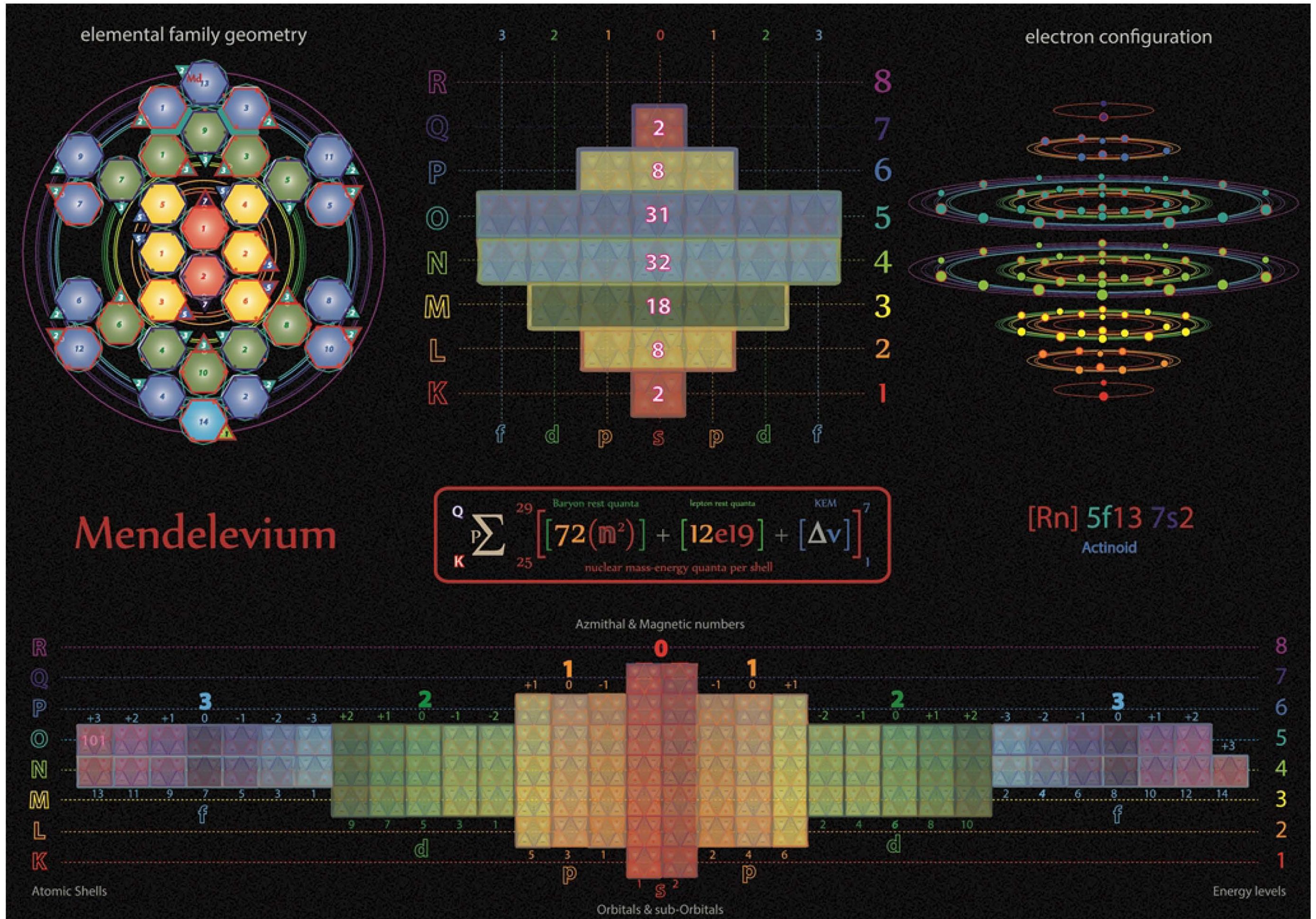
Tetryonics 53.98 - Californium atomic config



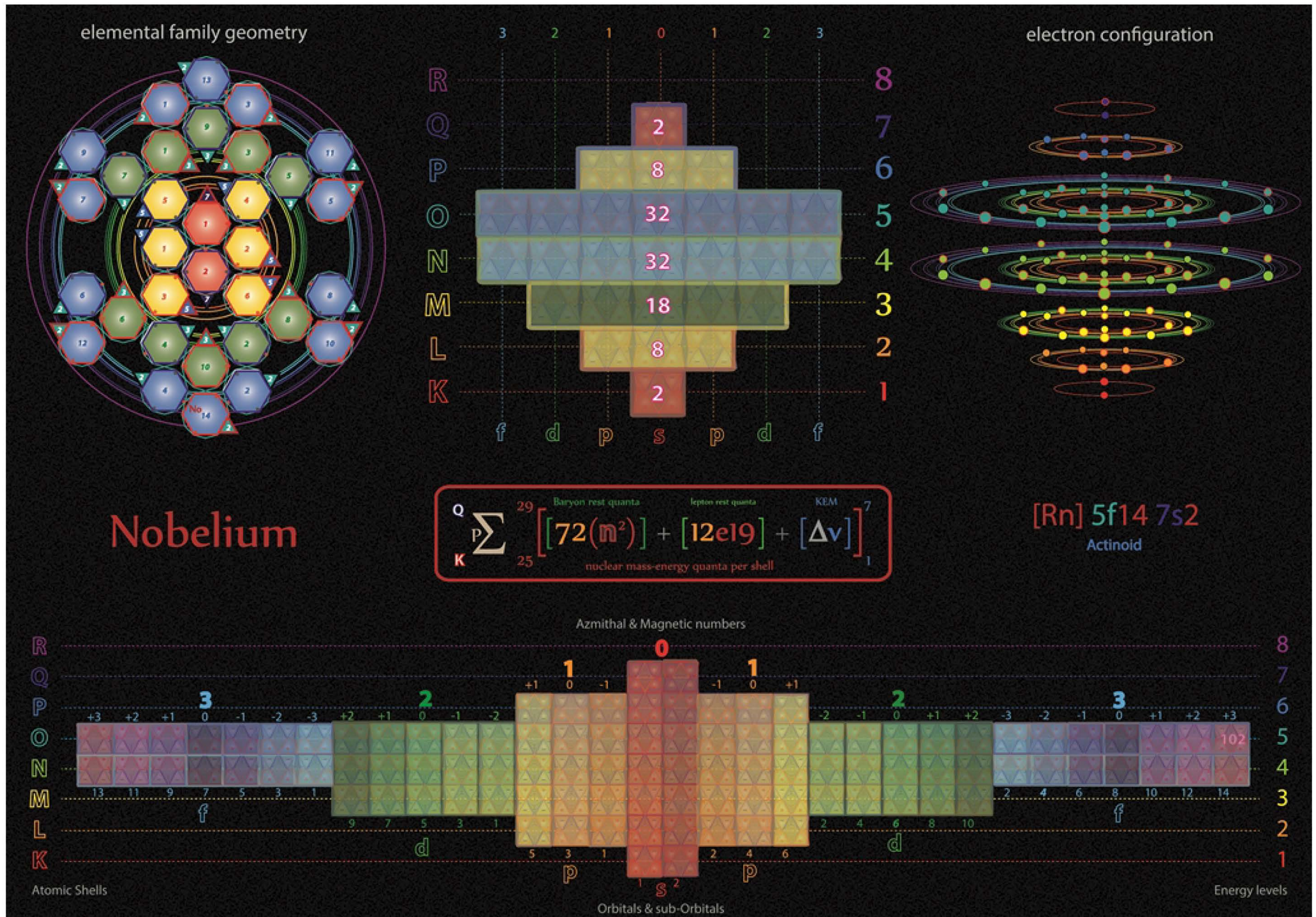
Tetryonics 53.99 - Einsteinium atomic config



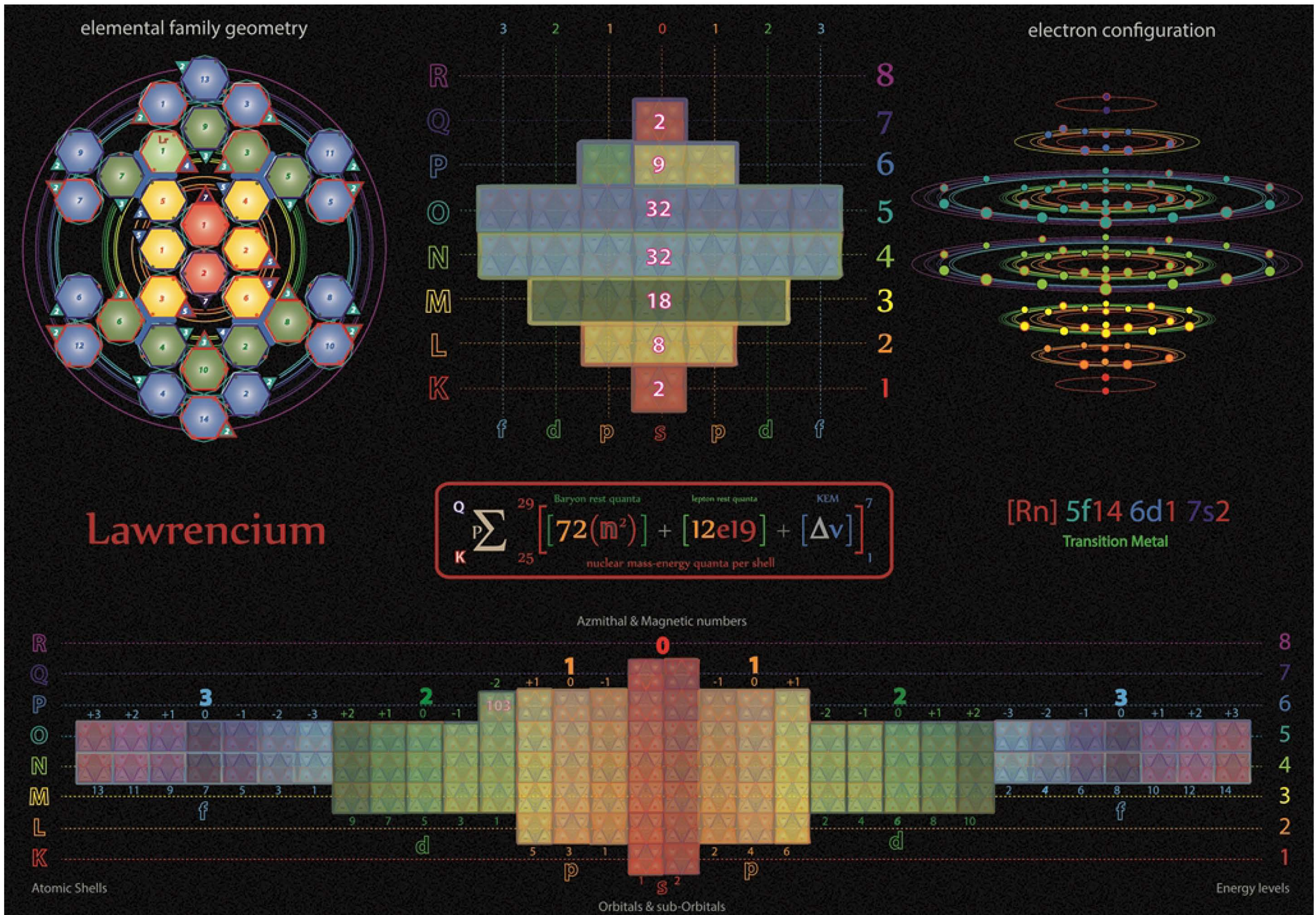
Tetryonics 53.100 - Fermium atomic config



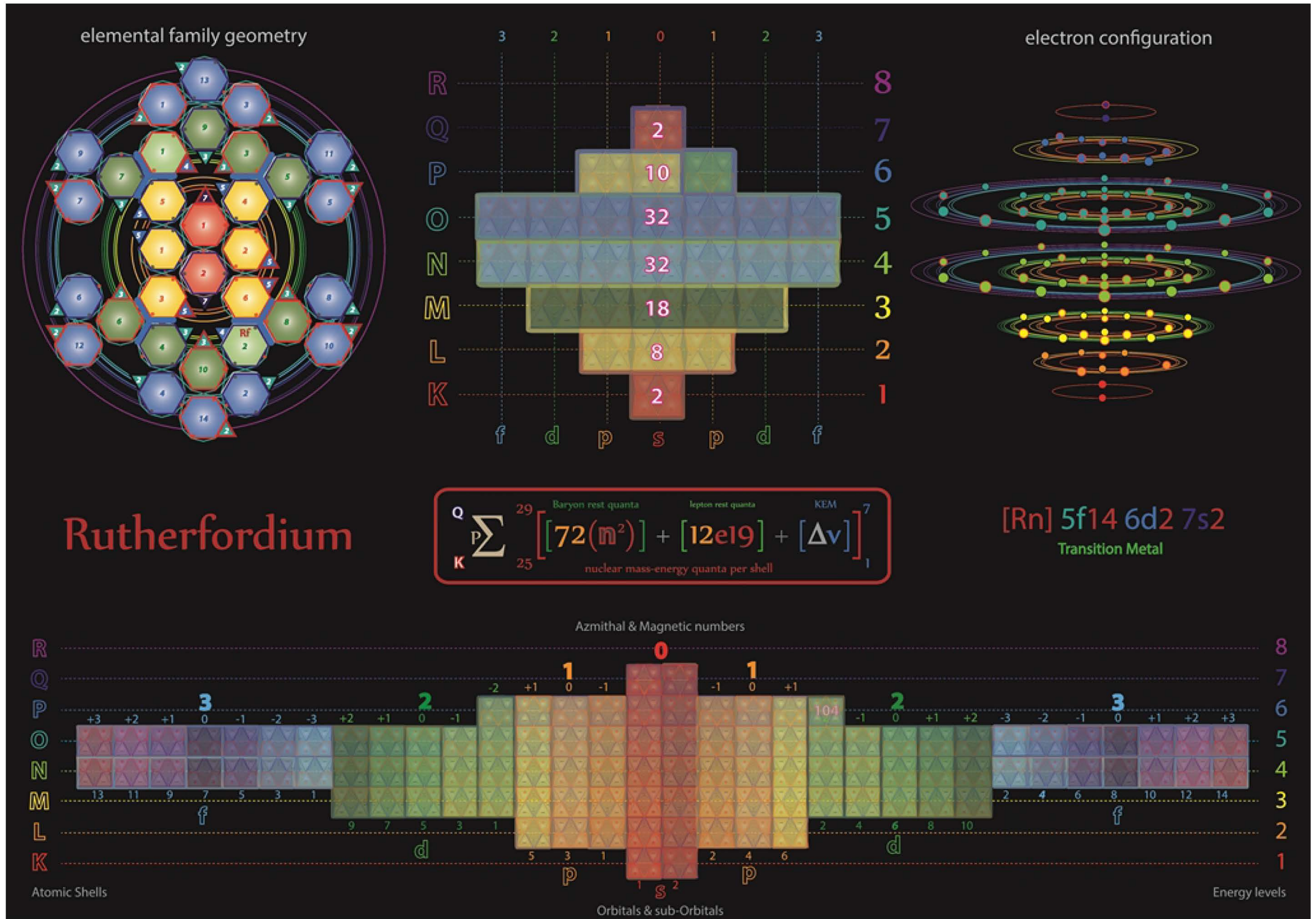
Tetryonics 53.101 - Mendeleevium atomic config



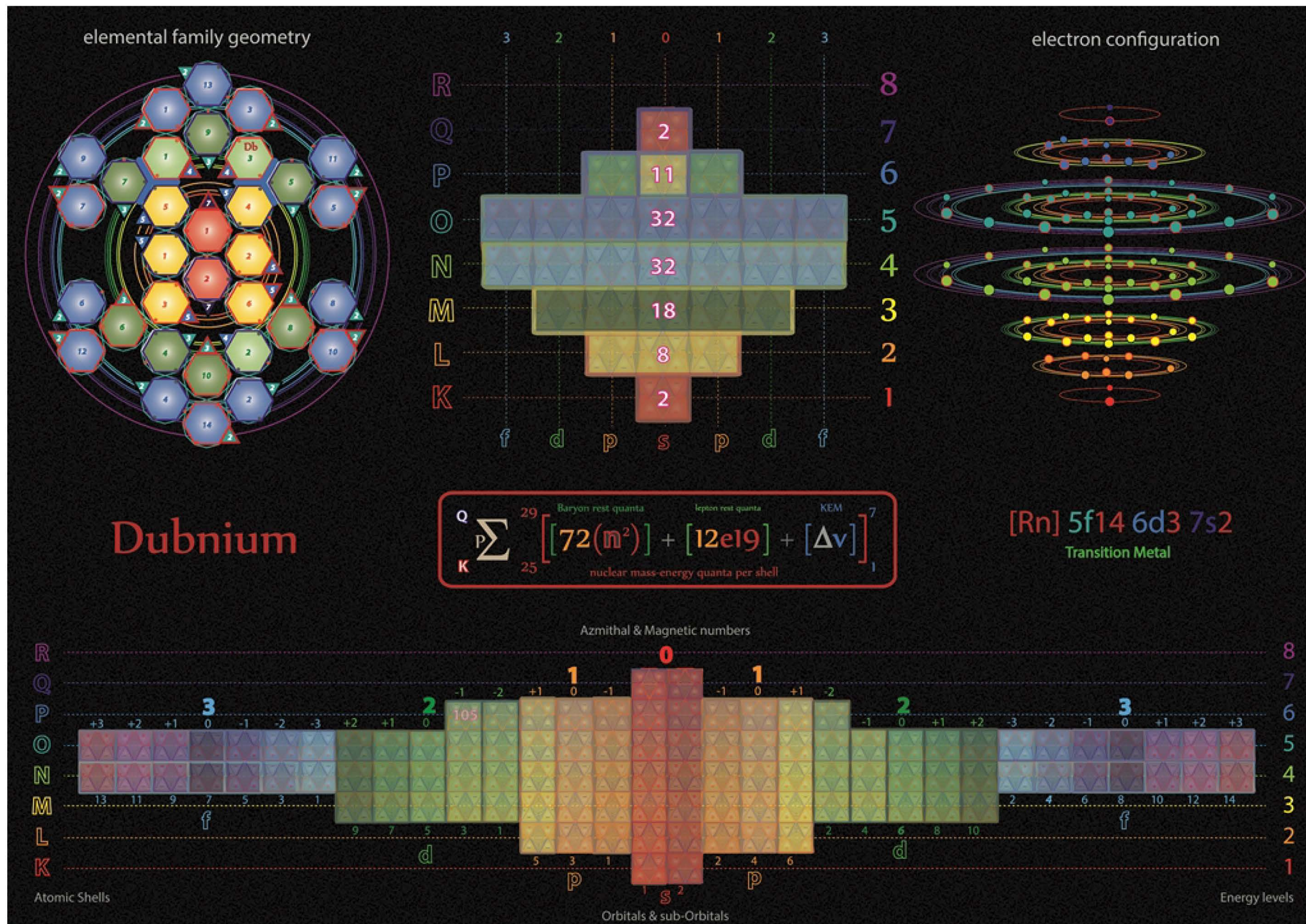
Tetryonics 53.102 - Nobelium atomic config



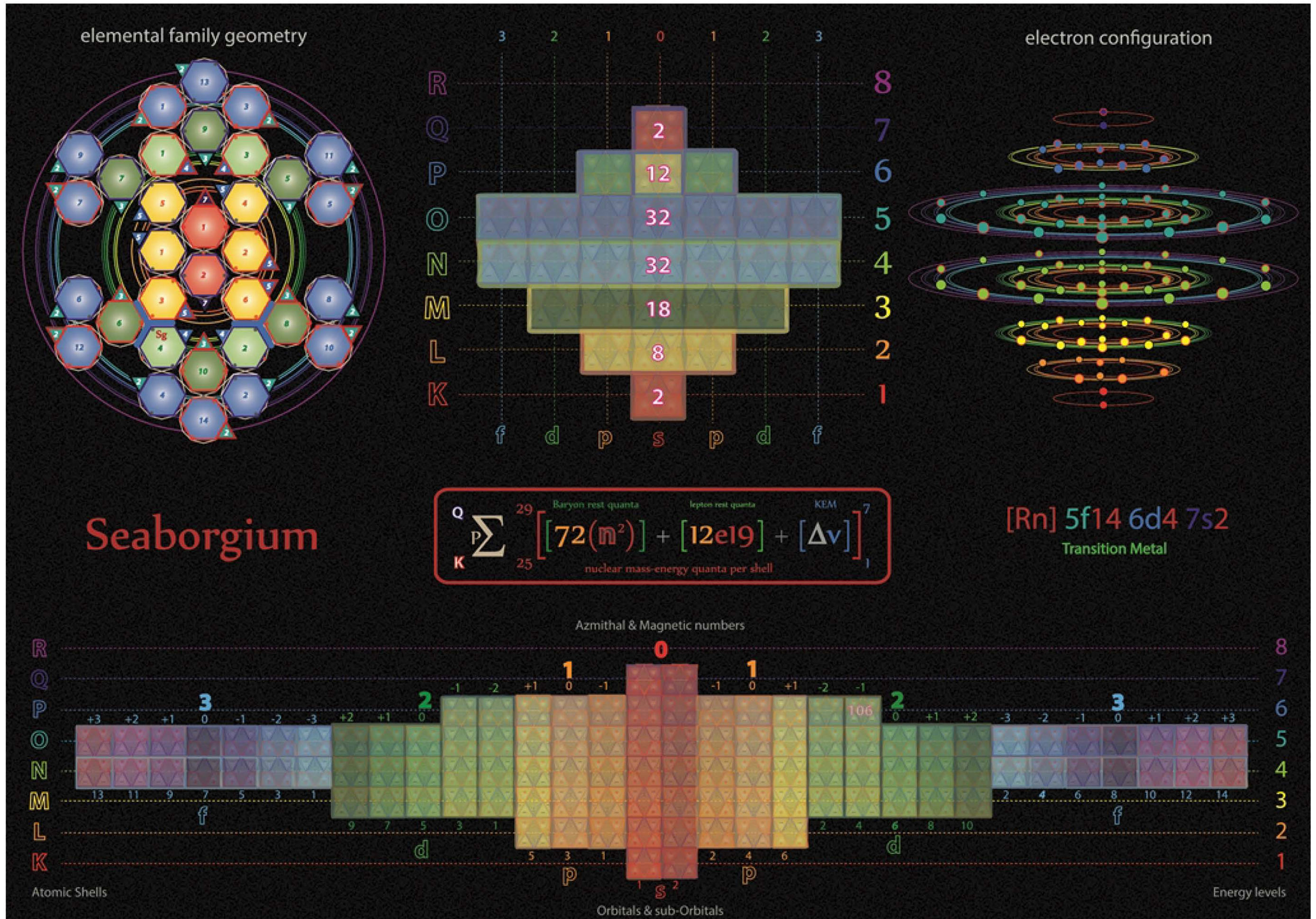
Tetryonics 53.103 - Lawrencium atomic config



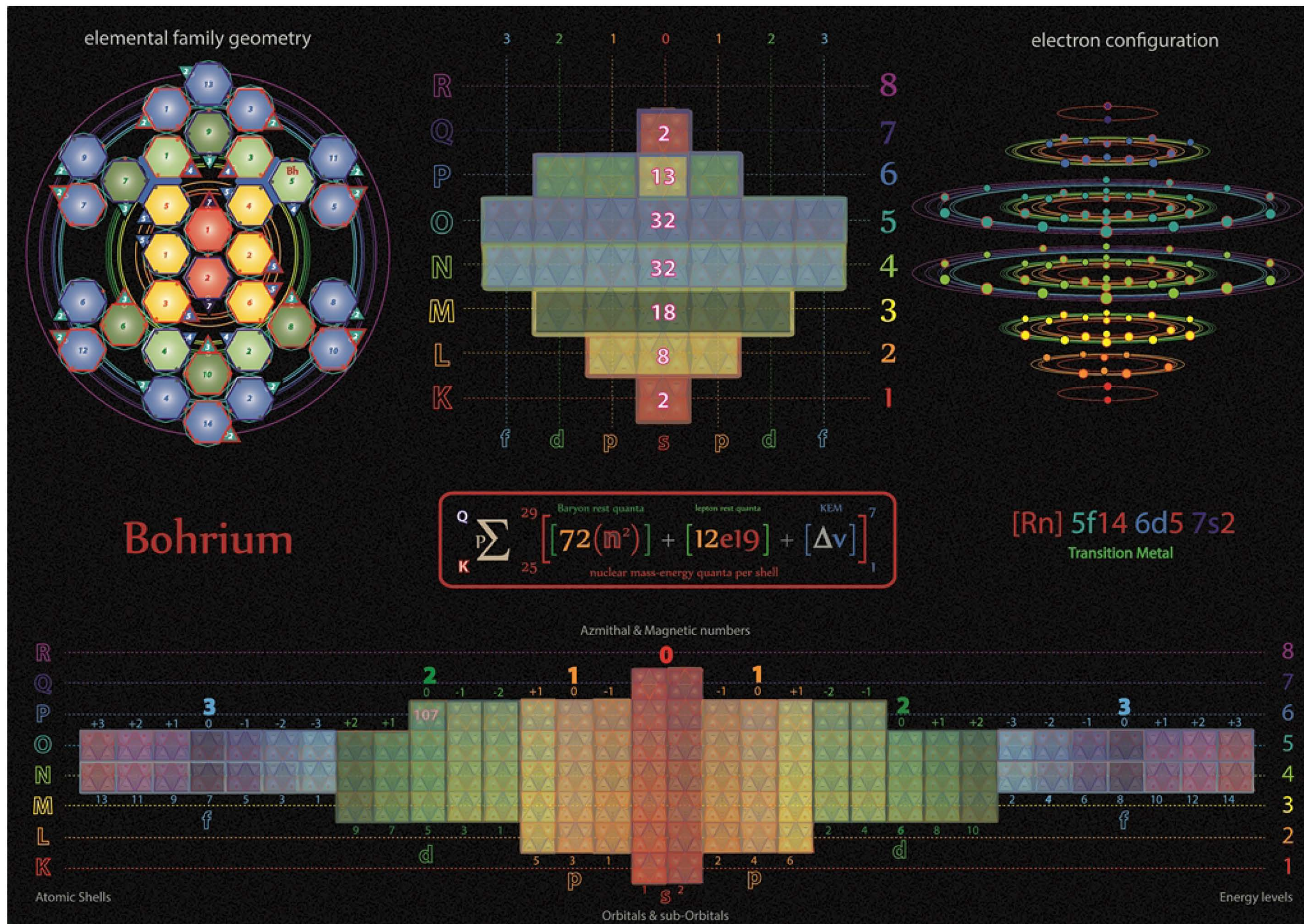
Tetryonics 53.104 - Rutherfordium atomic config



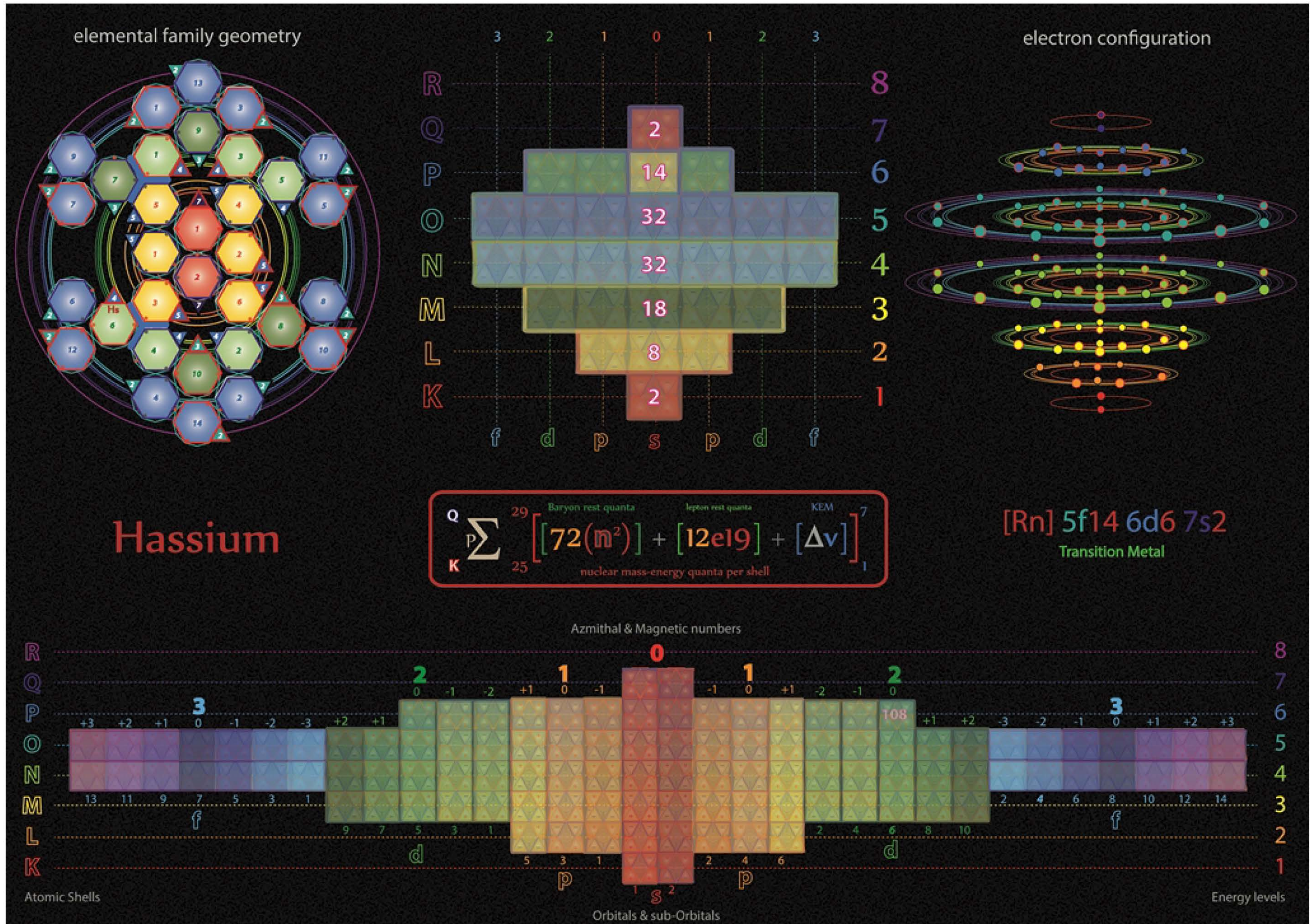
Tetryonics 53.105 - Dubnium atomic config



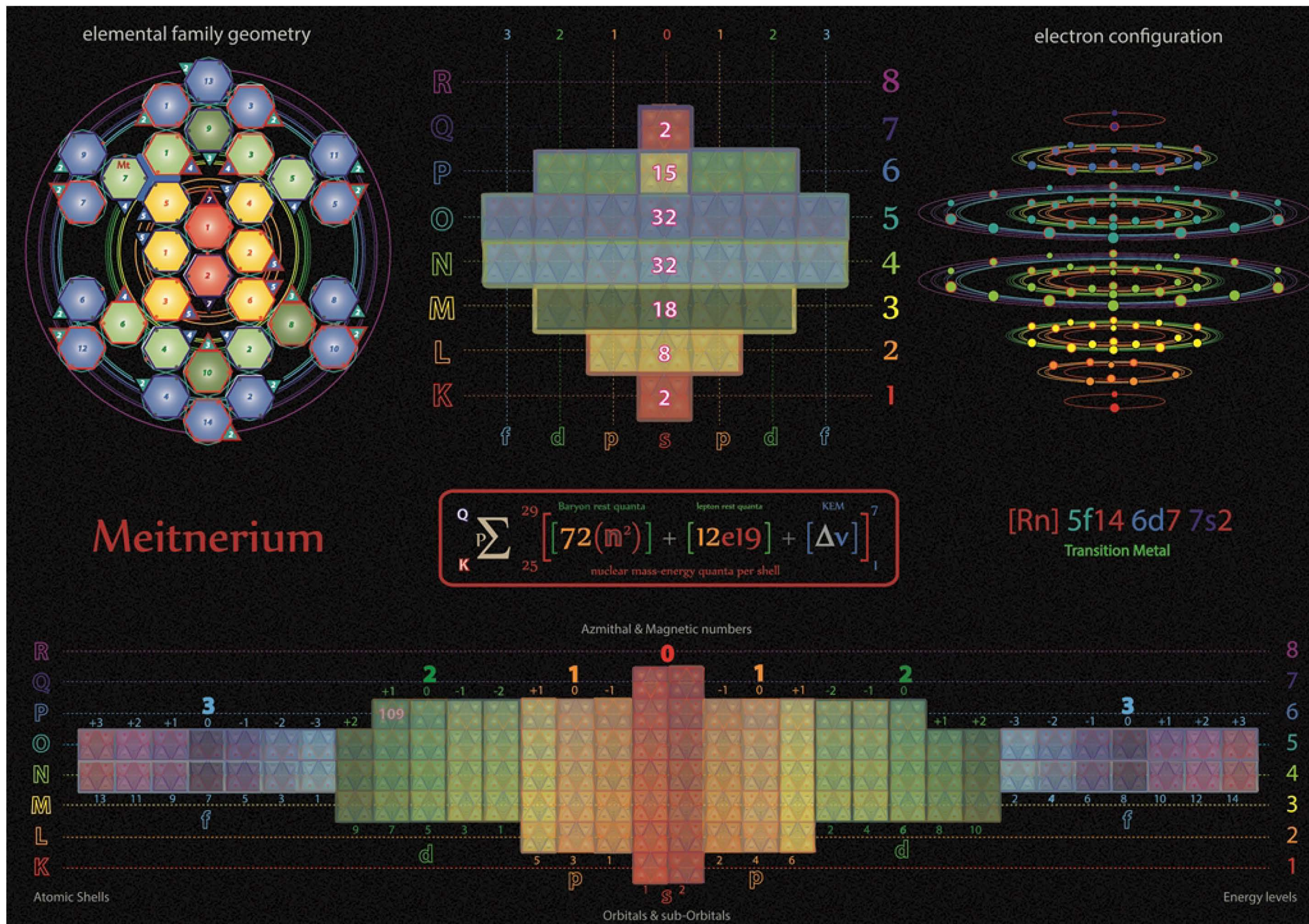
Tetryonics 53.106 - Seaborgium atomic config



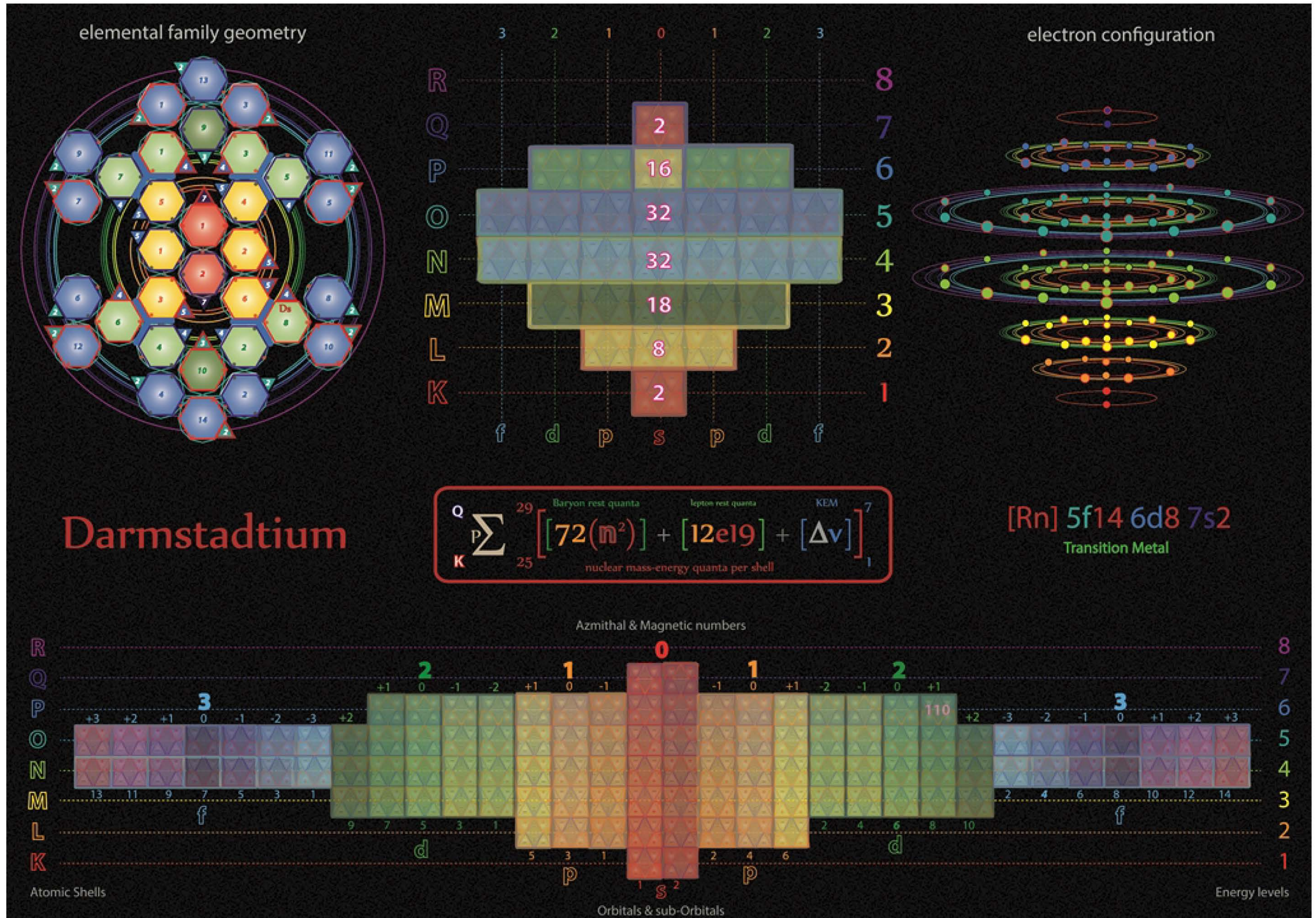
Tetryonics 53.107 - Bohrium atomic config



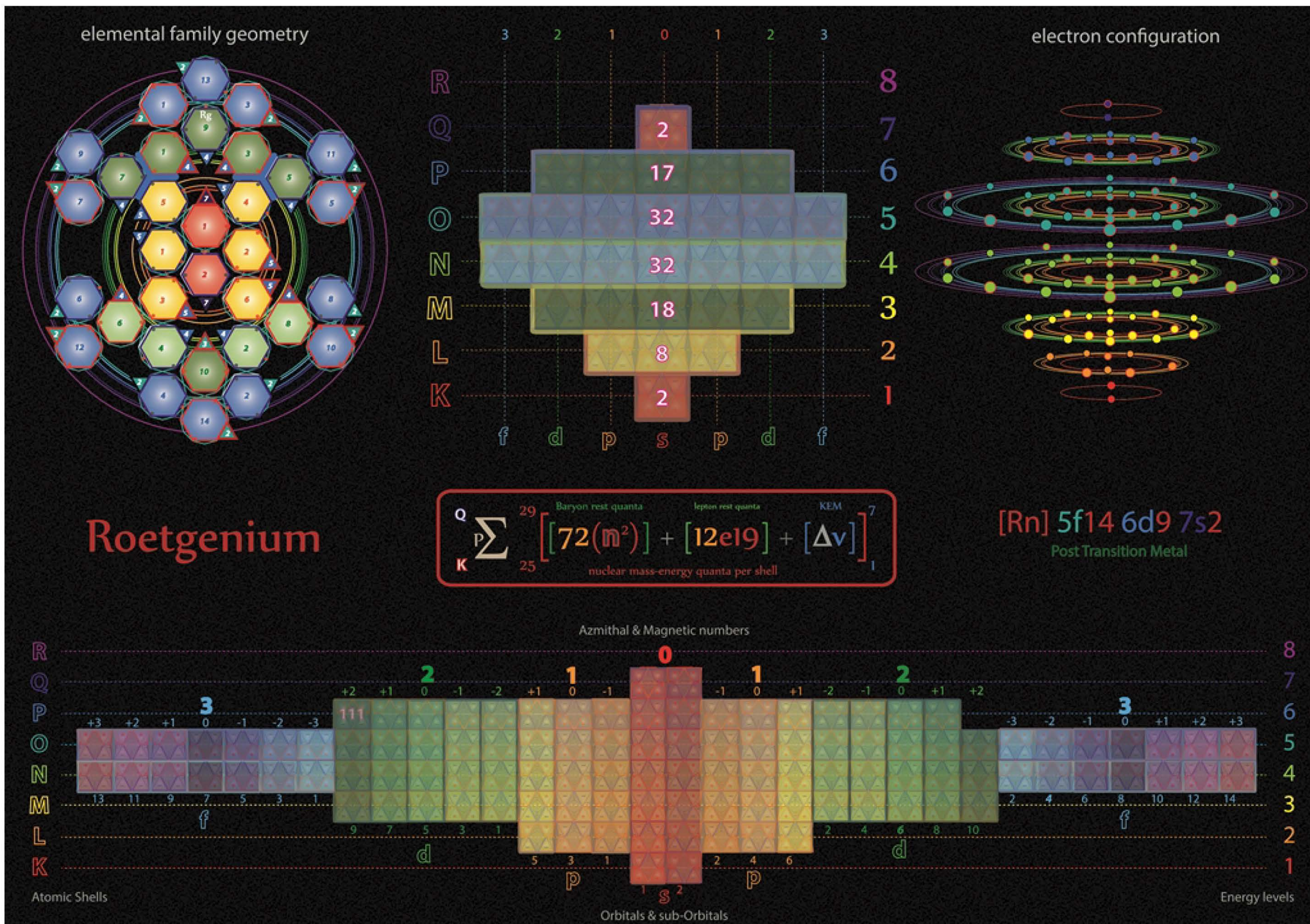
Tetryonics 53.108 - Hassium atomic config



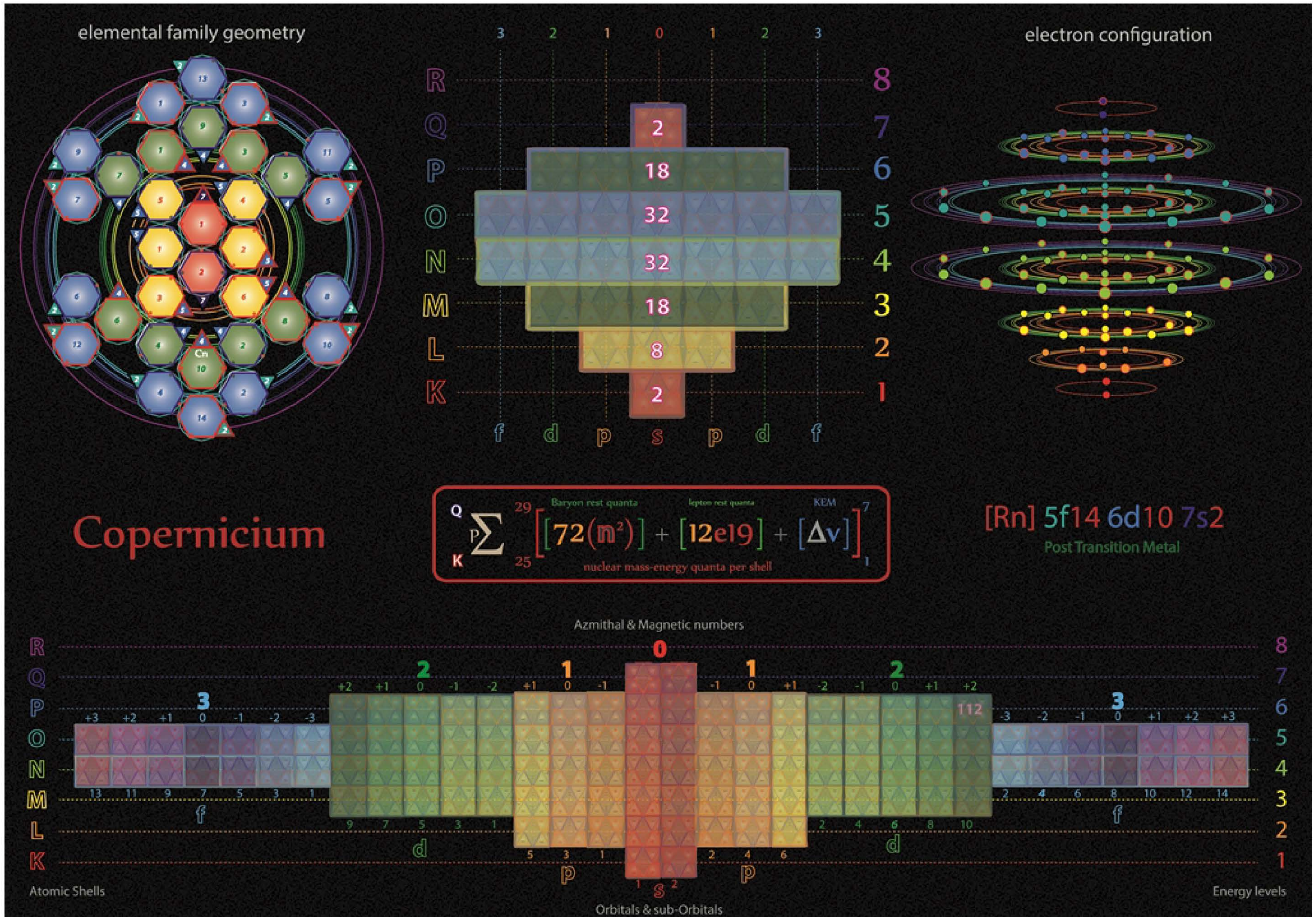
Tetryonics 53.109 - Meitnerium atomic config



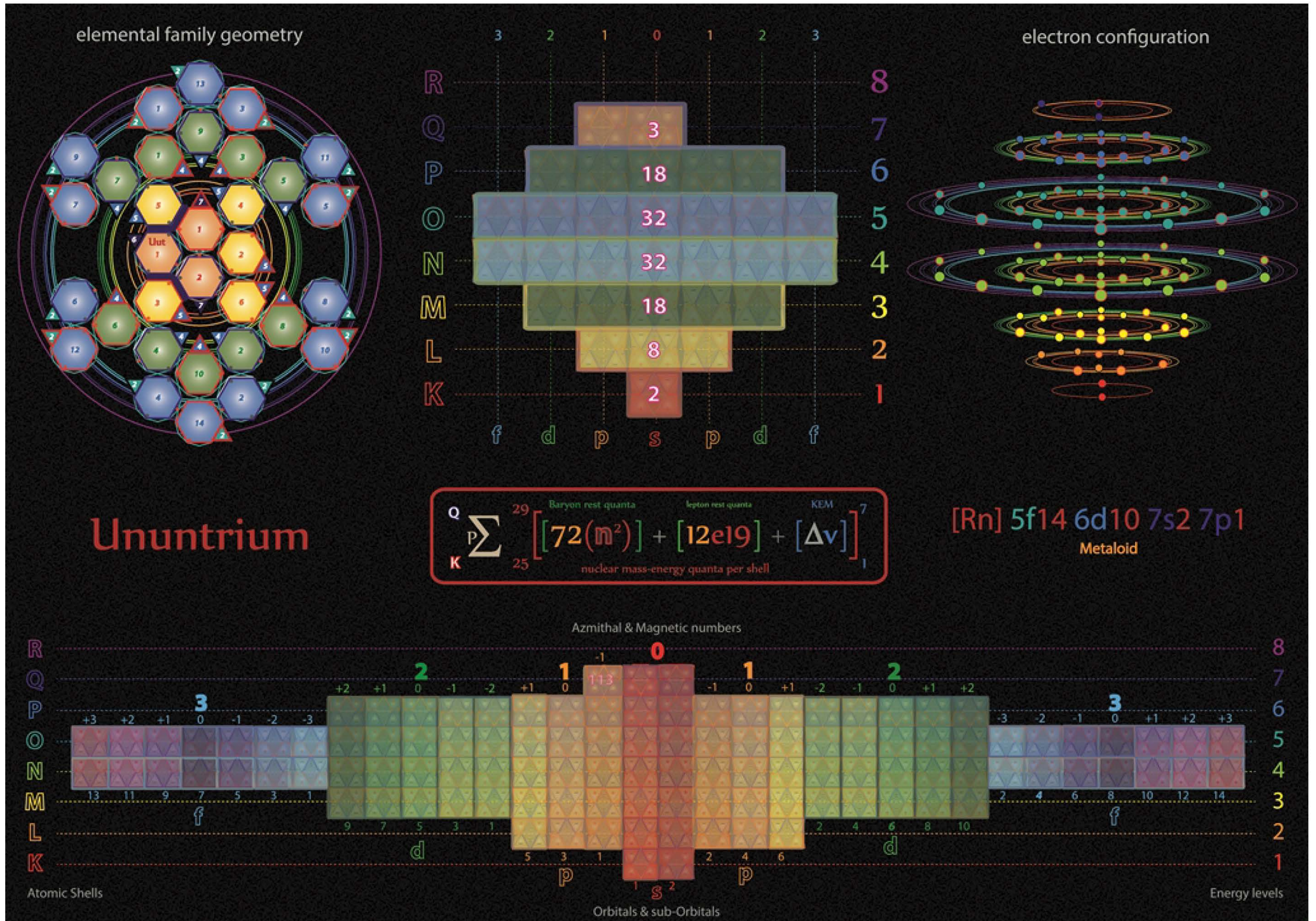
Tetryonics 53.110 - Darmstadtium atomic config



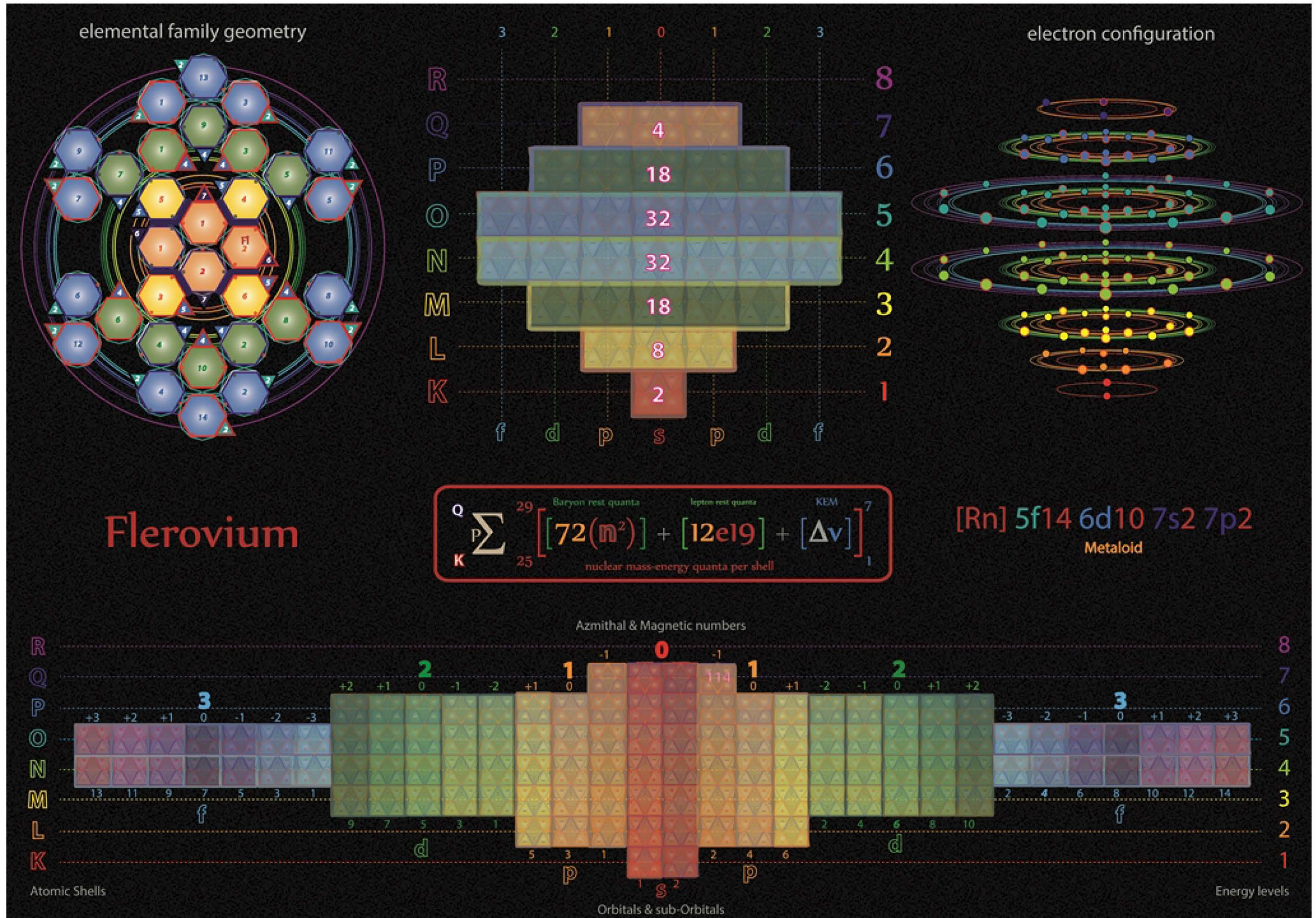
Tetryonics 53.111 - Roetgenium atomic config



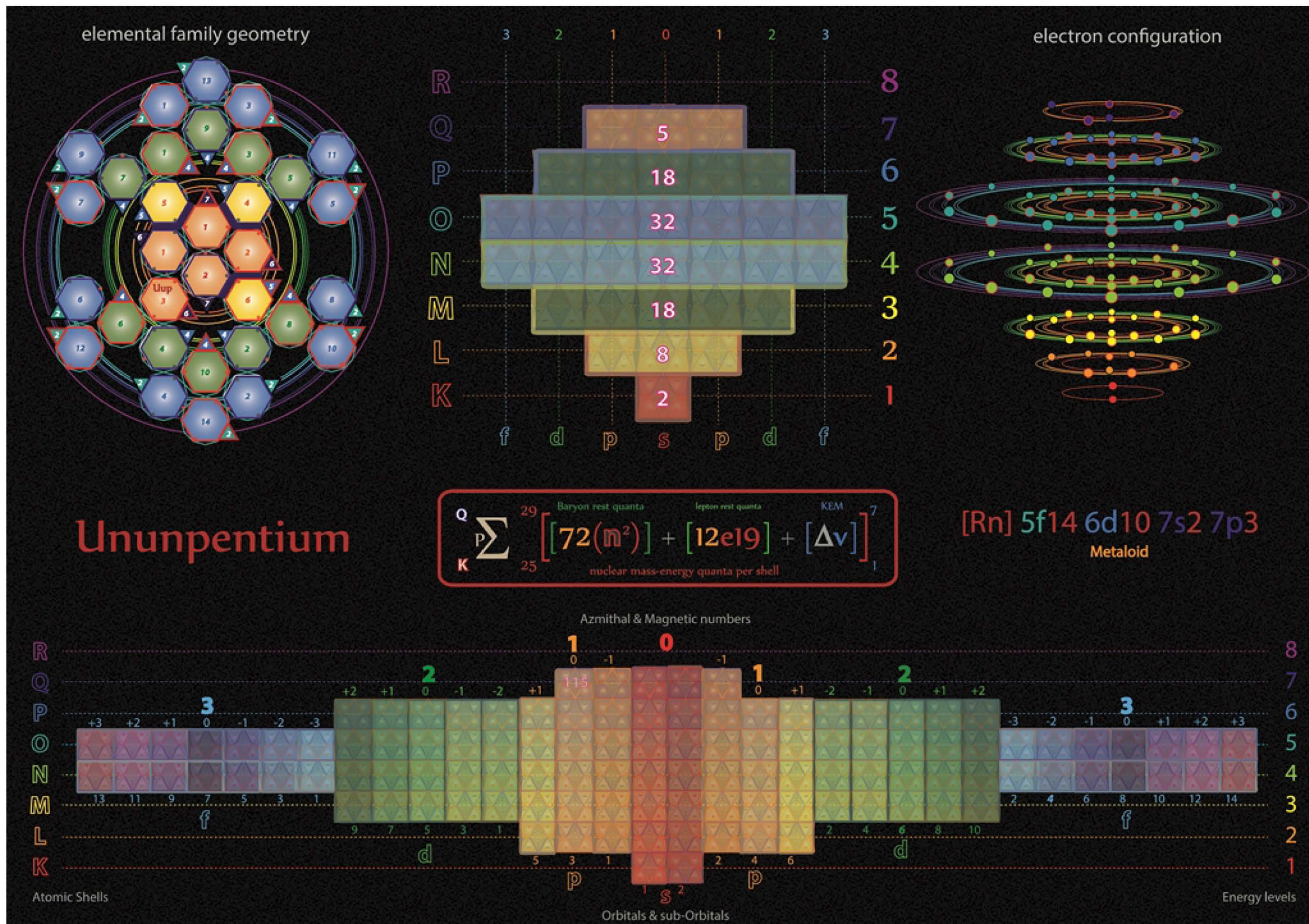
Tetryonics 53.112 - Copernicium atomic config



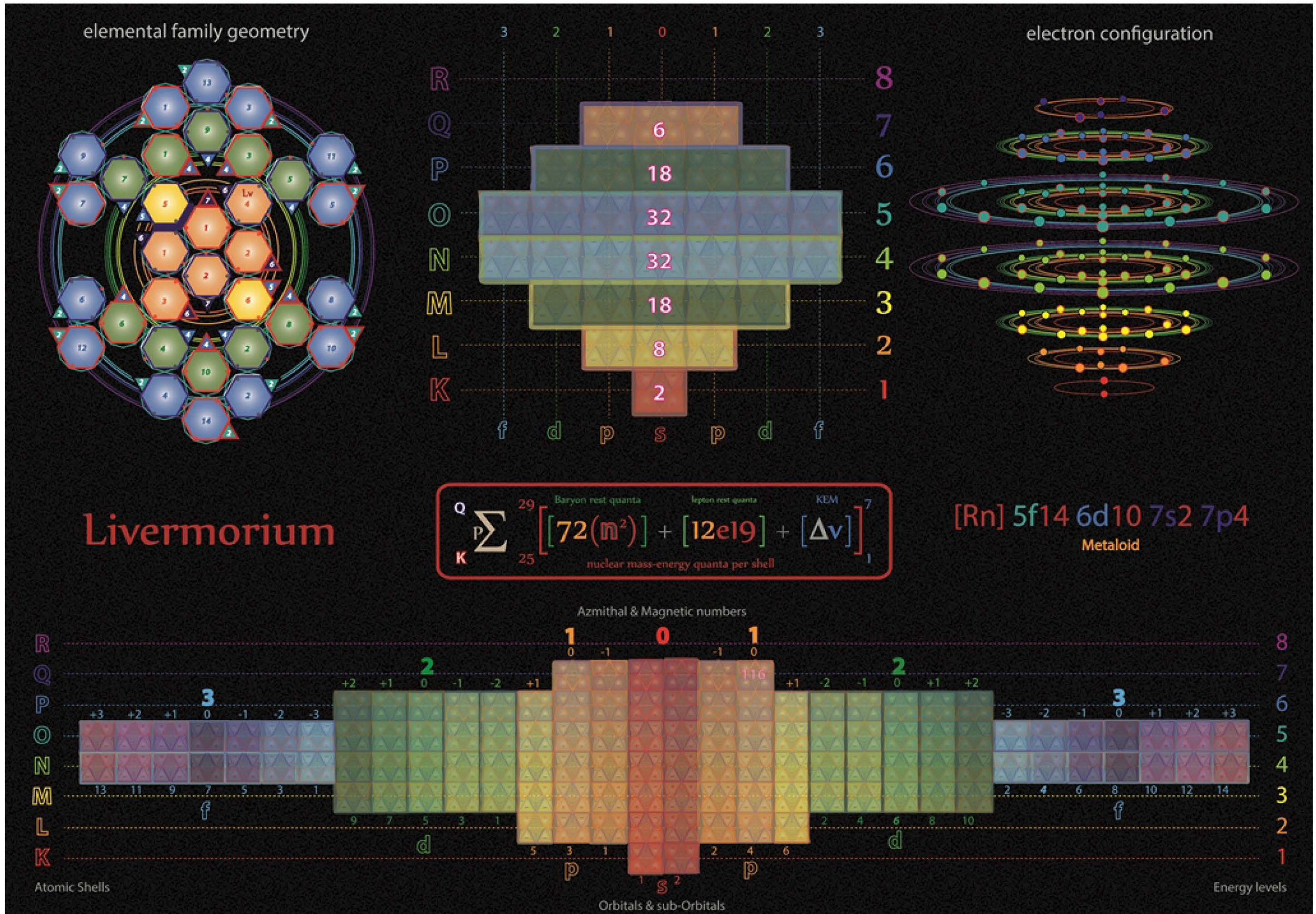
Tetryonics 53.113 - Ununtrium atomic config



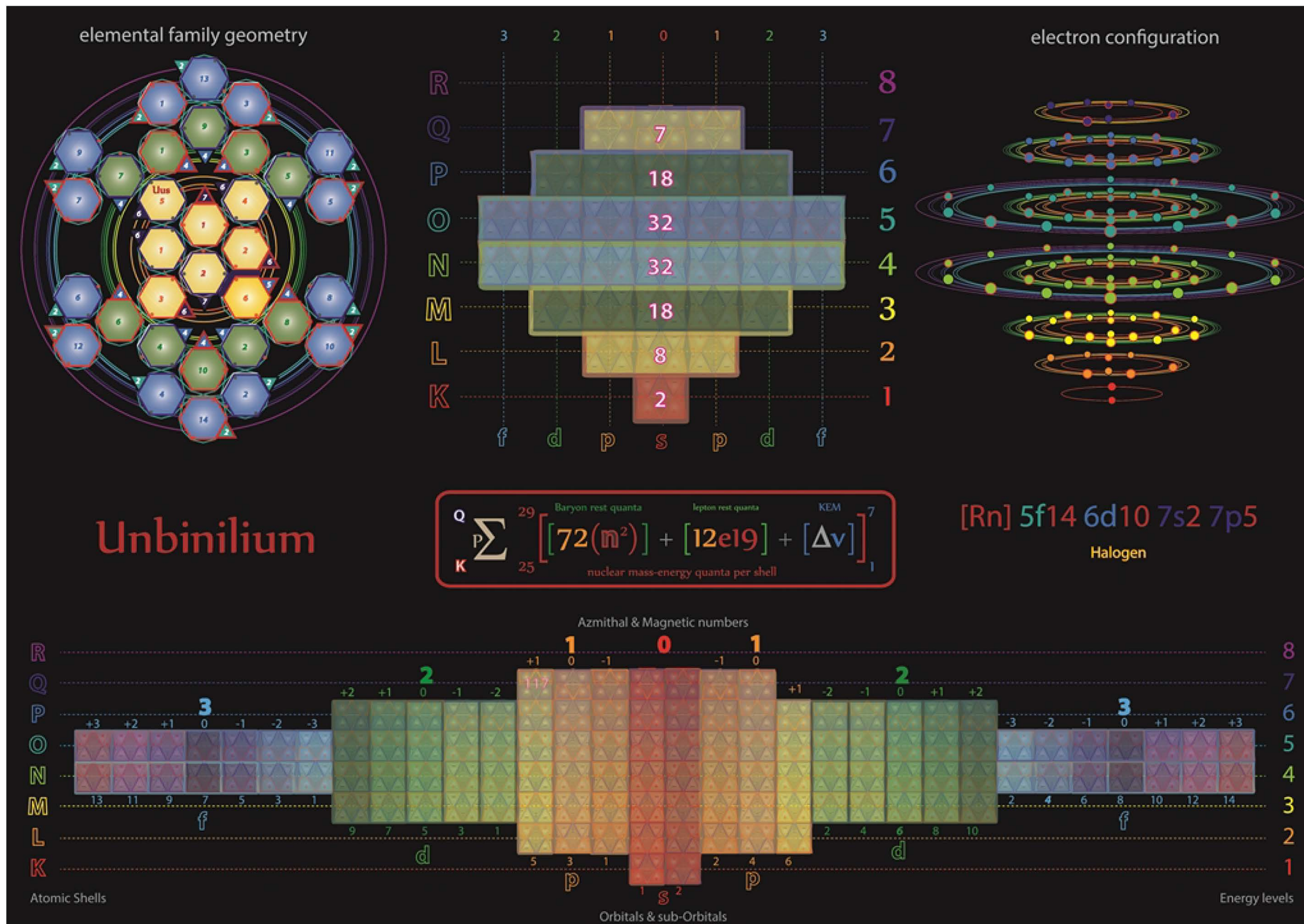
Tetryonics 53.114 - Flerovium atomic config



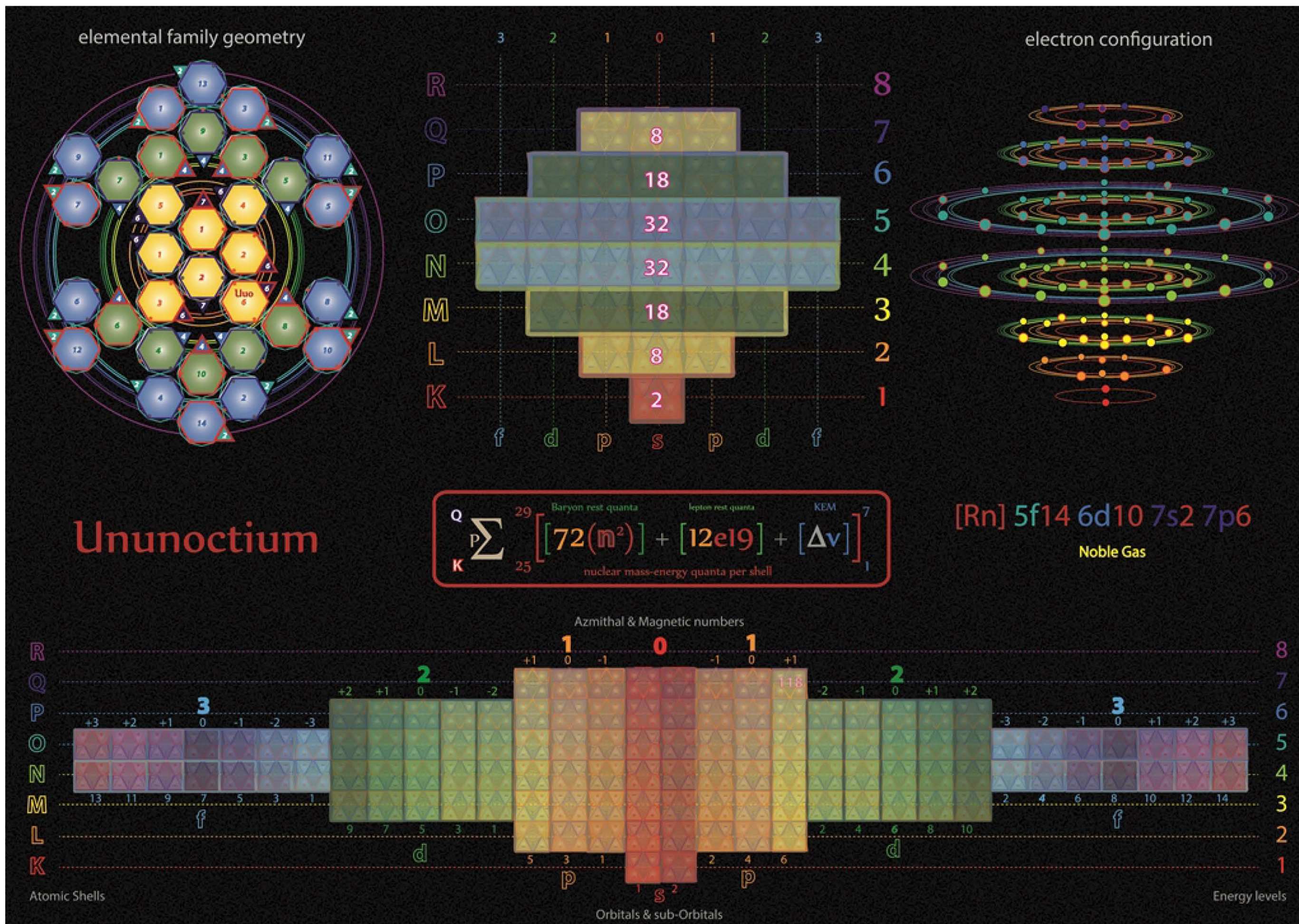
Tetryonics 53.115 - Ununpentium atomic config



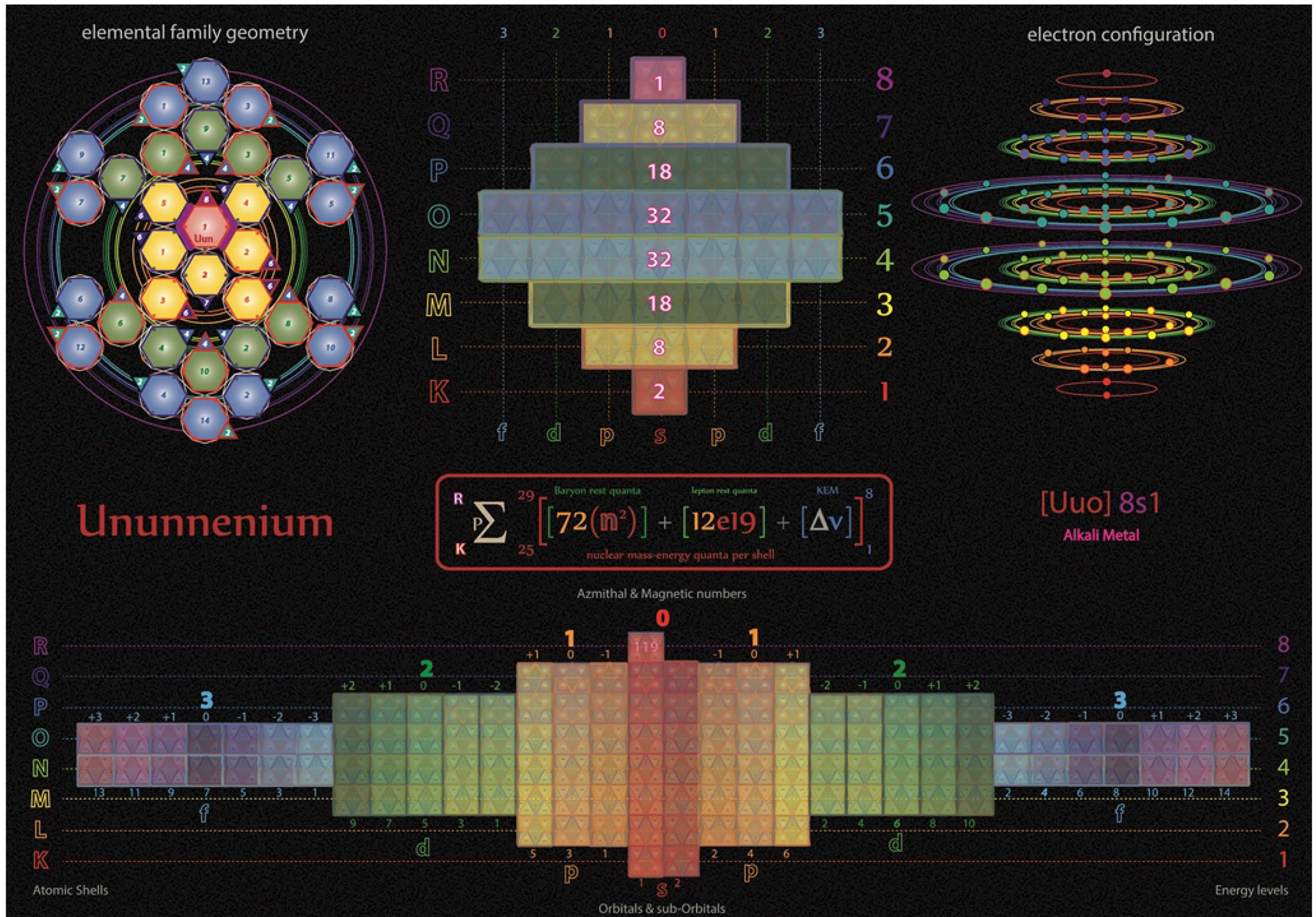
Tetryonics 53.116 - Livermorium atomic config



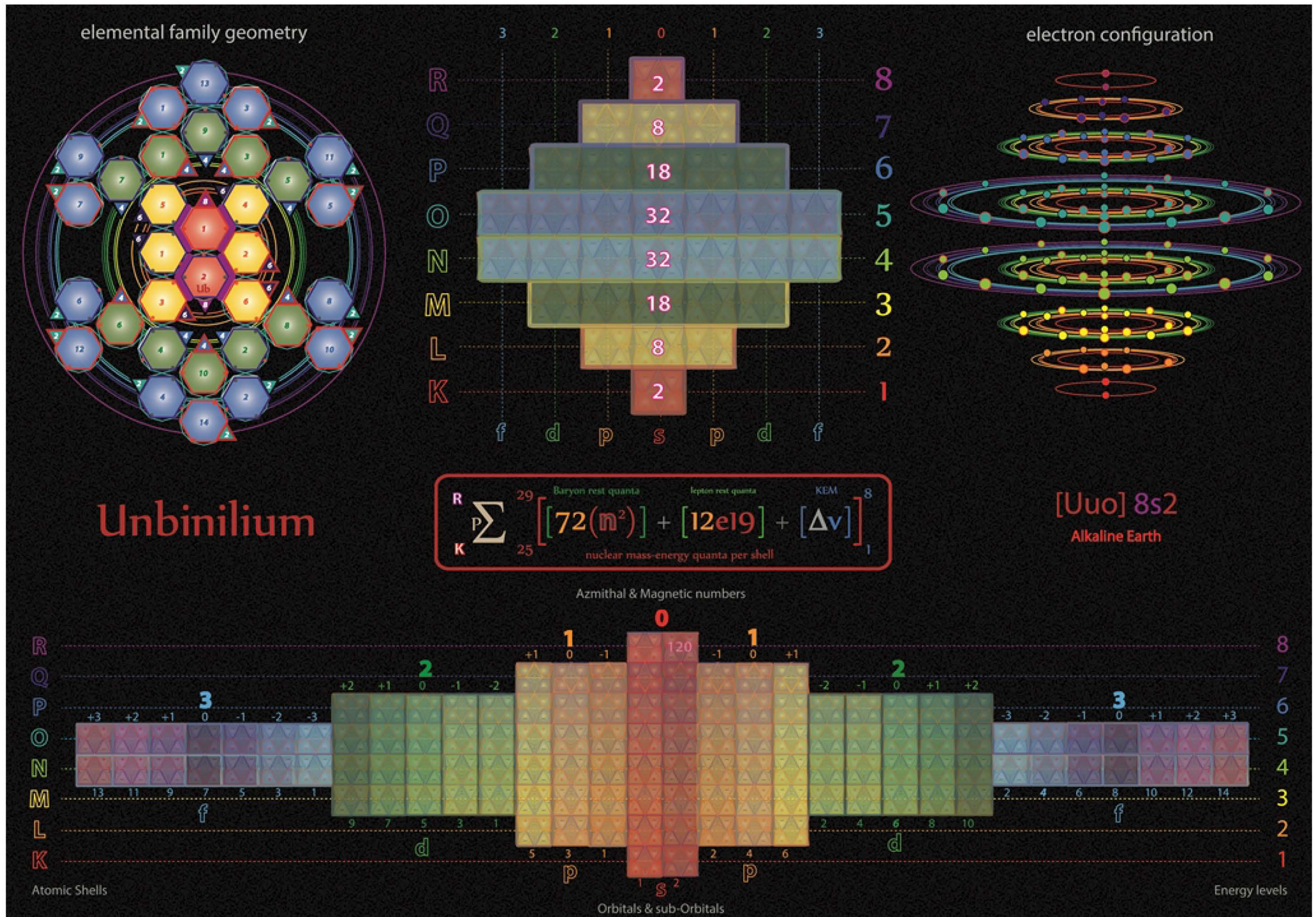
Tetryonics 53.117 - Ununseptium atomic config



Tetryonics 53.118 - Ununoctium atomic config



Tetryonics 53.119 - Ununnenium atomic config



Tetryonics 53.120 - Unbinilium atomic config

Chemical element bonding

All Deuterium nuclei pack in hexagonal patterns to form larger atoms & molecules



Individual chemical element topologies are mapped using Cormier grid.

Hexagonal tiling is a regular tiling of the Euclidean plane

Tetryonic chemistry utilises hexagonal tiling for modelling chemical bonds

H

s1

s2

p5

p1

p3

s1

s2

p4

p2

p6

unfilled atomic orbital positions are indicated by vacant hexagonal tiles.

Tetryonic mass-Matter topologies can be represented as hexagonal cells in a Cormier grid

p6

∞

p3

p1

p2

p5

p4

p5

p1

p3

s1

s2

p4

p2

p6

Euclidean space is tiled with equilateral tessellations of Planck mass-energy geometries

When seeking the most stable energy configurations nuclei & atoms bond to create filled s&p [stable octet] electron orbital patterns as well as filled d & f orbitals.



Periodic Table Atomic configurations

252
[126-126]

Li
6.1615

138,708
[1.023143308 e-26 kg]

3,672
[0.1519GeV]

504
[252-252]

C
12.6493

284,760
[2.100457713 e-26 kg]

14,688
[0.6077GeV]

672
[336-336]

O
16.9744

382,128
[2.81667317 e-26 kg]

36,864
[0.916GeV]

Allotropes are different structural forms of the same element and can exhibit quite different physical properties and chemical behaviours

Lithium

252
[126-126]

Li
6.1615

135,036
[0.9960577602 e-26 kg]

Oxygen

672
[336-336]

O
15.995

360,096
[2.656154027 e-26 kg]

The Periodic Table, although useful in identifying Elements via their atomic and quantum numbers, does not reflect all the charged topologies that Deuterium nuclei can form as they combine.

Allotropes

Various atomic configurations with the same Tetryonic charge, but differing in their final mass-Matter topologies and properties can be formed - they are the Allotropes

Some of the more plentiful chemical elements form this way

504
[254-254]

C₁₂
11.9968

270,072
[1.99215421 e-26 kg]

6 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1

504
[252-252]

C
11.9968

270,072
[1.99215421 e-26 kg]

6 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1

504
[252-252]

C
12.6493

284,760
[2.100457713 e-26 kg]

14,688
[0.6077GeV]

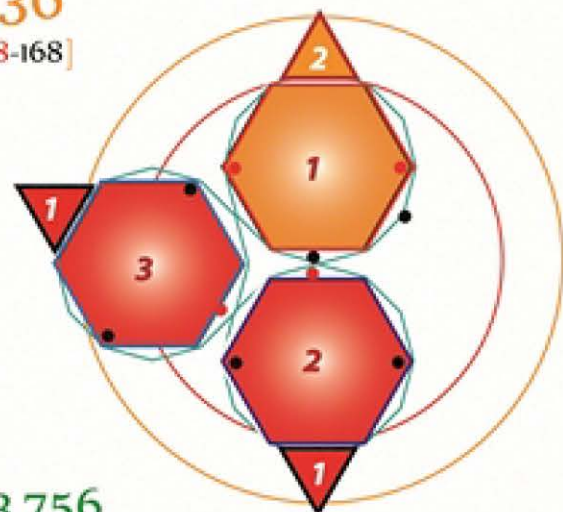
6 [Protons [24-12]
Neutrons [18-18]
electrons [0-12]] n1-2

Allotropes are elements created from the same number of Deuterium nuclei as periodic elements but possess a differing mass-Matter topology

Q

same component charge

336
[168-168]



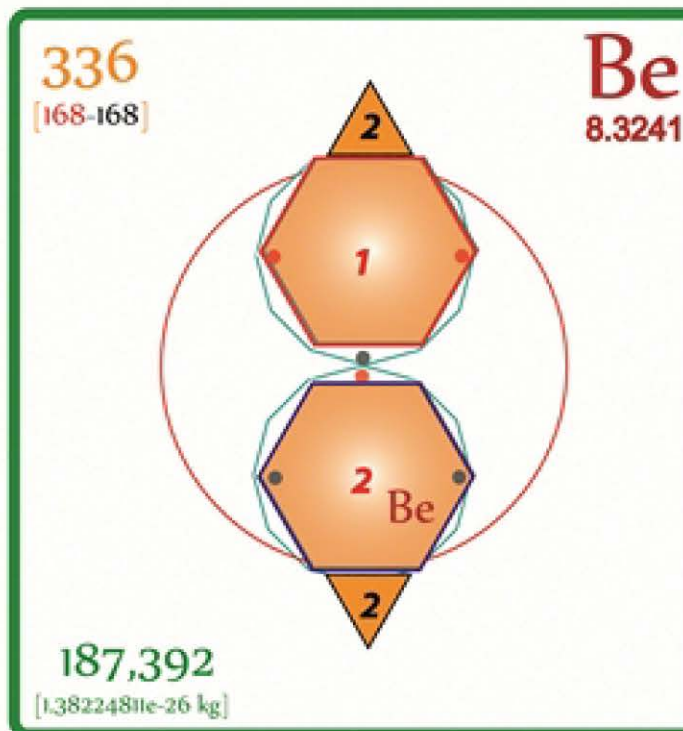
183,756

different Matter geometries

M

The varying material geometries allows what is the same chemical element to possess vastly different bonding points and chemical attributes

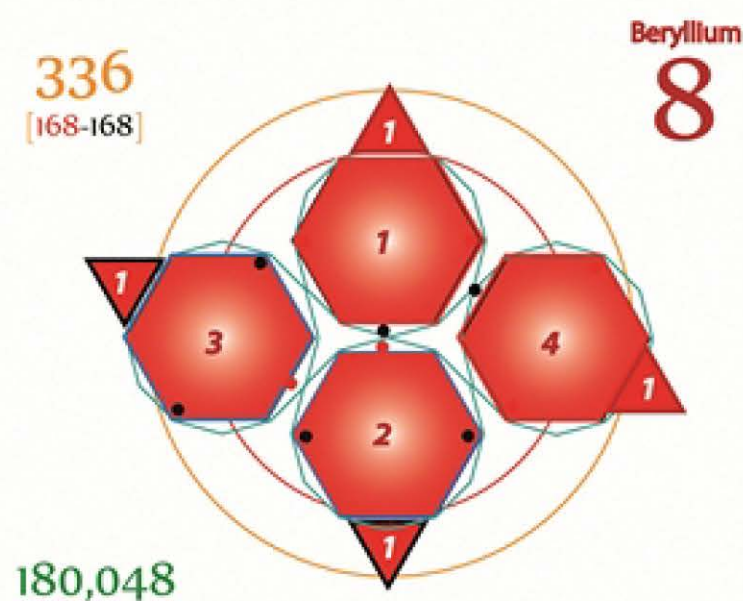
Beryllium
8



336
[168-168]

Be
8.3241

187,392
[1.3822481e-26 kg]



336
[168-168]

Beryllium
8

180,048

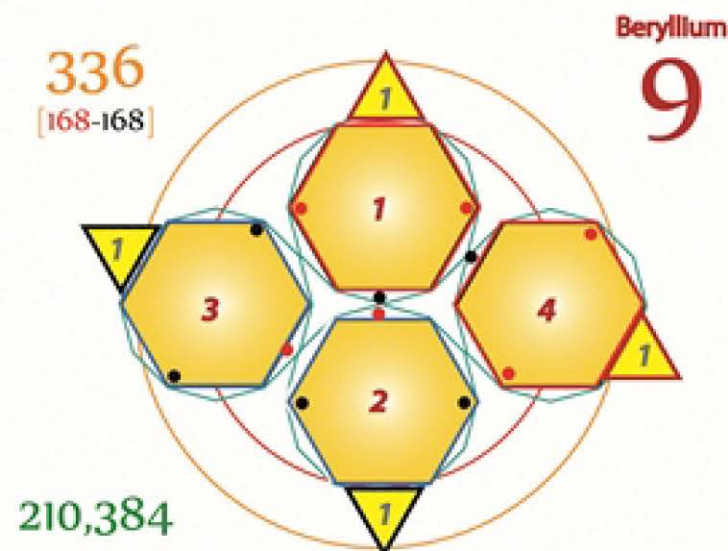
Allotropic geometries [charge vs Matter]

	3	2	1	0	1	2	3	
R								8
Q								7
P								6
O								5
N								4
M								3
L				2				2
K				2				1
	f	d	p	s	p	d	f	

Some element allotropes have different Matter topologies that persist in different phases

Allotropes vs. Isotopes

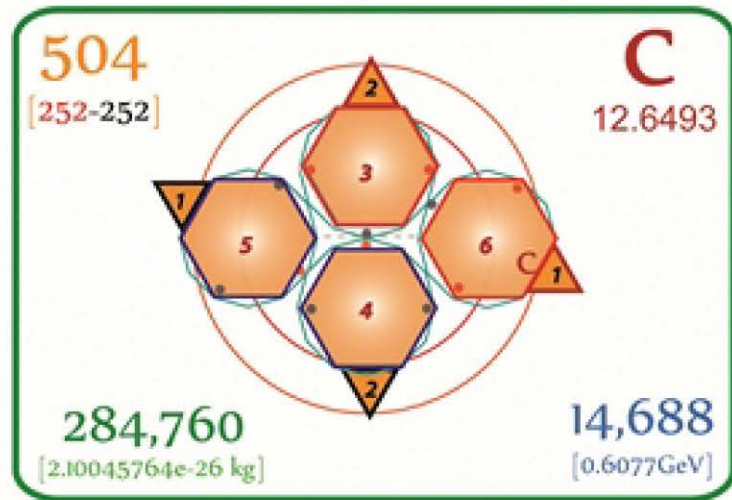
Isotopes are elementary atoms with the same number of nuclei, but with differing energy levels, resulting in different mass-energies



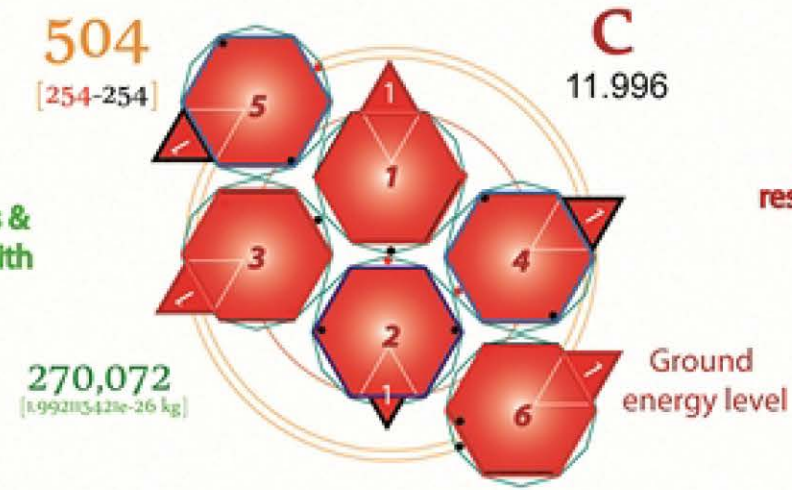
336
[168-168]

Beryllium
9

210,384



Tetryonic theory affords us the ability to model the charged mass-energy geometries & 3D Matter topologies of each element along with its bonding points



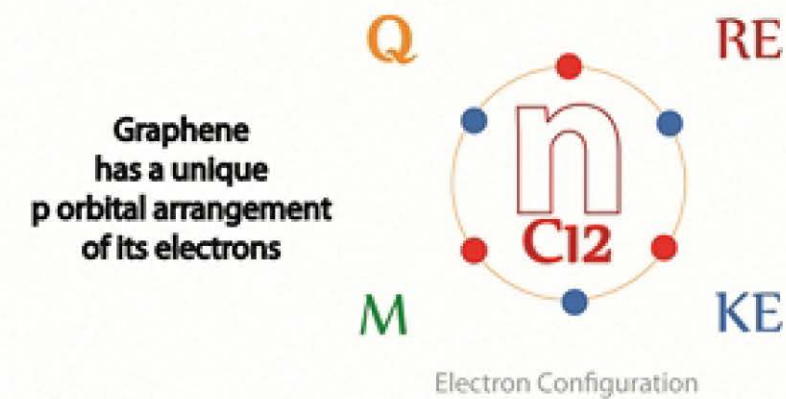
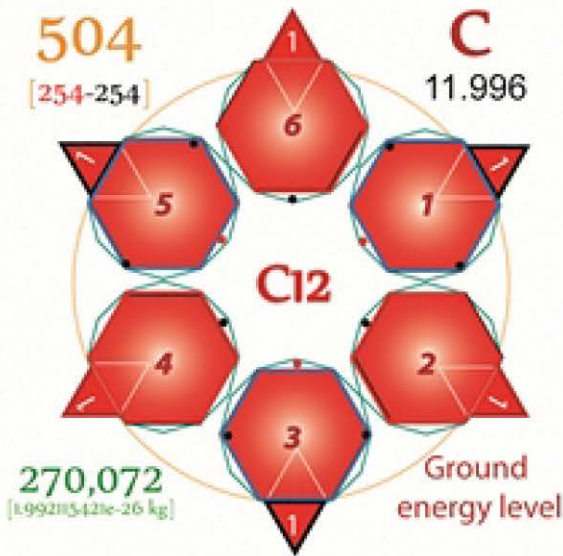
It also allows for the calculation of the molar rest mass-energy geometry of any Matter topology

Carbon Allotropes

Carbon is capable of forming many allotropes due to its valency.

Well known forms of carbon include:

- Carbon
- Diamond
- Graphite
- Graphene
- Amorphous carbon
- Buckminsterfullerenes
- Carbon nanotubes
- Glassy carbon
- atomic & diatomic carbon



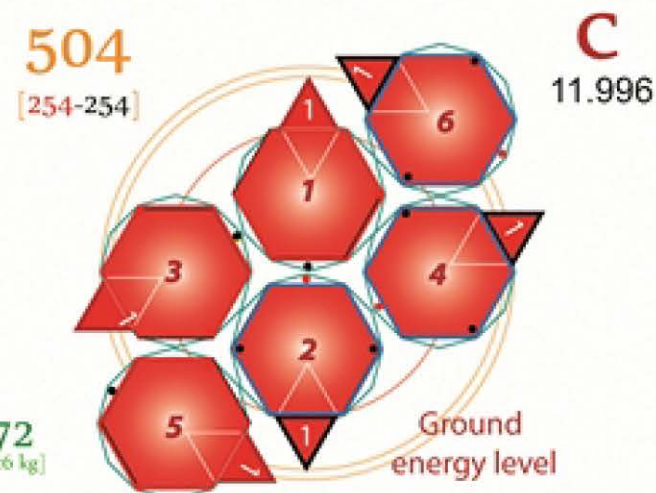
Graphene has a unique p orbital arrangement of its electrons

Electron Configuration

Shell	[n] p6	Molar meM	Nuclei per shell
R 8	446,976	19.855	6
Q 7	418,680	18.598	6
P 6	391,392	17.385	6
O 5	365,112	16.218	6
N 4	339,840	15.095	6
M 3	315,576	14.018	6
L 2	292,320	12.985	6
K 1	270,072	11.996	6

Carbon-14, a radioactive isotope of carbon with a half-life of 5,730 years, is used to find the age of formerly living things through a process known as radiocarbon dating.

In 1961 the International unions of physicists and chemists agreed to use the mass of the isotope carbon-12 as the basis for atomic weight.



There are nearly ten million known carbon compounds and an entire branch of chemistry, known as organic chemistry, is devoted to their study.

Graphene

504
[254-254]

C
11.996

$n p 6$

270,072
[6901042e-26 kg]

Ground energy level

Graphene is also an allotrope of carbon.

Its structure is one-atom-thick planar sheets of sp^2 -bonded carbon atoms that are densely packed in a honeycomb crystal lattice

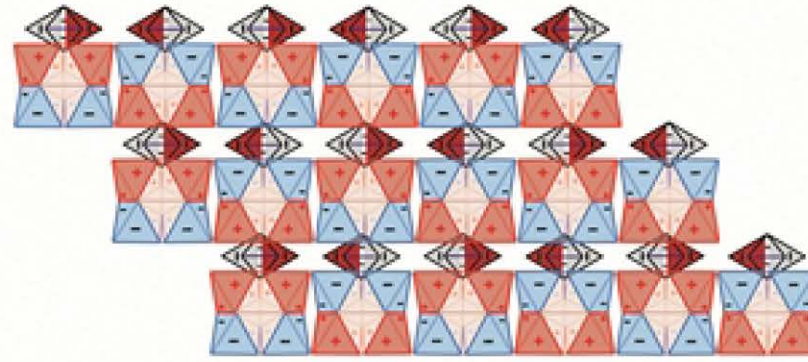
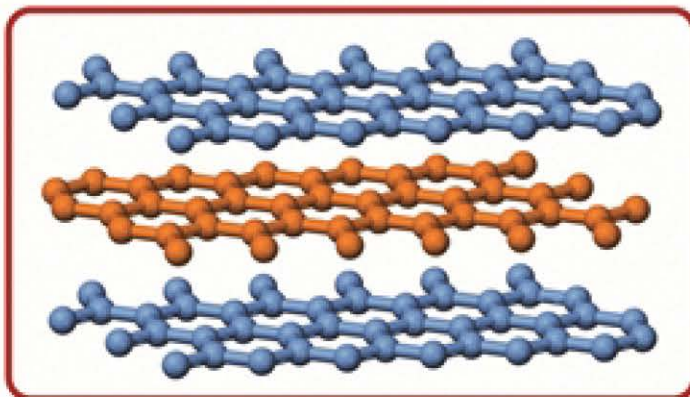
Graphite

The mineral graphite is an allotrope of carbon.

Unlike periodic table carbon [diamond], graphite is an electrical conductor, a semi-metal.

And Graphite is the most stable form of carbon under standard conditions.

Graphite has a layered, planar structure. In each layer, the carbon atoms are arranged in a hexagonal lattice



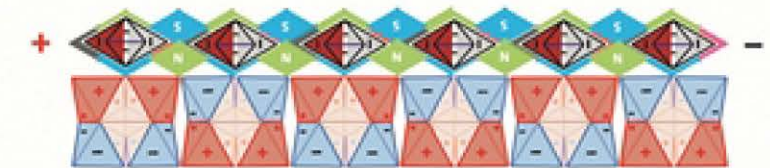
Graphite electrons can act as atomic bearings between the planar sheets of graphene



Tetryonic modelling of C12 atoms reveals two packing densities can occur between graphene atoms as they form graphite sheets



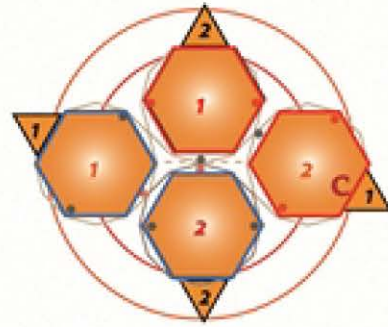
Unlike periodic carbon where electrons are tightly bound, graphite is highly conductive, with electrical energy being propagated via the electrons & their KEM fields



Graphene electrons are loosely bound to the top of the Deuterium nuclei

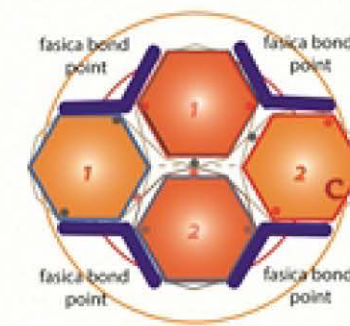
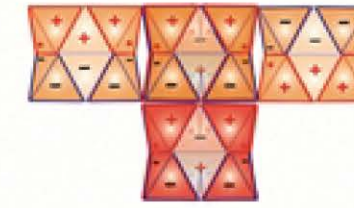
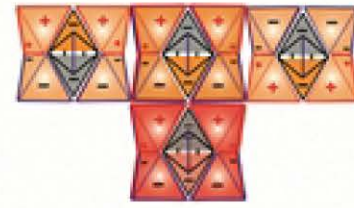
Diamonds

are a metastable allotrope of carbon, where the carbon atoms are arranged in cubic crystal structure called a diamond lattice.



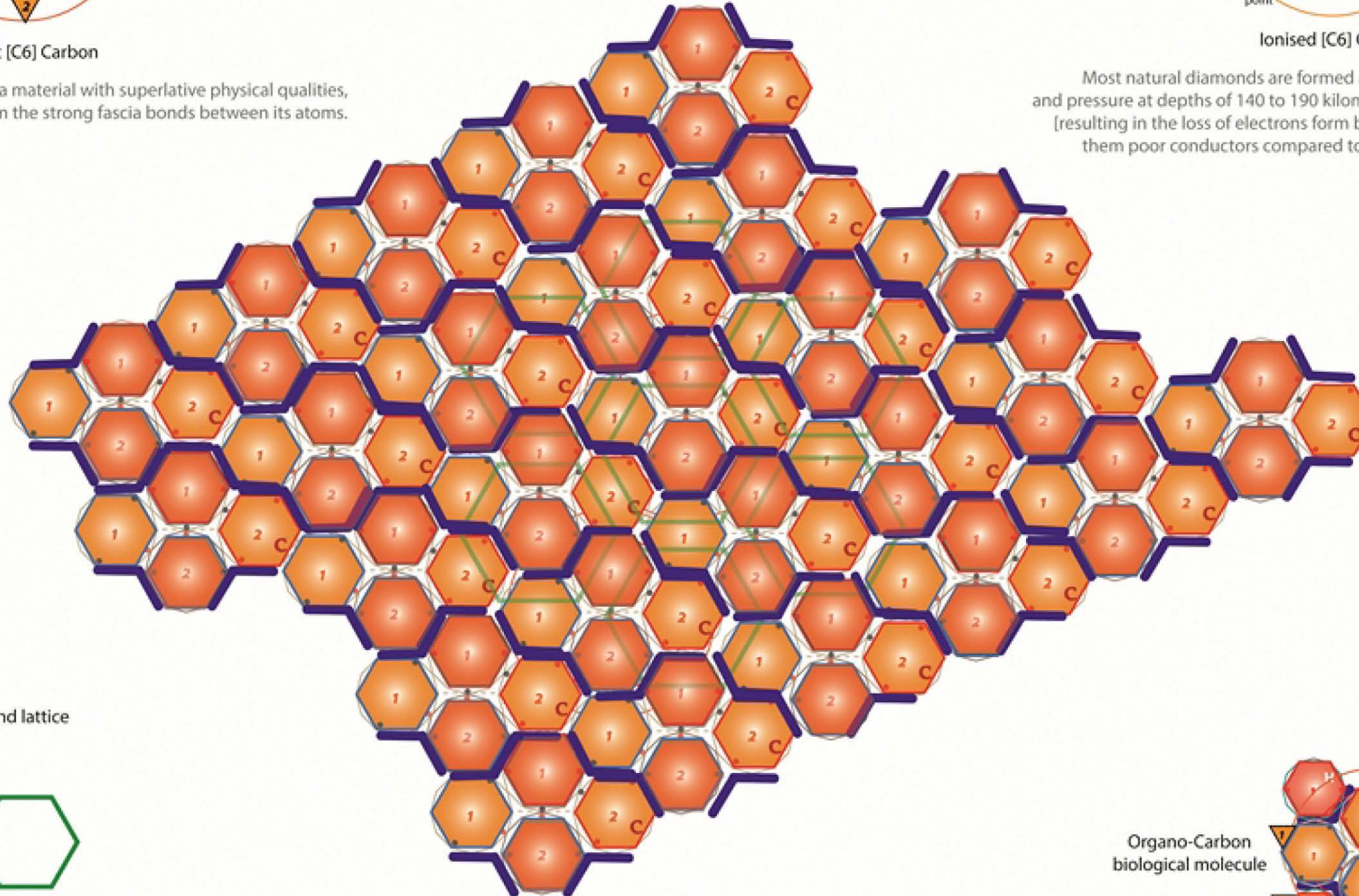
Periodic [C6] Carbon

Diamonds are renowned as a material with superlative physical qualities, most of which originate from the strong fascia bonds between its atoms.

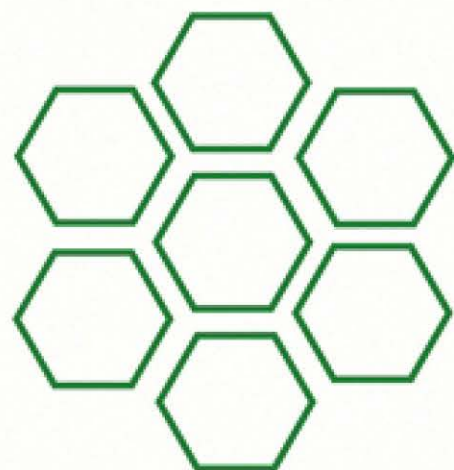


Ionised [C6] Carbon

Most natural diamonds are formed at high temperature and pressure at depths of 140 to 190 kilometers in the Earth's mantle [resulting in the loss of electrons from bound positions, making them poor conductors compared to graphene atoms].



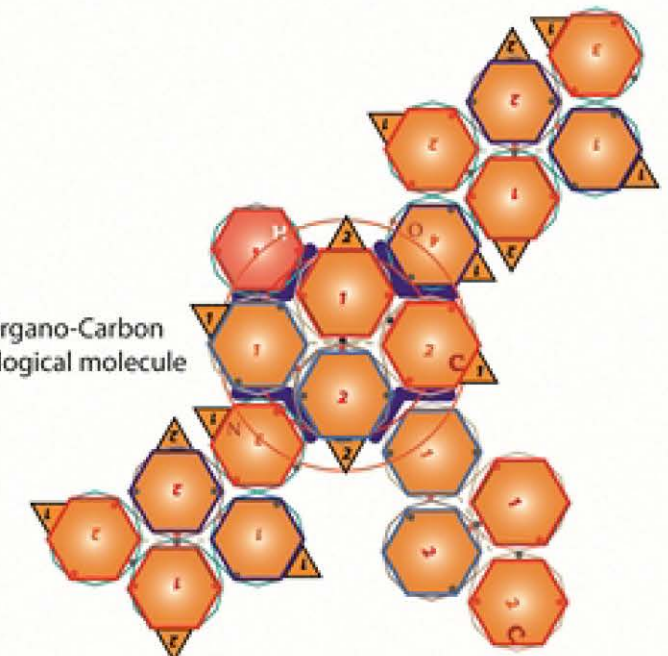
filled n[C7] Carbon diamond lattice



The chemical bonds that hold the carbon atoms in diamonds together are stronger than those in graphite.

In diamonds, the bonds form an inflexible three-dimensional lattice, whereas in graphite, the atoms are tightly bonded into sheets, which can slide easily over one another, making the overall structure weaker

Organo-Carbon biological molecule

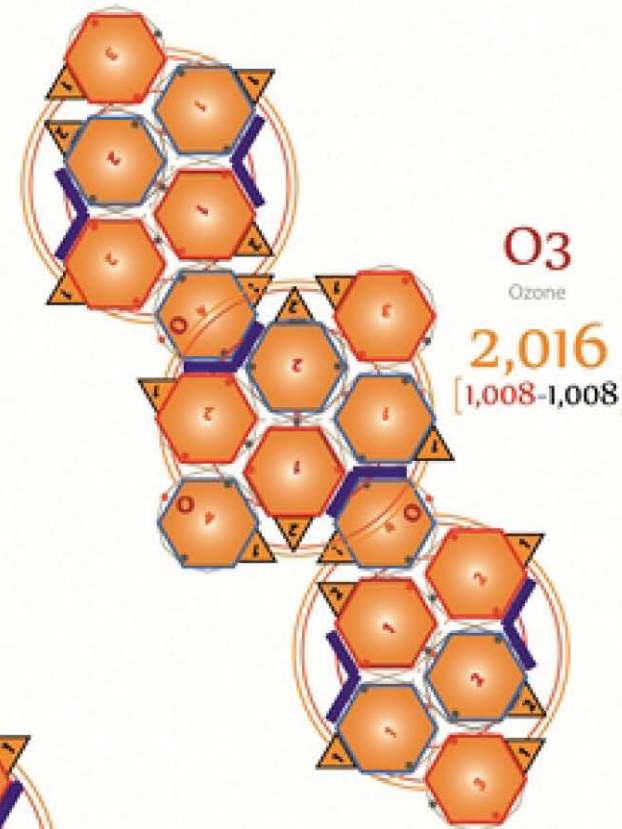
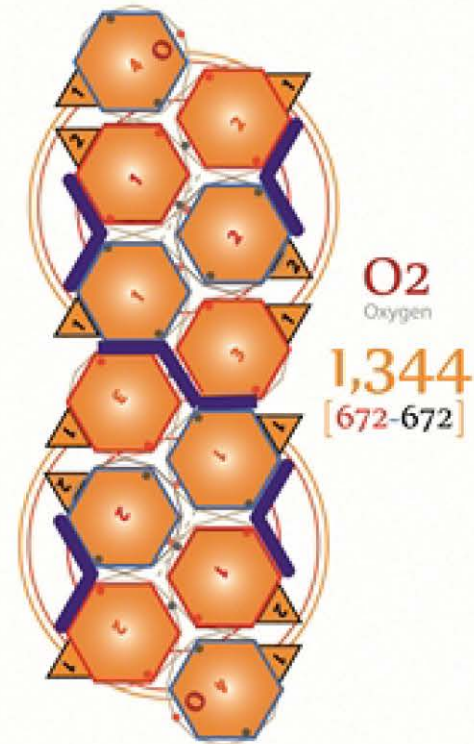
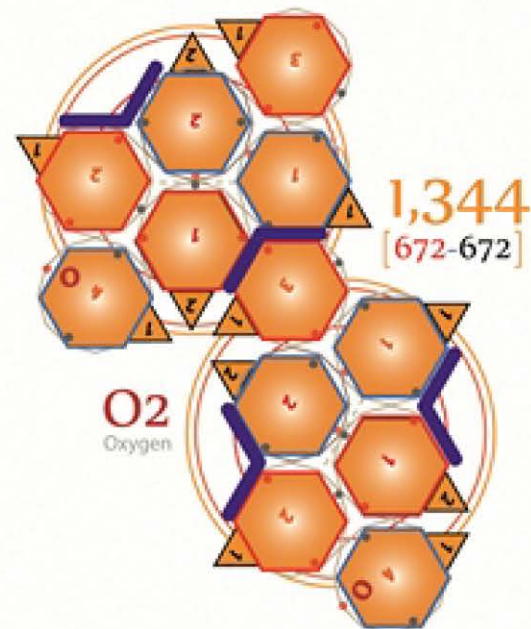


Oxygen Allotropes

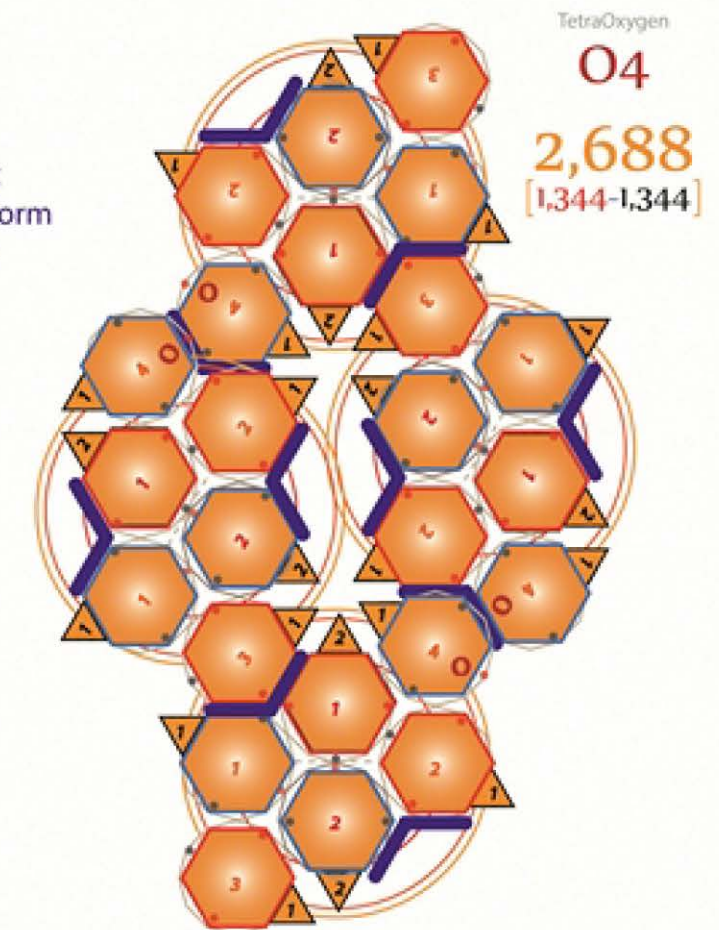
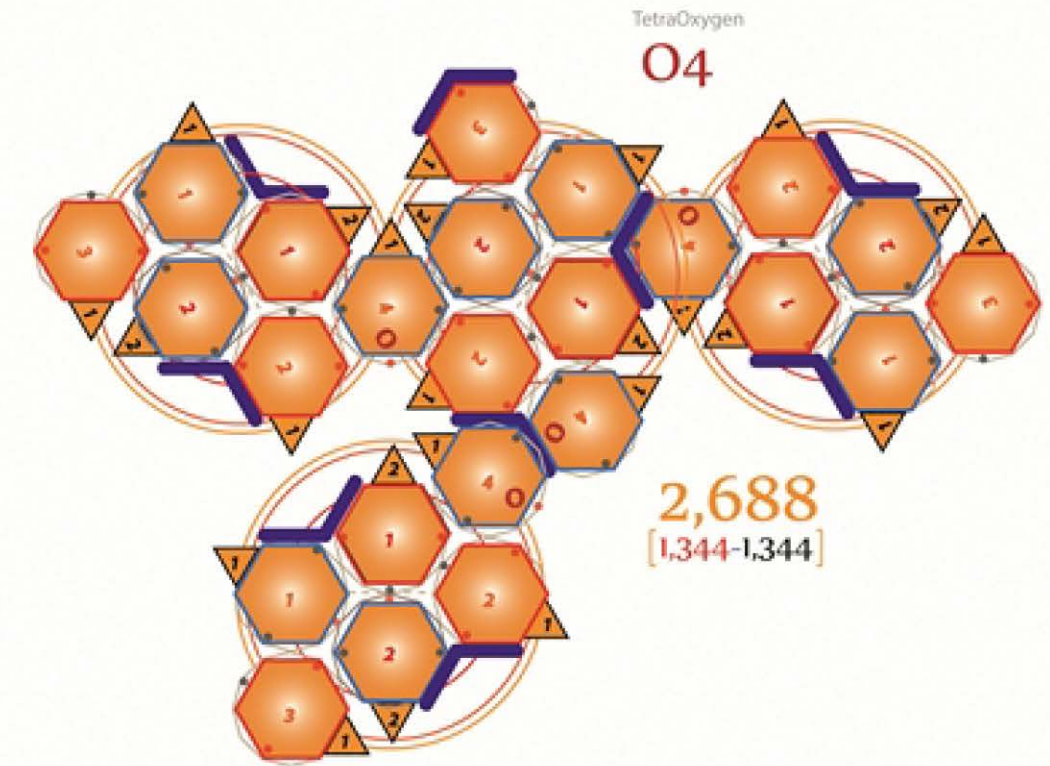
There are several known allotropes of oxygen.
 The most familiar is molecular oxygen (O₂), present at significant levels in Earth's atmosphere and also known as dioxygen or triplet oxygen.
 Another is the highly reactive ozone (O₃).

Others include:
 Atomic oxygen (O₁, a free radical)
 Singlet oxygen (O₂), either of two metastable states of molecular oxygen
 Tetraoxygen (O₄), another metastable form
 Solid oxygen, existing in six variously colored phases, of which one is O₈ and another one metallic

Atomic Oxygen also forms bonds easily with Hydrogen to create Hydroxy compounds



All charge fascia interact and bind where possible to form neutral chemical bonds

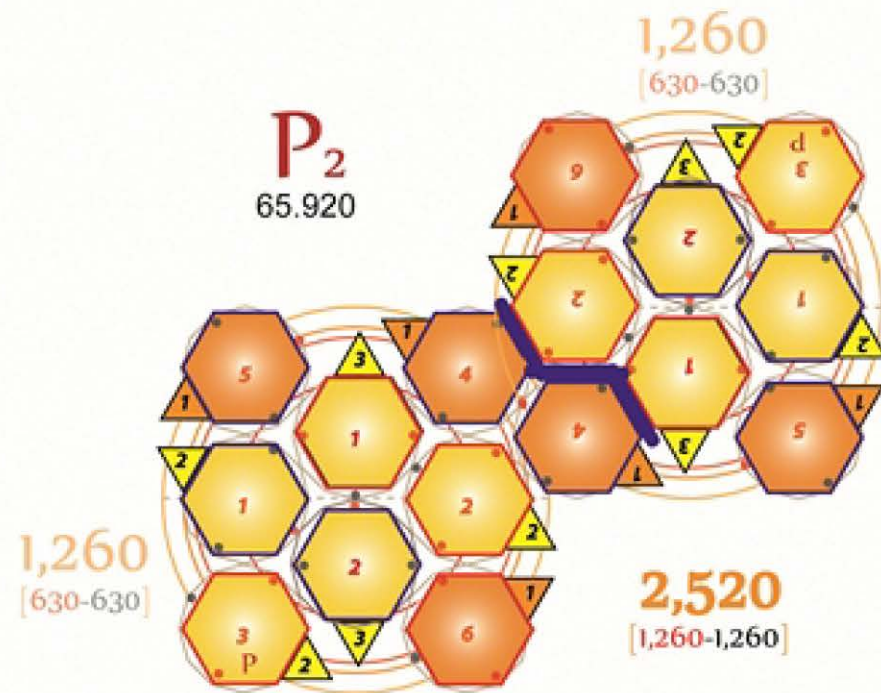
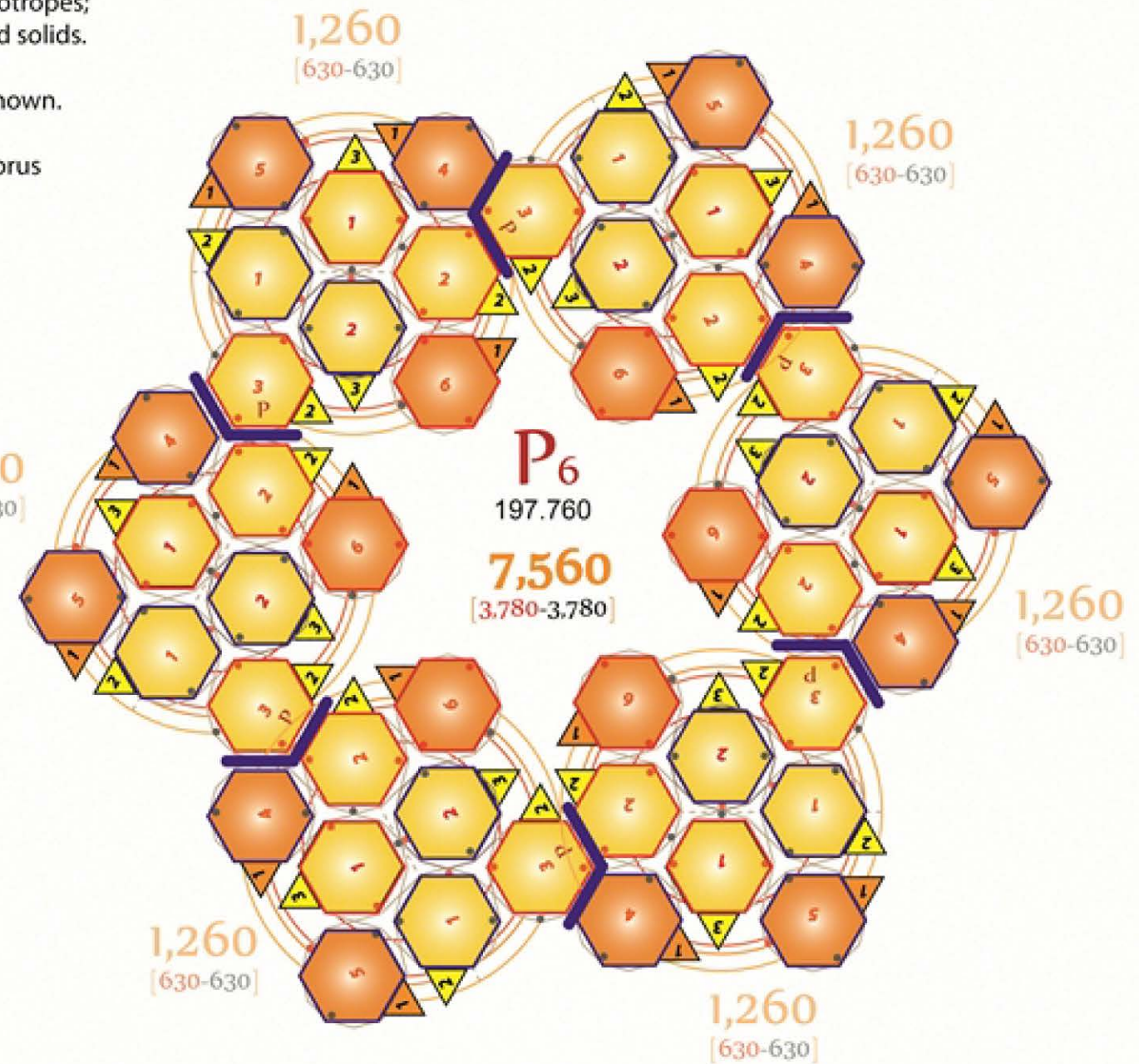


Phosphor Allotropes

Elemental phosphorus can exist in several allotropes; the most common of which are white and red solids.

Solid violet and black allotropes are also known.

Gaseous phosphorus exists as diphosphorus and atomic phosphorus.



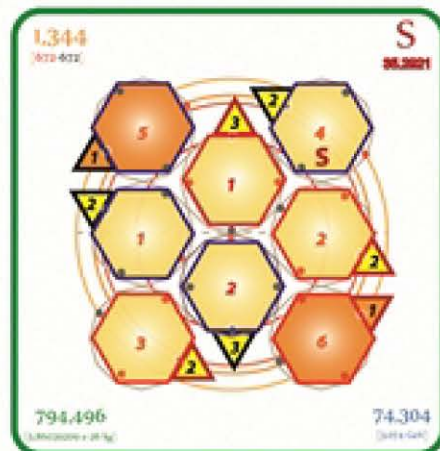
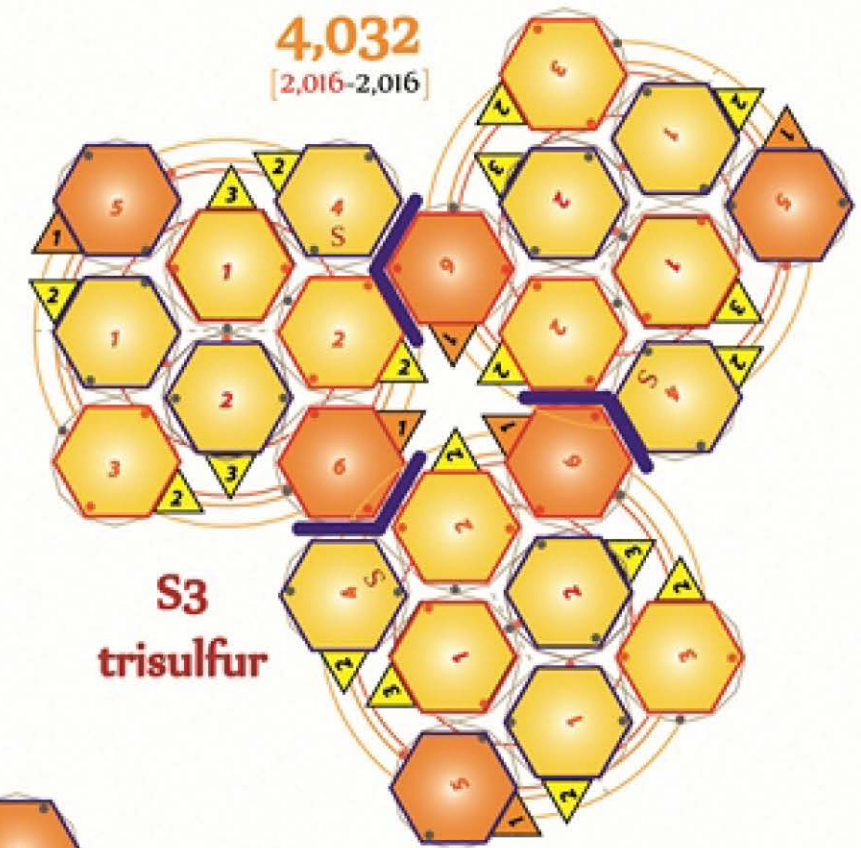
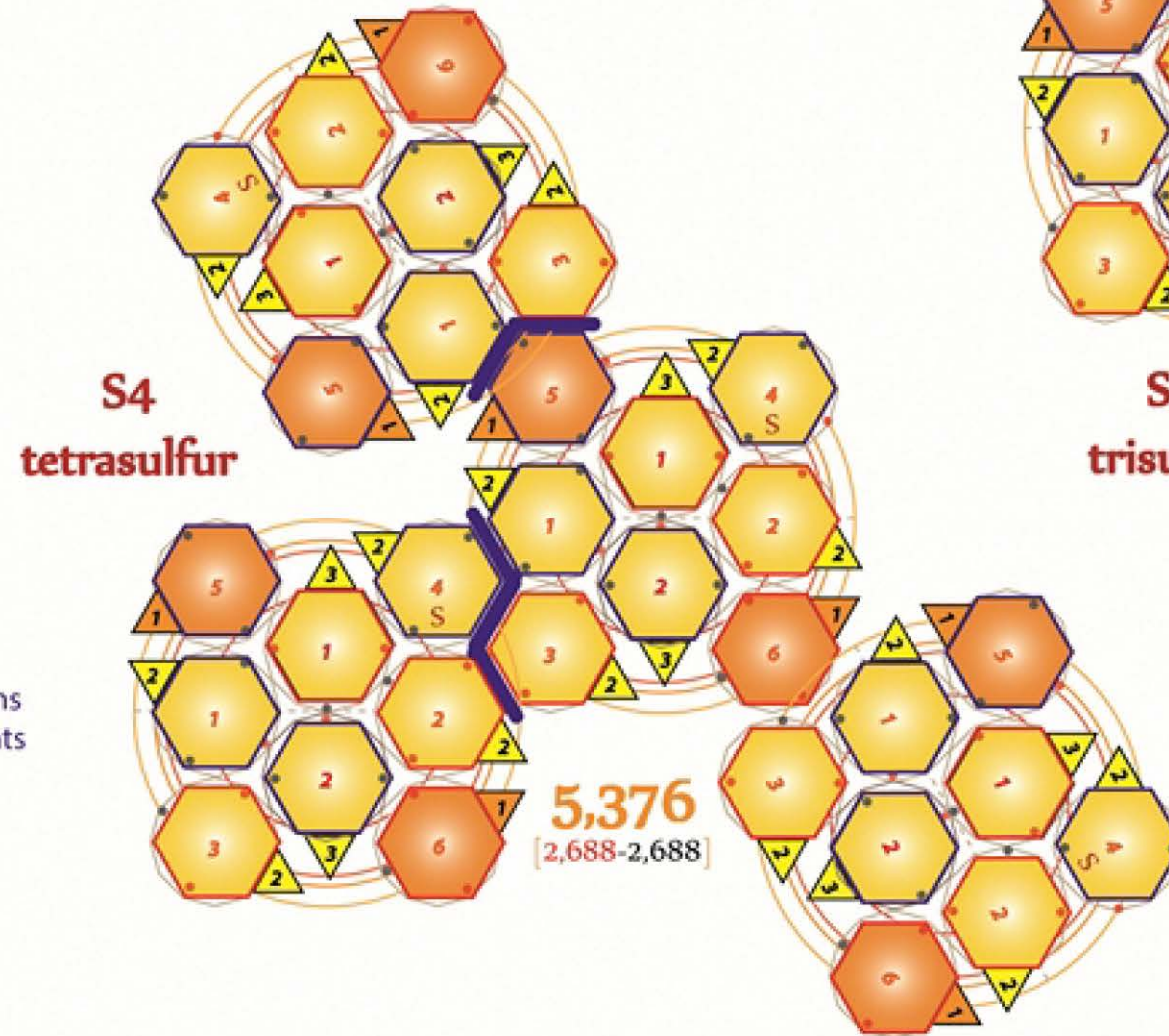
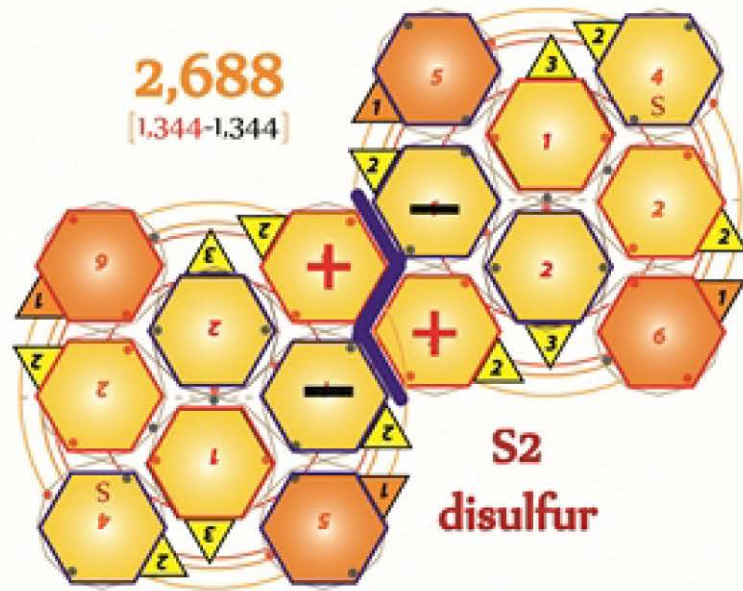
The diphosphorus allotrope (P₂) can be obtained normally only under extreme conditions (for example, from P₄ at 1100 kelvin).

Nevertheless, some advancements were obtained in generating the diatomic molecule in homogenous solution, under normal conditions with the use by some transition metal complexes (based on for example tungsten and niobium).

Black phosphorus is the thermodynamically stable form of phosphorus at room temperature and pressure. It is obtained by heating white phosphorus under high pressures (12,000 atmospheres).

In appearance, properties and structure it is very like graphite, being black and flaky, a conductor of electricity, and having puckered sheets of linked atoms

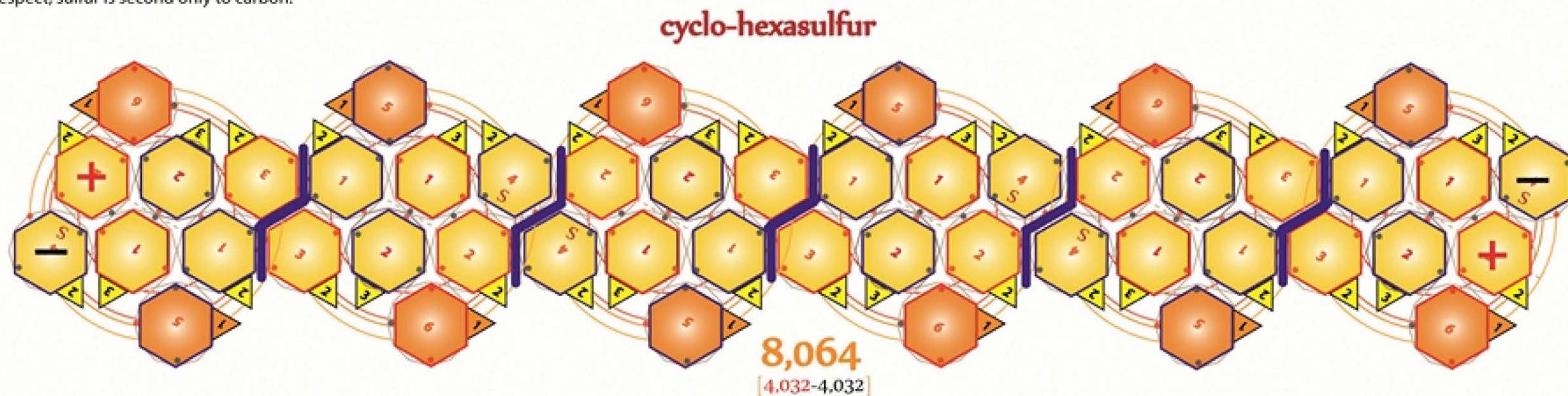
Sulfur Allotropes



Charged fascia interactions between differing elements result in the familiar chemical bonds

Sulfur [like Carbon] can form Chains or Ring compounds

There are a large number of allotropes of sulfur. In this respect, sulfur is second only to carbon.

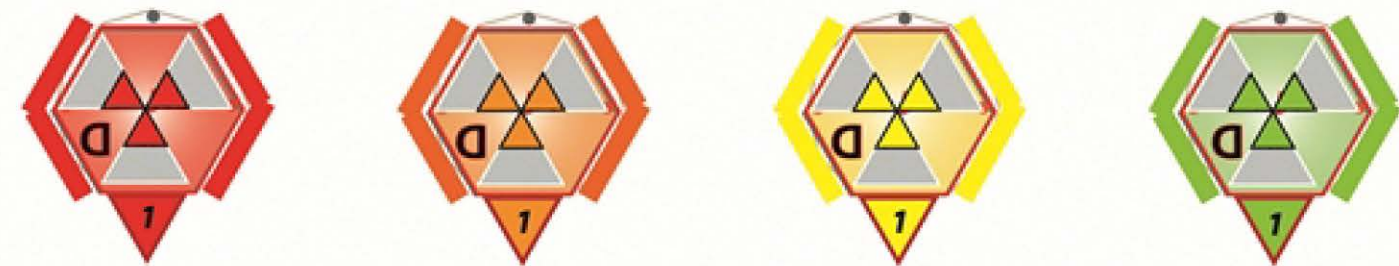


Isotopes

In addition to forming varying allotropic elements

Atoms can also absorb energy directly and create numerous elemental isotopes as a result of their differing nuclear energy levels

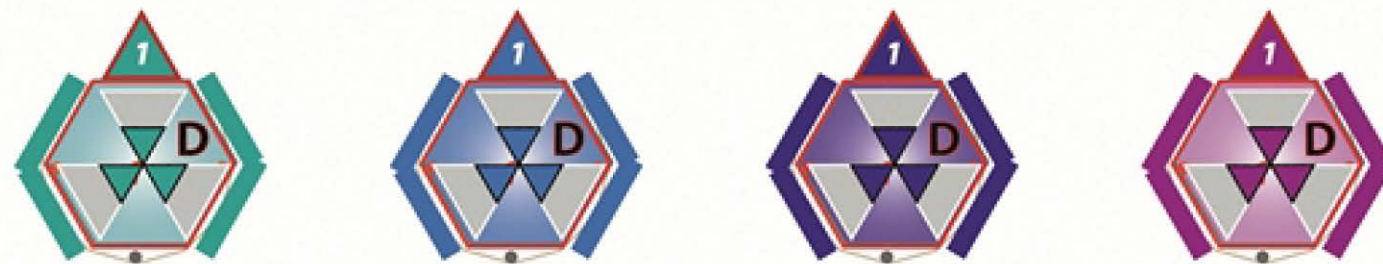
Deuterium nuclei with bound photo-electrons form quantum-scale synchronous converters



Element	0 Hydrogen	1	2	3	4	5	6	7	8
1 Deuterium	22,512	45,012	48,720	52,596	56,640	60,852	65,232	69,780	74,496
2 Helium	24,384	90,024	97,440	105,192	113,280	121,704	130,464	139,560	148,992
3 Lithium	26,352	135,036	146,160	157,788	169,920	182,556	195,696	209,340	223,488
4 Beryllium	28,416	180,048	194,880	210,384	226,560	243,408	260,928	279,120	297,984
5 Boron	30,576	225,060	243,600	262,980	283,200	304,260	326,160	348,900	372,480
6 Carbon	32,832	270,072	292,320	315,576	339,840	365,112	391,392	418,680	446,976
7 Nitrogen	35,184	315,084	341,040	368,172	396,480	425,964	456,624	488,460	521,472
8 Oxygen	37,632	360,096	389,760	420,768	453,120	486,816	521,856	558,240	595,968
9 Fluorine		405,108	438,480	473,364	509,760	547,668	587,088	628,020	670,464
10 Neon		450,120	487,200	525,960	566,400	608,520	652,320	697,800	744,960
11 Sodium		495,132	535,920	578,556	623,040	669,372	717,552	767,580	819,456
12 Magnesium		540,144	584,640	631,152	679,680	730,224	782,784	837,360	893,952
13 Aluminium		585,156	633,360	683,748	736,320	791,076	848,016	907,140	968,448
14 Silicon		630,168	682,080	736,344	792,960	851,928	913,248	976,920	1,042,944
15 Phosphorus		675,180	730,800	788,940	849,600	912,780	978,480	1,046,700	1,117,440
16 Sulfur		720,192	779,520	841,536	906,240	973,632	1,043,712	1,116,480	1,191,936
17 Chlorine		765,204	828,240	894,132	962,880	1,034,484	1,108,944	1,186,260	1,266,432
18 Argon		810,216	876,960	946,728	1,019,520	1,095,336	1,174,176	1,256,040	1,340,928
19 Potassium		855,228	925,680	999,324	1,076,160	1,156,188	1,239,408	1,325,820	1,415,424
20 Calcium		900,240	974,400	1,051,920	1,132,800	1,217,040	1,304,640	1,395,600	1,489,920



**It is the increased nucleonic energy levels that creates isotopes
(not extra Neutrons within an atomic nucleus)**



The energy level of Baryons determines the KEM energies of photo-electrons bound to them

Most isotopes are considered to be radioactive as a result of the nuclei seeking to release excess energy in the form of photons of energy or particles with high kinetic energies

Carbon Isotopes

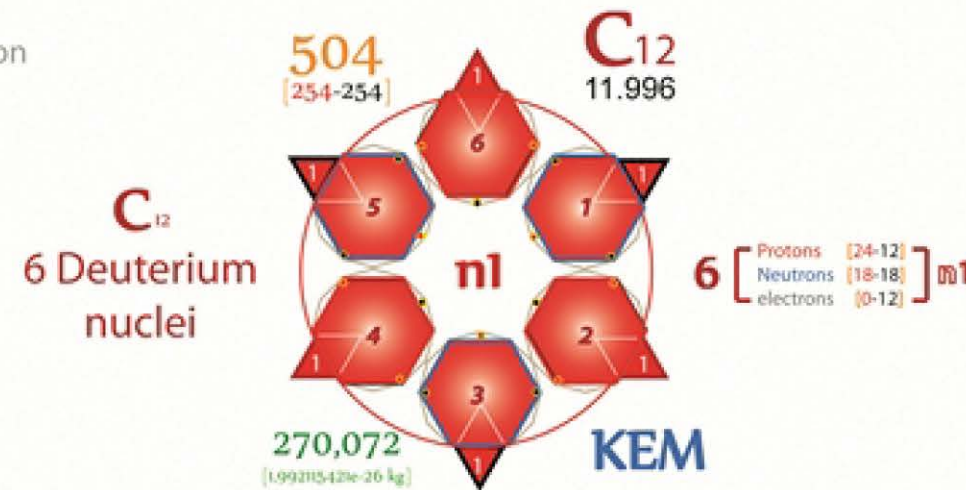
It is widely held in the scientific community that Carbon-14, ^{14}C , or radiocarbon, is a radioactive isotope of carbon with a nucleus containing 6 protons and 8 neutrons.

It is in fact a nucleus comprised of 6 deuterium nuclei [with 6 Protons, 6 Neutrons & 6 electrons]

The mistaken belief in 'extra' neutrons being present in the nucleus stems from the fact that electrons and protons combine in equal numbers in the atomic nucleus and historically attributing the mass in excess of this as being the result of the mass contribution of 'extra' neutrons

Tetryonics finally corrects this erroneous assumption

Carbon 12-14



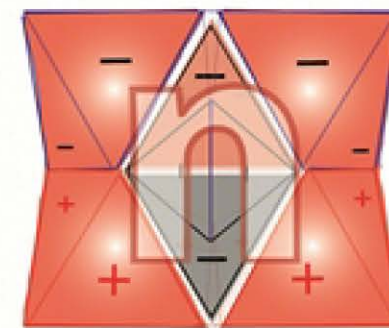
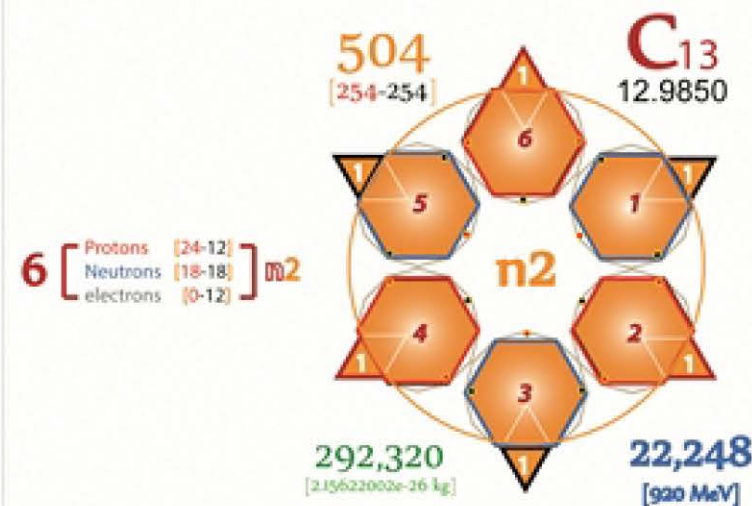
There are NO extra neutrons (in excess of the element's Z#) in the nuclei of atomic isotopes.

The measured 'excess mass' is the direct result of the raised quantum levels of the Deuterium nuclei that comprise each atomic element

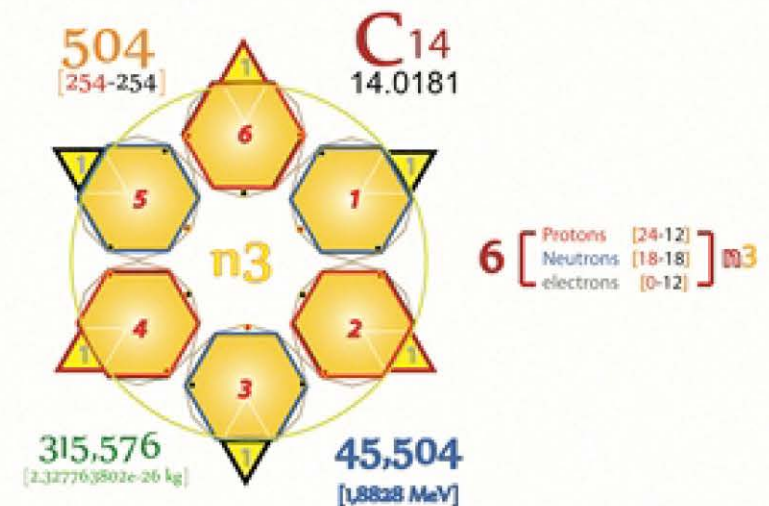
And is completely accounted for in Tetryonic theory by calculating for the total rest mass-energies in each elementary Matter topology.

The 'extra' mass historically attributed to neutron numbers above that of the elemental number are now reflected as stored kinetic 'chemical' energies as they always were.

ALL elements & isotopes have equal numbers of Protons, electrons & Neutrons



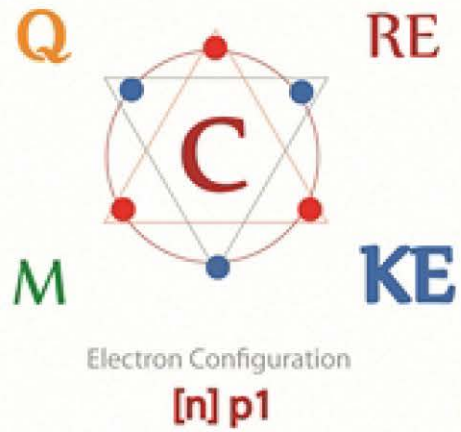
Quantum levels of atomic nuclei contribute to the molar mass [Isotopes are higher energy nuclei]



KEM diff
neutron #

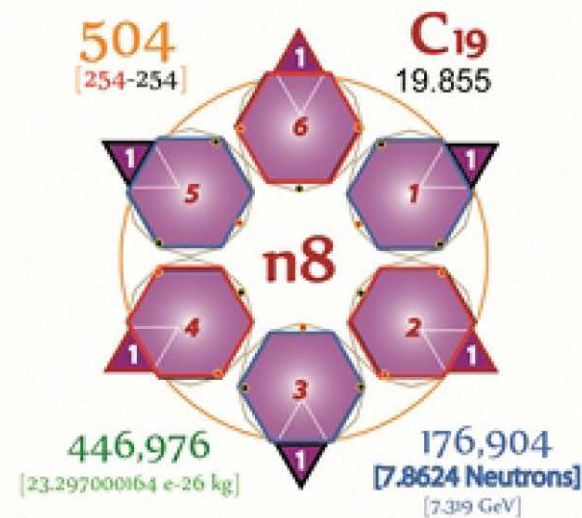
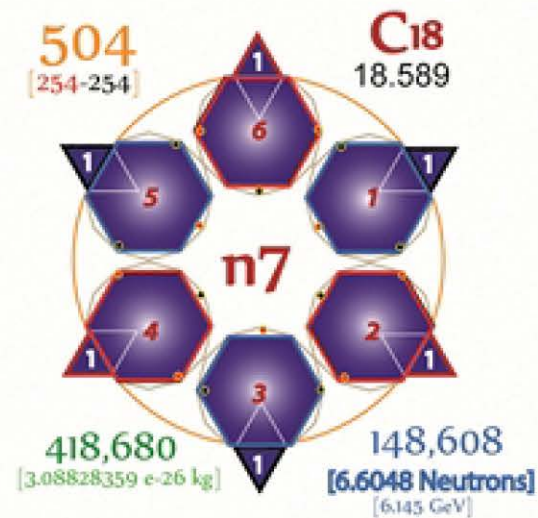
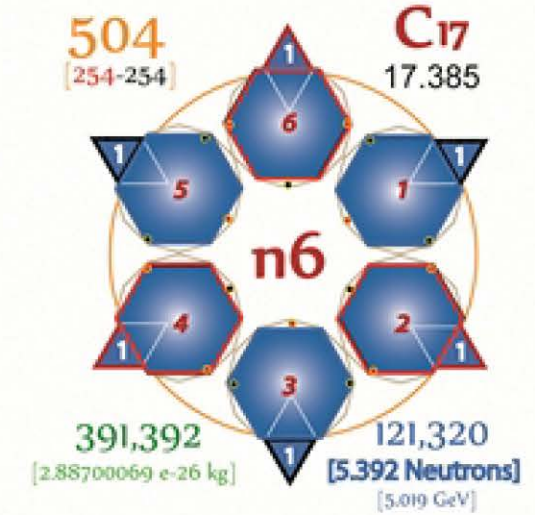
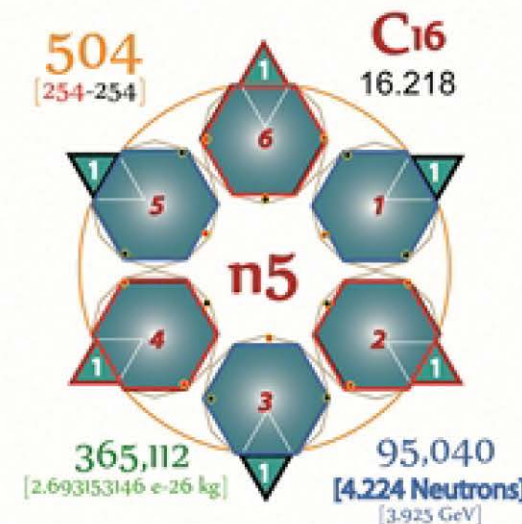
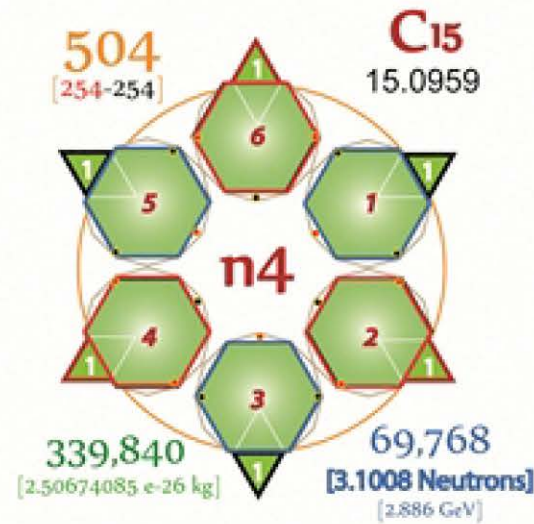
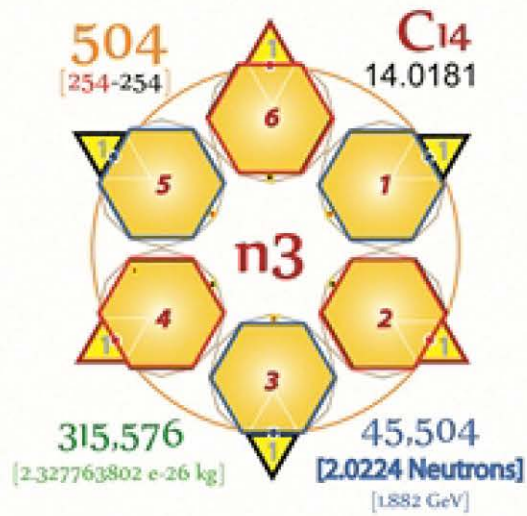
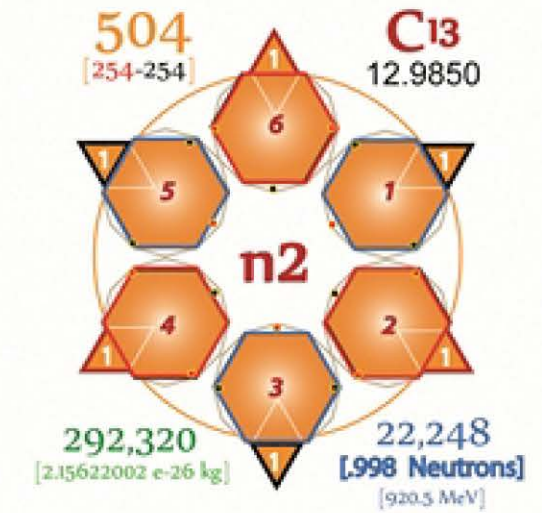
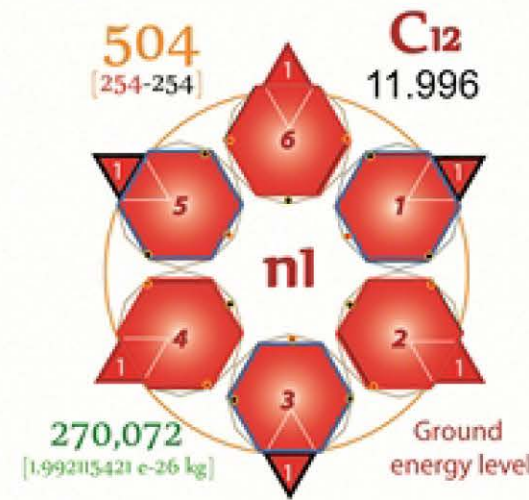
	n1	n2	n3	n4	n5	n6	n7	n8
C_{12}	270,072	292,320	315,576	339,840	365,112	391,392	418,680	446,976
	0	22,248	45,504	69,768	95,040	121,320	148,608	176,904
		.98	2.0	3.1	4.2	5.4	6.6	7.8

This applies equally to all atomic nuclei



Atoms store mass-energies in their standing wave Matter topologies and release it via radioactive decay paths

It is increased kinetic energy level geometries that create nuclear isotopes (not extra Neutrons within a nucleus)



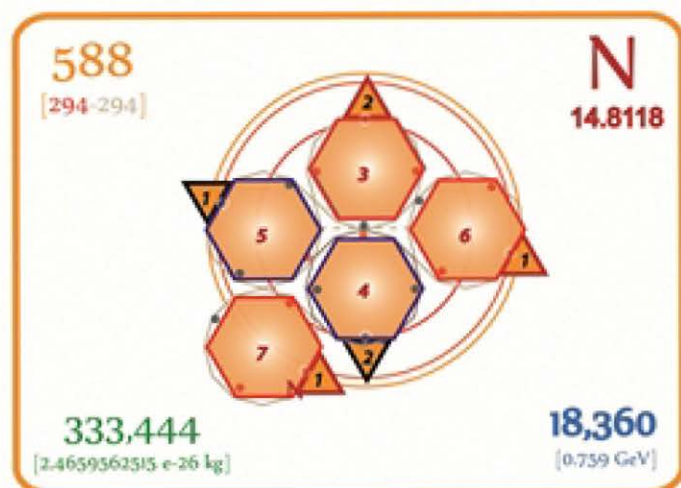
Shell		Molar meM	
R	8	446,976	19.855
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P	6	391,392	17.385
O	5	365,112	16.218
N	4	339,840	15.095
M	3	315,576	14.018
L	2	292,320	12.985
K	1	270,072	11.996

energy level

22,500
[1 Neutron]
n
[930.97 MeV]

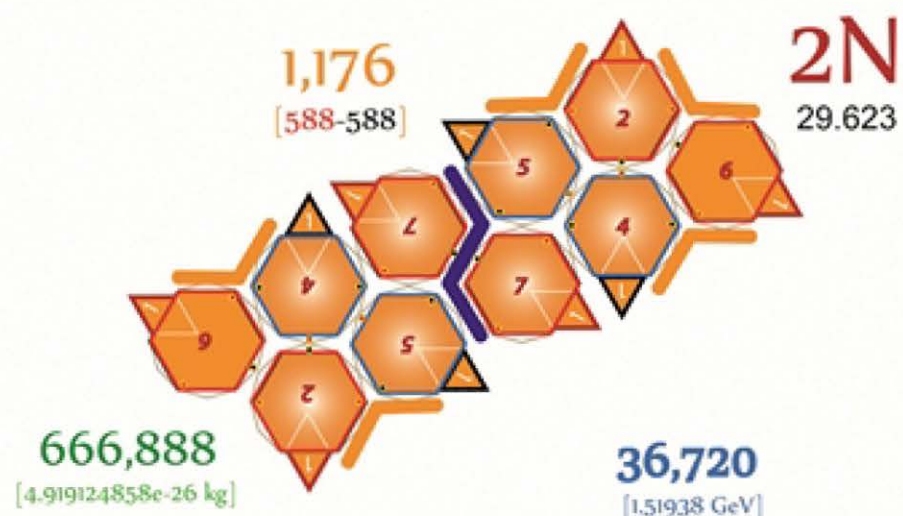
Kinetic mass-energy geometries stored in 3D Matter topologies is released as Chemical energies

Deuterium nuclei with bound photo-electrons form quantum-scale synchronous converters



It is increased Nucleonic energy levels that creates isotopes (not extra Neutrons within any elementary Nucleus)

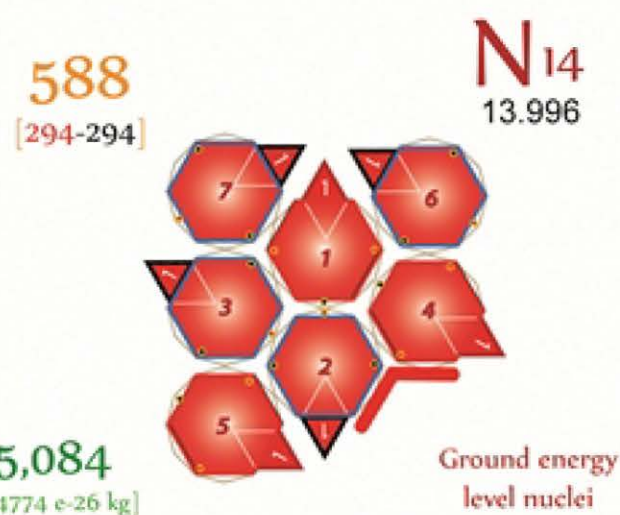
Nitrogen gas



Nitrogen Allotropes & Isotopes



Isotopes are created by increasing the number of Planck mass-energies stored in the standing-wave geometries of chemical elements

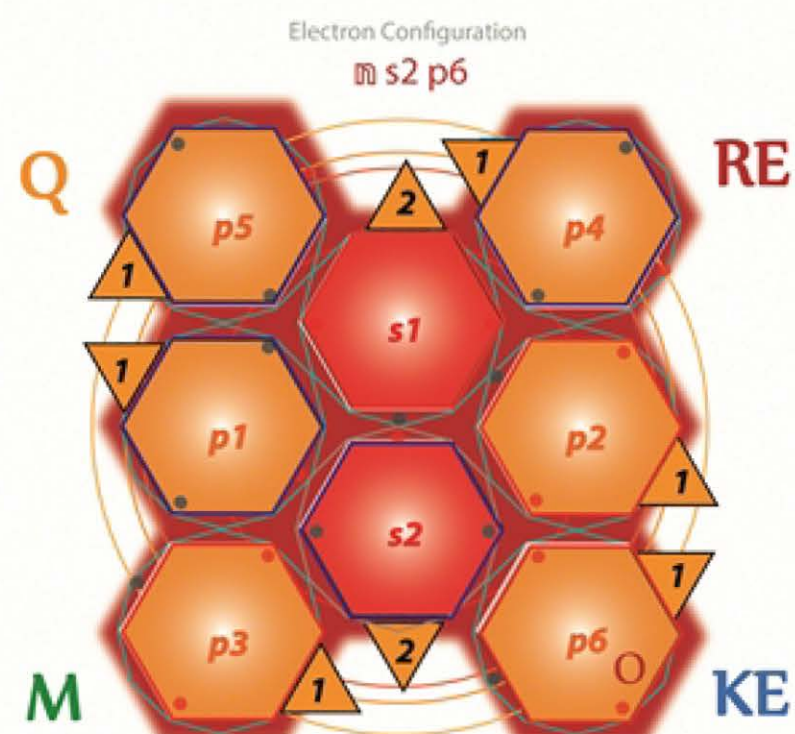
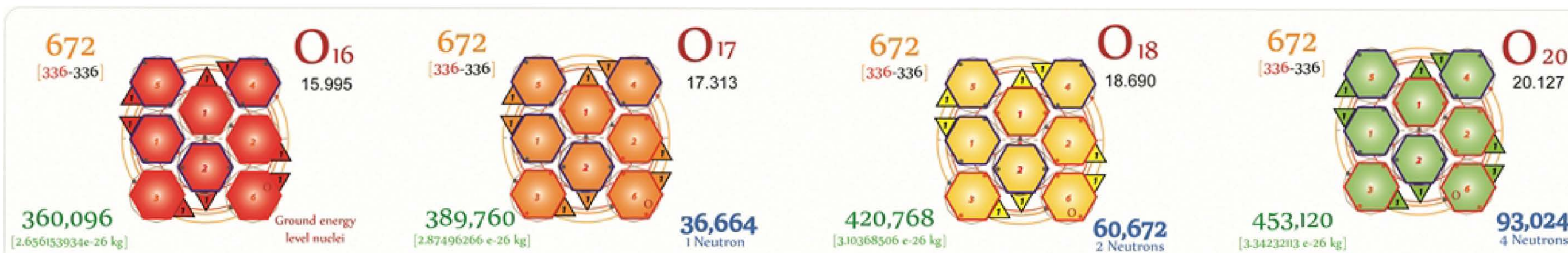


The charged mass-energy geometries of differing allotropic topologies create various chemical bond points

Shell		Molar meM	
R	8	521,472	23.164
Q	7	488,460	21.697
P	6	456,624	20.283
O	5	425,964	18.921
N	4	396,480	17.612
M	3	368,172	16.354
L	2	341,040	15.149
K	1	315,084	13.996
			7

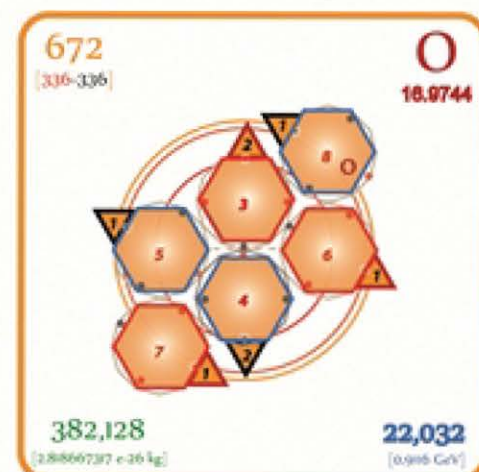
energy level

Nuclei per shell



This oxygen allotrope's nuclei arrangement is very stable and inert like Neon [due to its filled sp electron orbitals]

Oxygen Allotropes & Isotopes



There exists an allotrope of Oxygen formed when 8 nuclei combine in a single level SP orbital arrangement

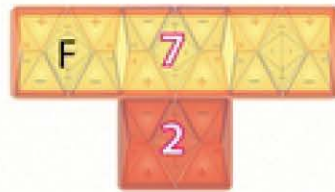
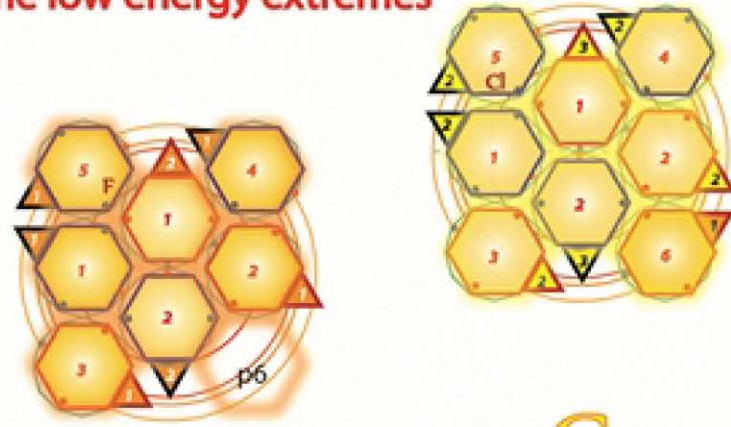
Shell		Molar meM	
R	8	595,968	26.473 8
Q	7	558,240	24.797 8
P	6	521,856	23.181 8
O	5	486,816	20.825 8
N	4	453,120	20.127 8
M	3	420,768	18.690 8
L	2	389,760	17.313 8
K	1	360,096	15.995 8
energy level		8	

Nuclei per shell

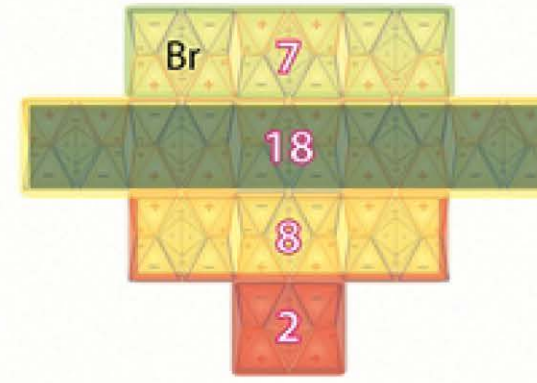
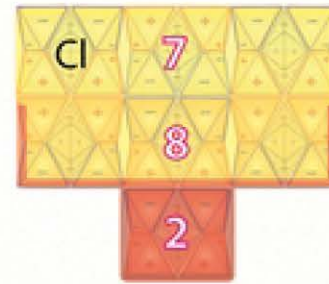
It is increased Nucleonic energy levels that creates isotopes (not extra Neutrons within a Nucleus)



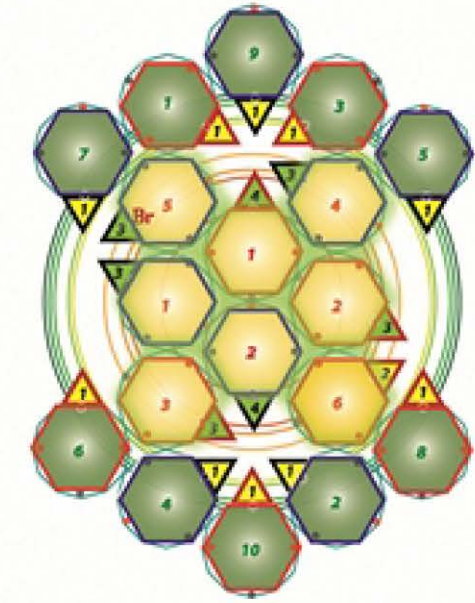
Bose-Einstein condensates exist at the low energy extremes



Gaseous



Liquid

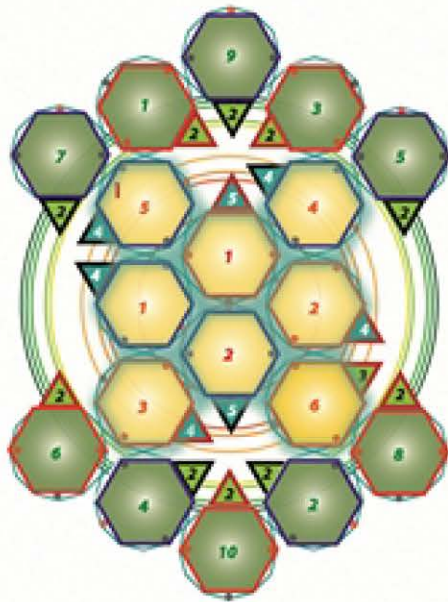


The Natural states of Matter (room temperature)

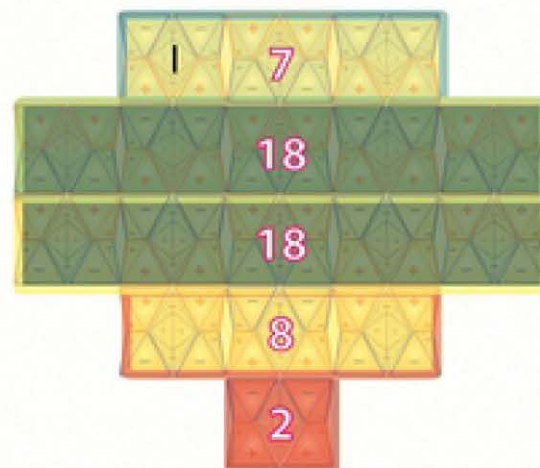
Elements appear in their natural phase at room temperature as a gas, liquid, solid or synthetic

As energy is added or removed from any element's charged Matter topology or their baryonic KEM field geometry their phase states & Brownian motion changes

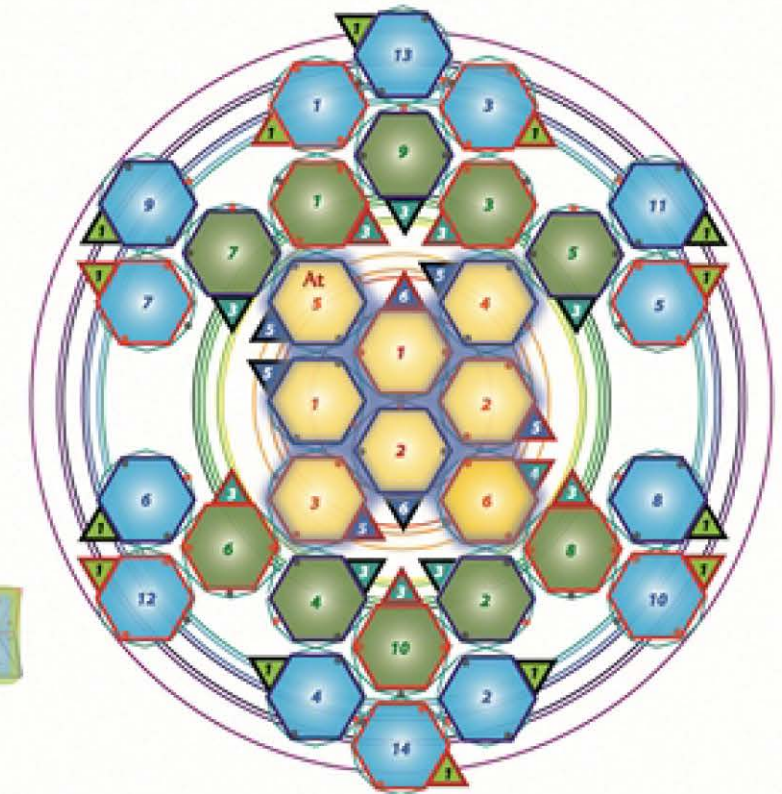
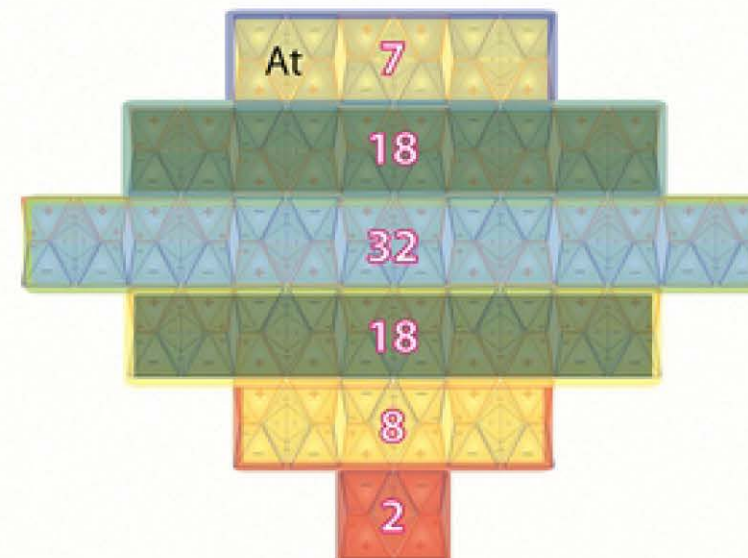
The halogen element family provides a great example of all 4 states of Matter at room temperature



Solid



Radioactive

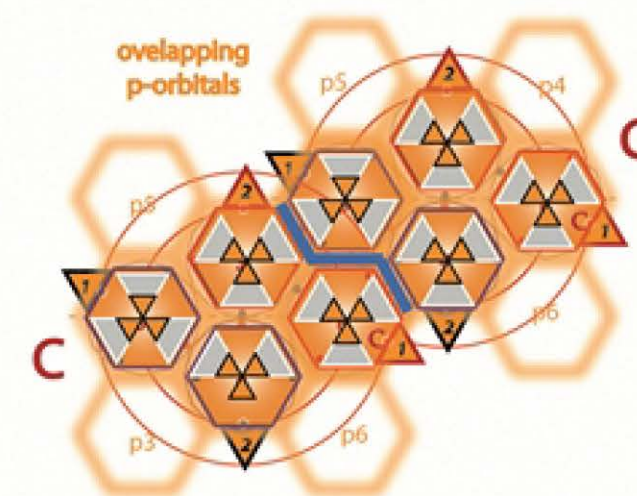
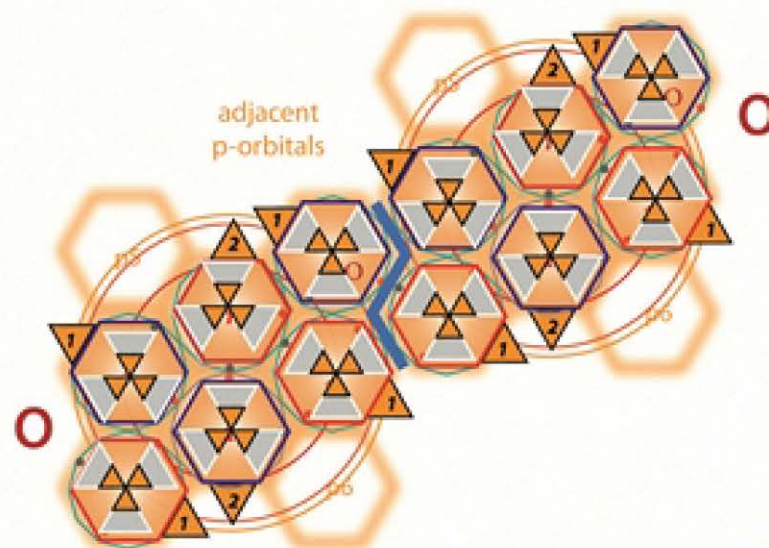
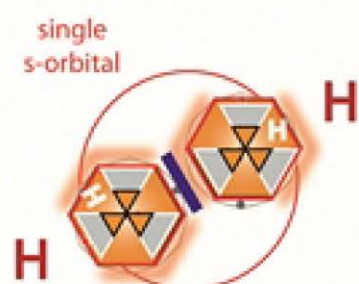


At the high energy extremes exist the Plasma states of Matter

Chemical bonds

A chemical bond is an attraction between atoms that allows the formation of chemical substances that contain two or more atoms.

Particle charge & Inter-fascia electric interaction provides the foundation of chemical bonds



It is usually taught that based on electron sharing principles a single bond contains 2 paired electrons, a double bond has 4 electrons and a triple bond has 6 shared electrons

filled electron shells
[weak KEM'ical bonds]

single bond

double bond

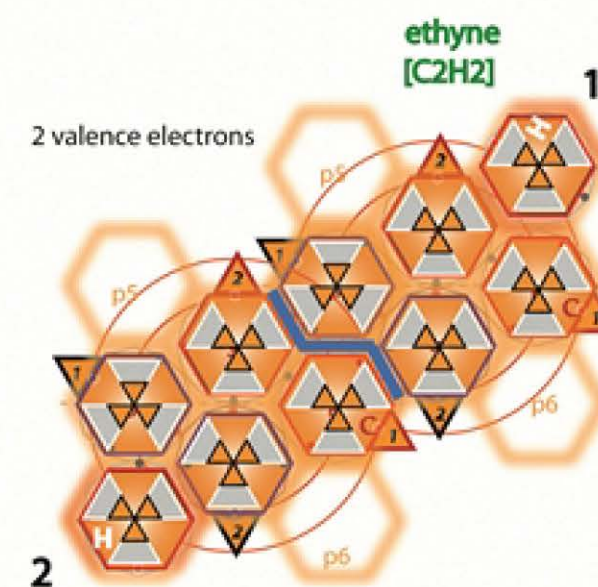
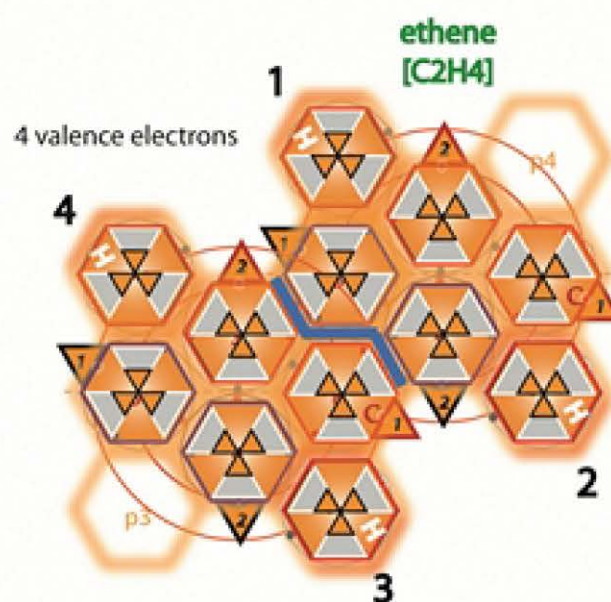
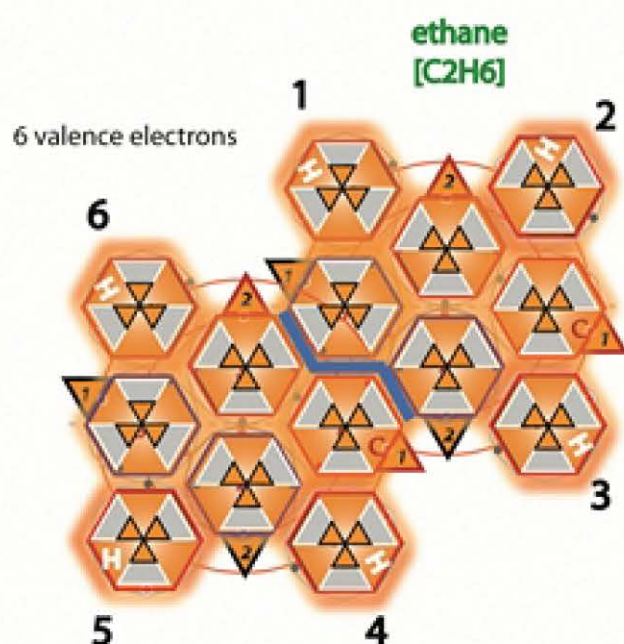
triple bond

Charged baryon fascia and electron sharing both play roles in facilitating chemical bonds

Lewis diagrams are not an accurate representation of chemical bonding in elements or compounds

unfilled electron shells
[stronger KEM'ical bonds]

Tetryonic geometry provides an advanced quantum topology for all atoms and compounds that is superior to the older Lewis diagrams and even molecular orbital theory, facilitating a clear understanding of the quantum geometry of each element, its nuclear bonds and electron sharing in all compound chemical structures; along with the core & valence electron configurations & interactive electric charge fascia bonding positions for each compound created.

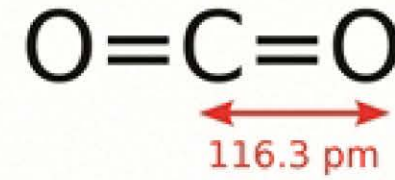
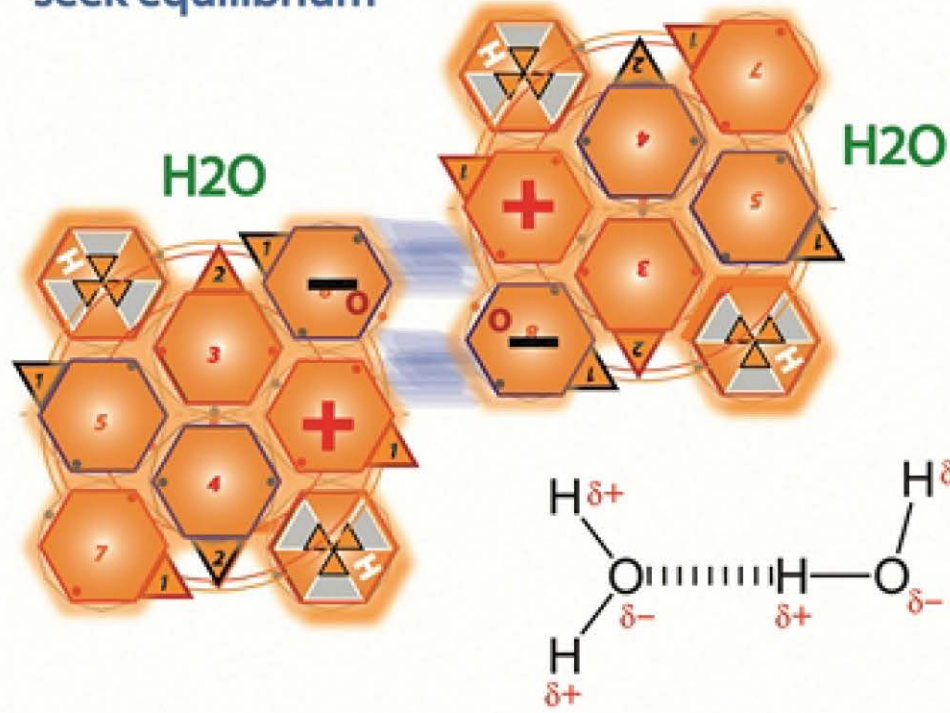


Valence electrons also play an important role in determining the strength of chemical bonds

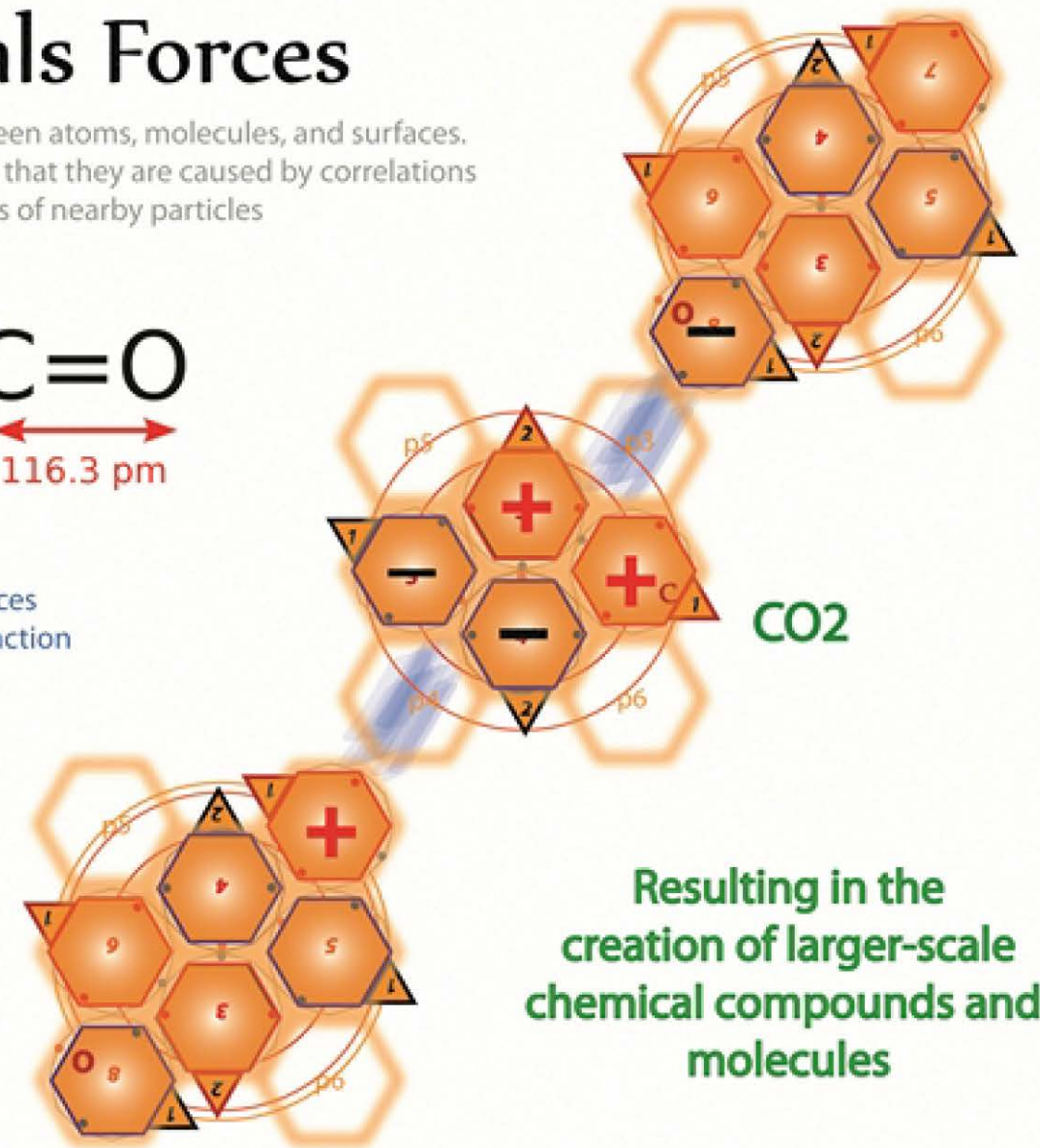
Van der Waals Forces

Van der Waals forces include attractions between atoms, molecules, and surfaces. They differ from covalent and ionic bonding in that they are caused by correlations in the fluctuating polarizations of nearby particles

All charges seek equilibrium



Van der Waals and London forces are the geometric fields of interaction between charged Matter topologies

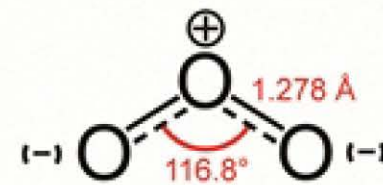
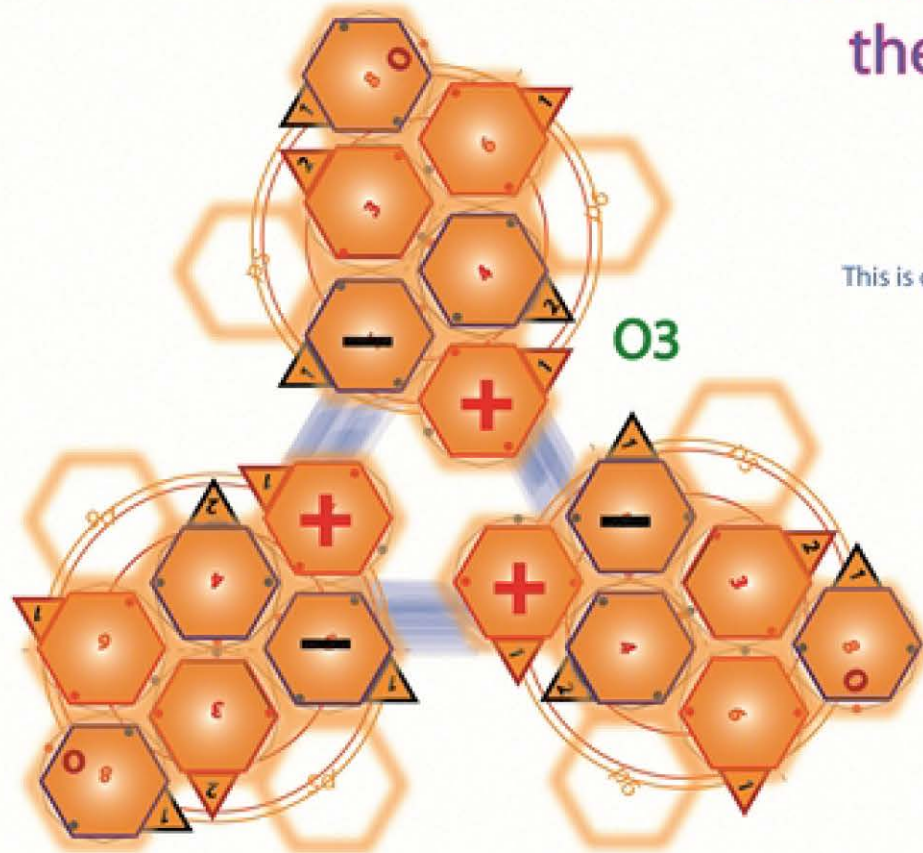


Resulting in the creation of larger-scale chemical compounds and molecules

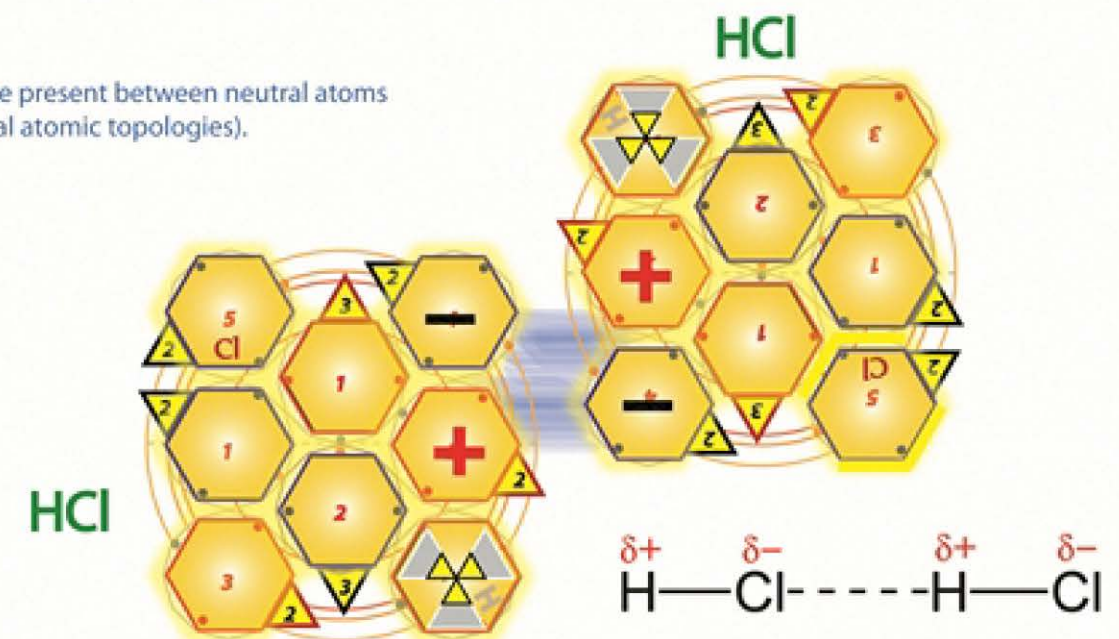
The Forces of interaction can be attractive or repulsive

Residual interactive bonding force between the charged fascia of atoms

This is considered to be the only attractive intermolecular force present between neutral atoms (e.g., a noble gas configurations and charge neutral atomic topologies).



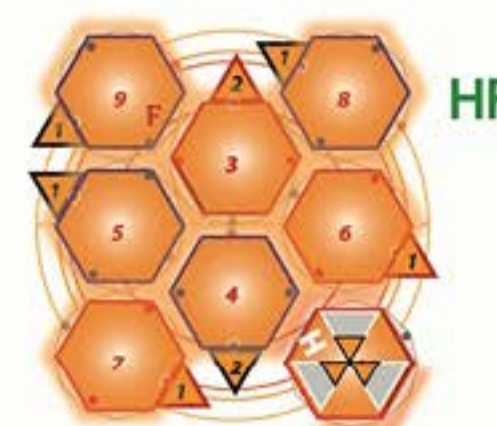
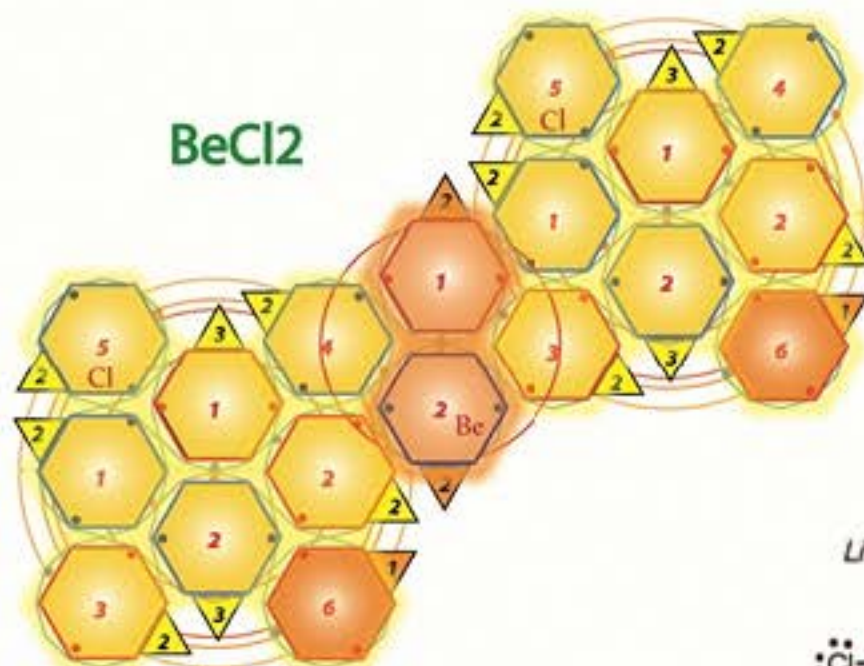
Without London forces, there would be no attractive force between noble gas atoms, and they wouldn't exist in liquid form.



Lewis Structures

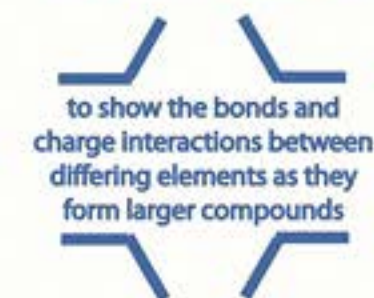
The Lewis structure was named after Gilbert N. Lewis, who introduced it in his 1916 article *The Atom and the Molecule*.

Lewis structures, also called Lewis-dot diagrams, are diagrams that show the bonding between the atoms of any molecule, and the lone pairs of electrons that may exist in the molecule.



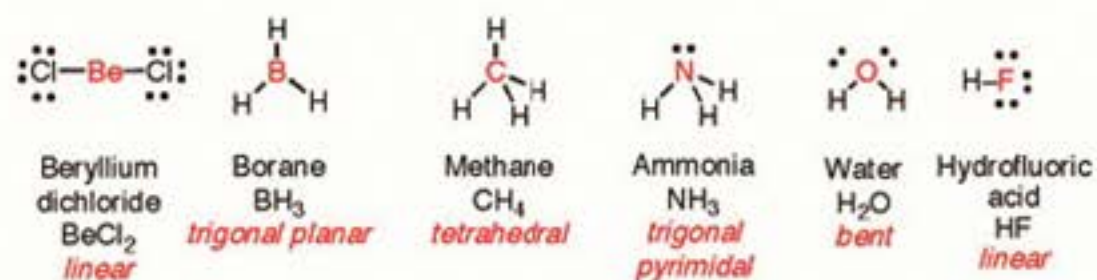
Hydrogen is a 'free radical' atom whose energy can be changed to facilitate chemical bonding between elements

Tetryonic geometry uses the charged geometry of the element fascia themselves

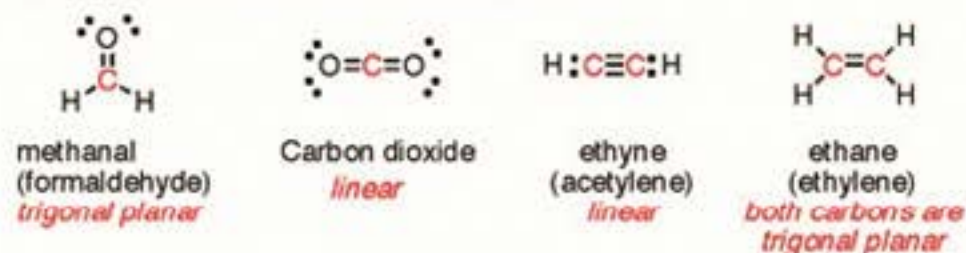


to show the bonds and charge interactions between differing elements as they form larger compounds
as well as the actual final quantum topology of compound elements and molecules

Line drawings can be used to depict molecular geometry:



Also applies to molecules with multiple bonding:



They are similar to electron dot diagrams in that the valence electrons in lone pairs are represented as dots, but they also contain lines to represent shared pairs in a chemical bond (single, double, triple, etc.).

single fascia bond



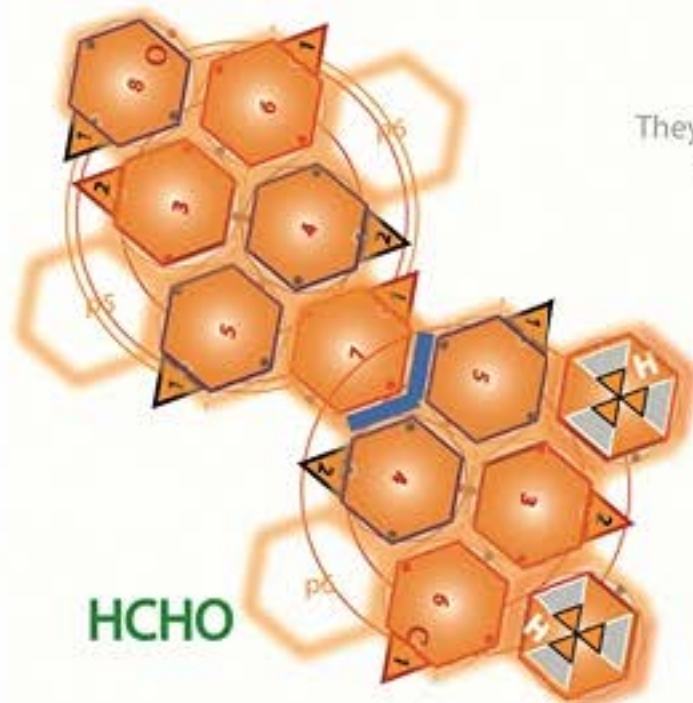
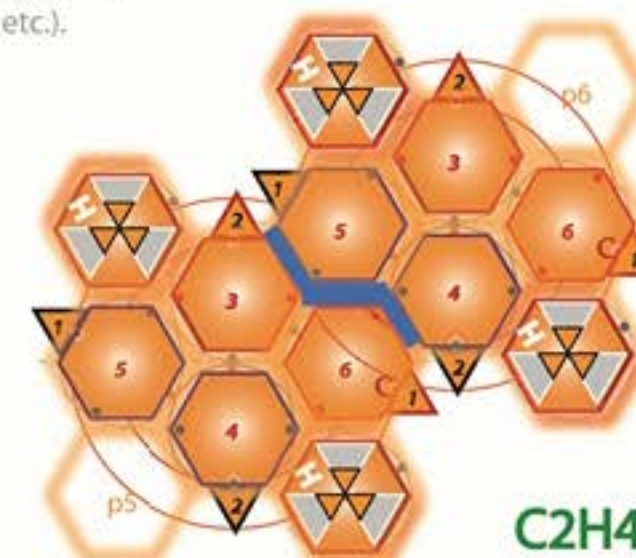
double fascia bonds



triple fascia bond

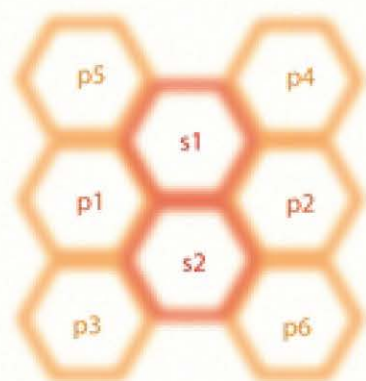


it is the electric field fascia of baryons that facilitates chemical bonds



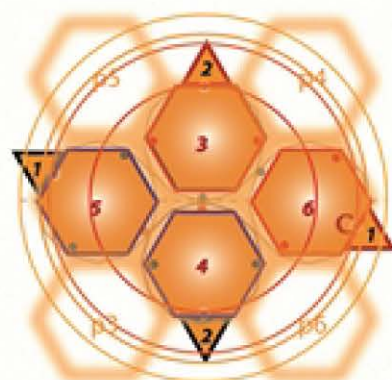
Atomic bonds

All atoms, elements and compounds seek stable core energy & configurations where their electron orbitals are filled



Hydrogen σ bonds

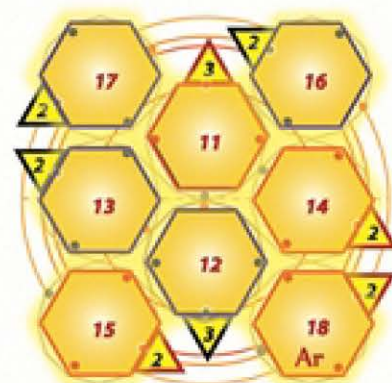
Outward presenting electric fascia bonds
Facilitate bonding between molecules



Molecular π bonds

Inward receiving bonds
capable of accepting Hydrogen
or extra-orbital electric fascia bonds

Bonds fill in order of orbital filling
ie p1-6, d1-10



Core electron configuration

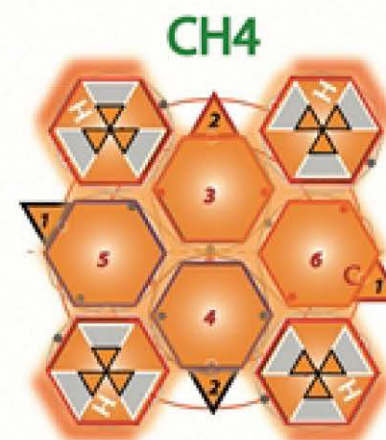
Unreactive [non-valence]
electron configuration



Hydroxide bonds

Oxygen-Hydrogen compound
creates a halogen-like topology
which seeks to fill its p6 orbital
in order to reach a stable electronic
configuration

Extremely reactive



CH4

Covalent bonds

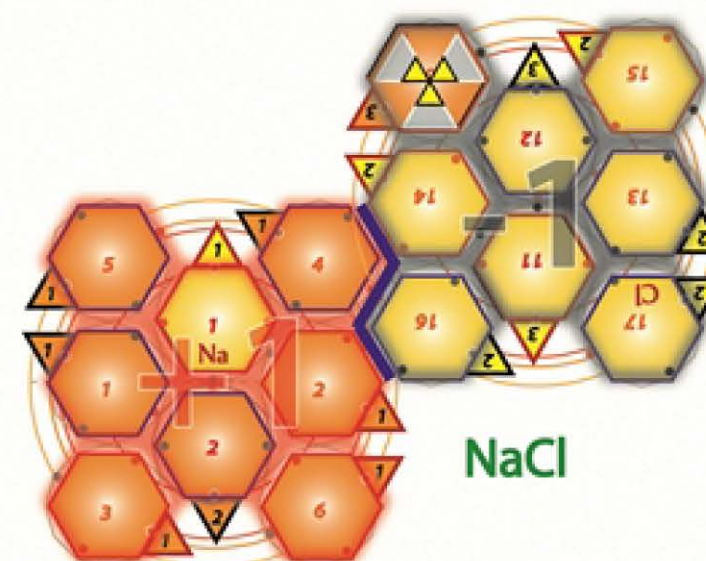
Intra-orbital bonding between
elements and compounds where
electrons exchange is the main
mechanism resulting in
stable electronic configurations



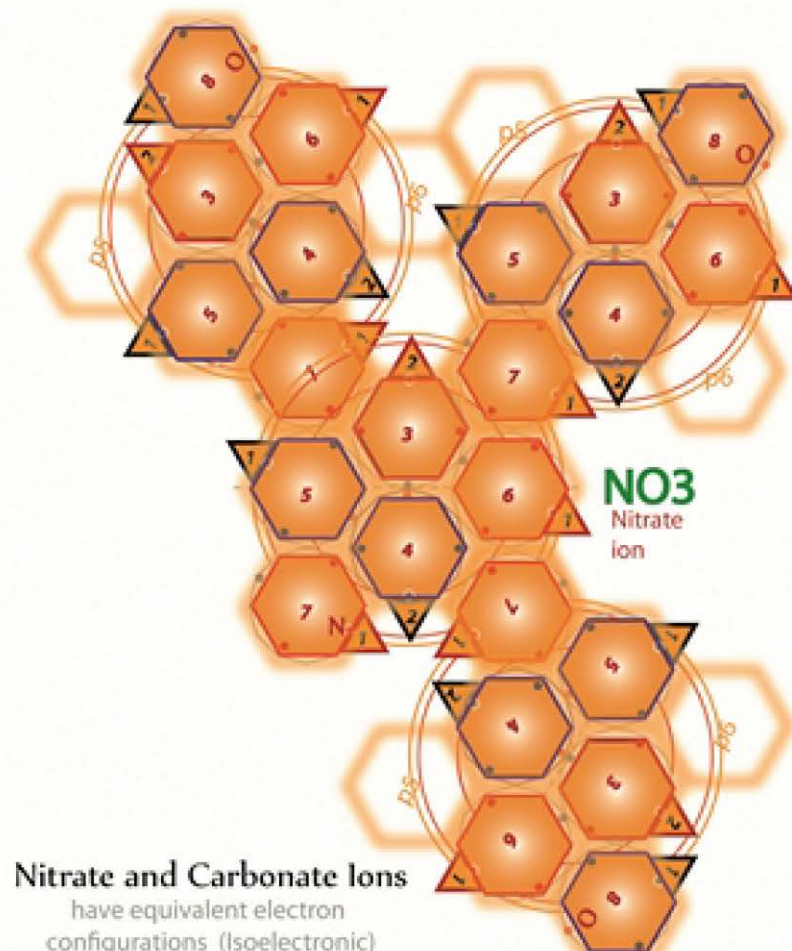
HCO3 Bi-Carbonate ion

Ionic bonds

Extra-orbital bonding between
elements and compounds where
element charge attraction is the
predominant mechanism
with electrons sharing resulting in
stable electronic configurations



NaCl

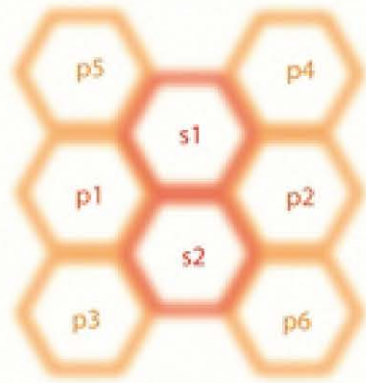


NO3 Nitrate ion

Nitrate and Carbonate ions
have equivalent electron
configurations (Isoelectronic)

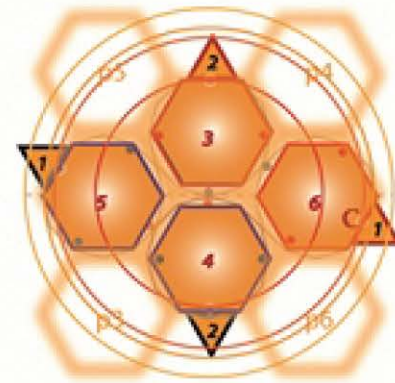
Atomic bonds

All atoms, elements and compounds seek stable core electron configurations where their electron orbitals are filled



Hydrogen Bonds

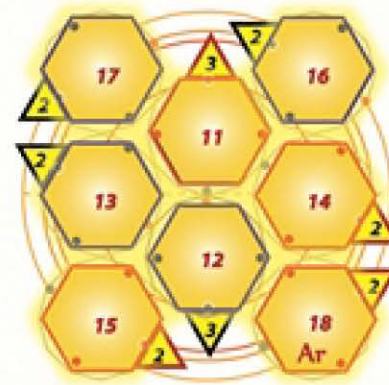
Outward presenting electric fascia bonds
Facilitate bonding between molecules



Molecular bonds

Inward receiving bonds capable of accepting Hydrogen or extra-orbital electric fascia bonds

Bonds fill in order of orbital filling
ie p1-6, d1-10



Core electron configuration

Unreactive [non-valence] electron configuration

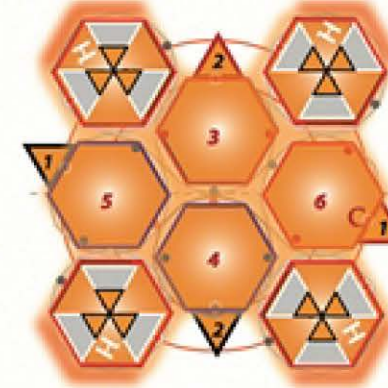


Hydroxide bonds

Oxygen-Hydrogen compound creates a halogen-like geometry which seeks to fill its p6 orbital in order to reach a stable electronic configuration

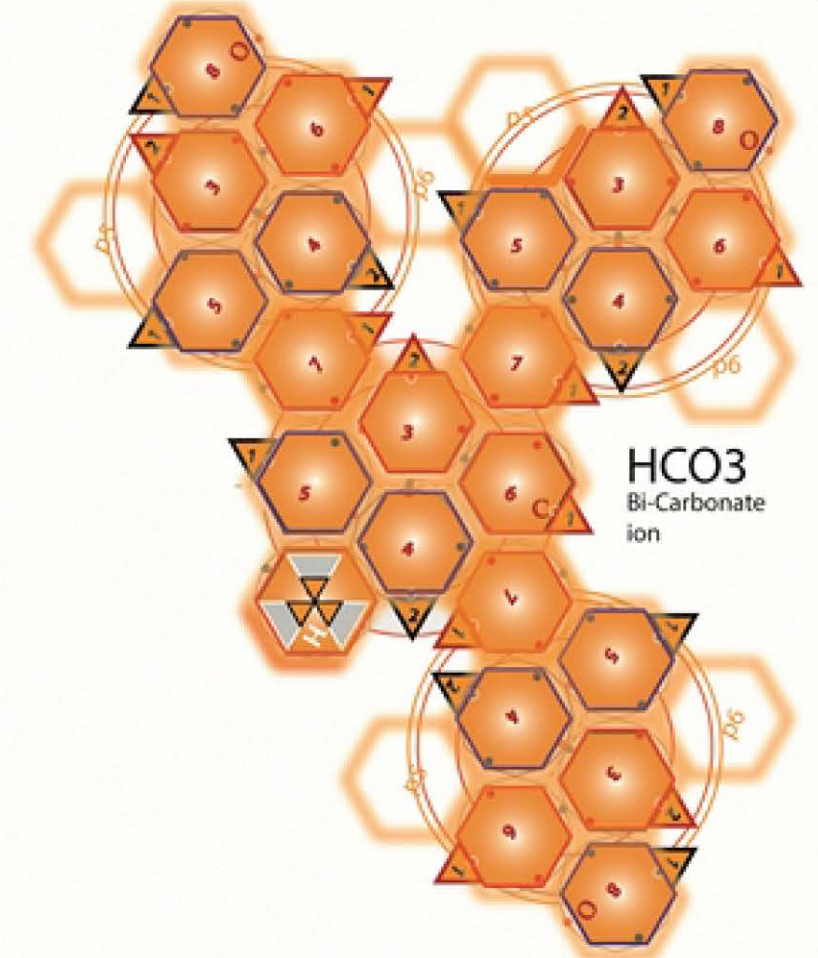
Extremely reactive

CH4



Covalent bonds

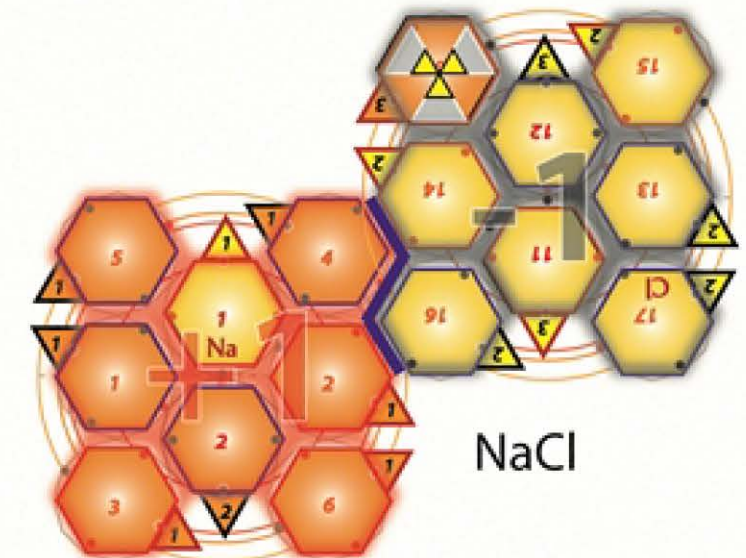
Intra-orbital bonding between elements and compounds where electrons exchange is the main mechanism resulting in stable electronic configurations



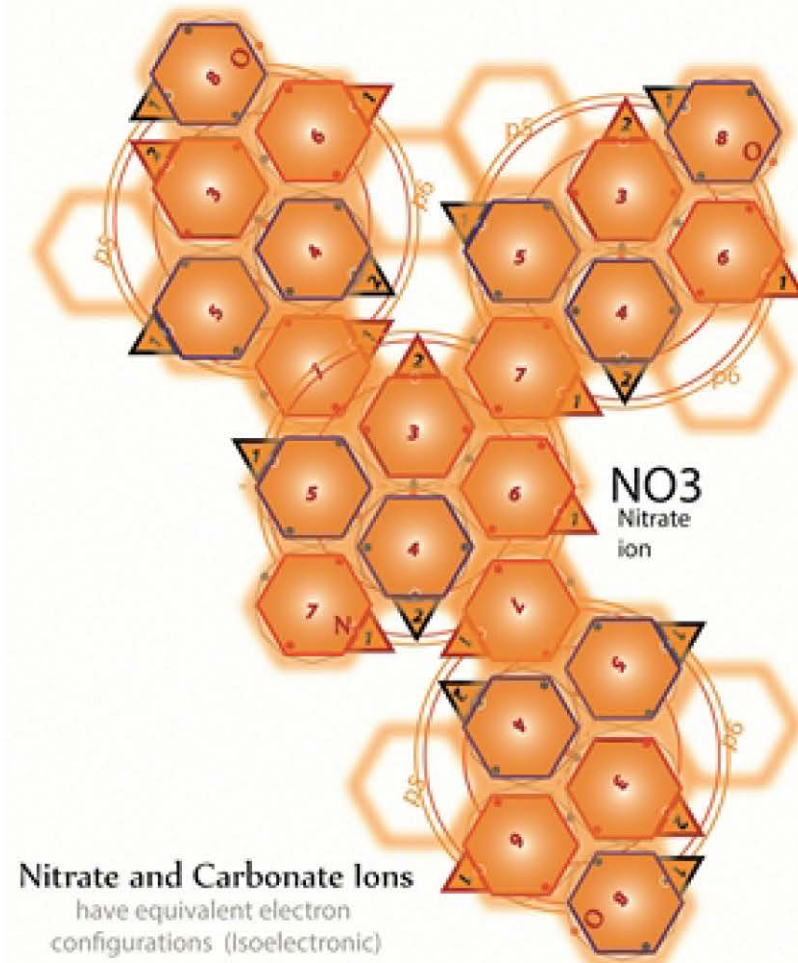
HCO3
Bi-Carbonate ion

Ionic bonds

Extra-orbital bonding between elements and compounds where element charge attraction is the predominant mechanism with electrons sharing resulting in stable electronic configurations

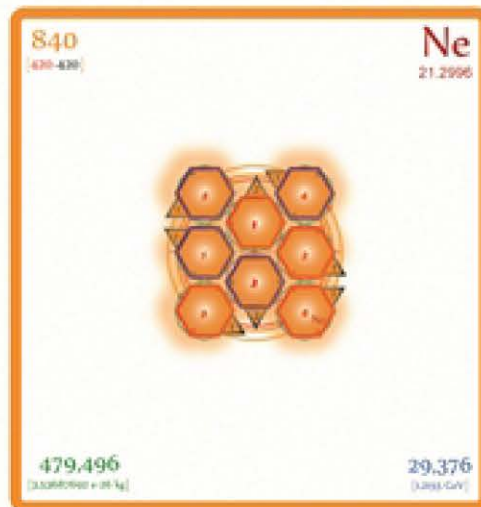


NaCl

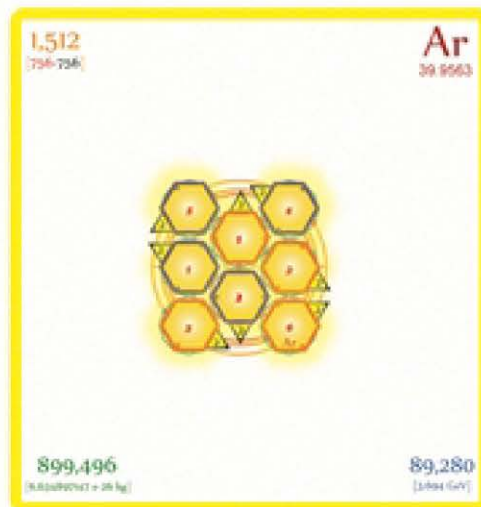


NO3
Nitrate ion

Nitrate and Carbonate ions have equivalent electron configurations (Isoelectronic)



[He] 2s² 2p⁶
2



[Ne] 3s² 3p⁶
10



[Ar] 3d¹⁰ 4s² 4p⁶
18

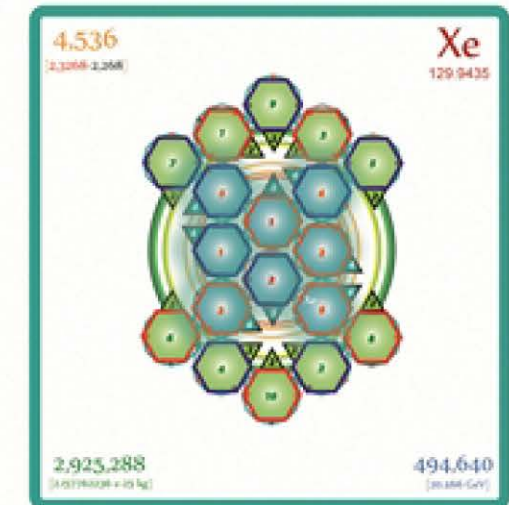
CORE ELECTRON configurations

L
M
N
O
P
Q

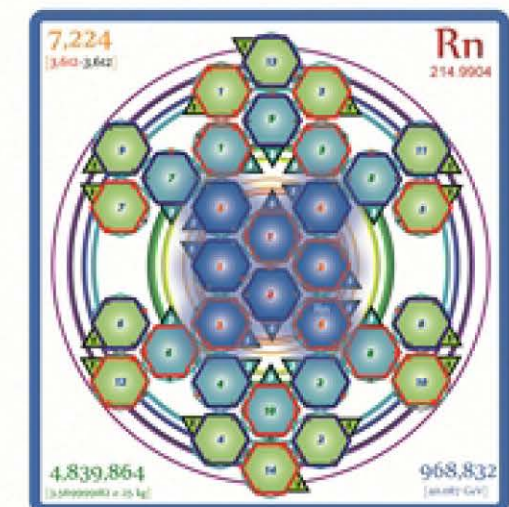
L	1s ²	2s ² 2p ⁶
M	1s ² 2s ² 2p ⁶	3s ² 3p ⁶
N	1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 3d ¹⁰	4s ² 4p ⁶
O	1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 3d ¹⁰ 4s ² 4p ⁶ 4d ¹⁰	5s ² 5p ⁶
P	1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 3d ¹⁰ 4s ² 4p ⁶ 4d ¹⁰ 4f ¹⁴ 5s ² 5p ⁶ 5d ¹⁰	6s ² 6p ⁶
Q	1s ² 2s ² 2p ⁶ 3s ² 3p ⁶ 3d ¹⁰ 4s ² 4p ⁶ 4d ¹⁰ 4f ¹⁴ 5s ² 5p ⁶ 5d ¹⁰ 5f ¹⁴ 6s ² 6p ⁶ 6d ¹⁰	7s ² 7p ⁶

[He]
[Ne]
[Ar]
[Kr]
[Xe]
[Rn]
[Uuo]

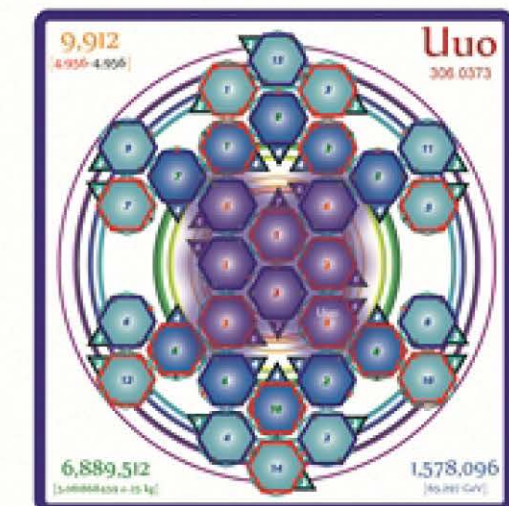
The term "core electrons" or "noble gas core" refers to the electrons within the atom which have the same electron configuration as the nearest noble gas of lower atomic number and contain filled s&p orbitals



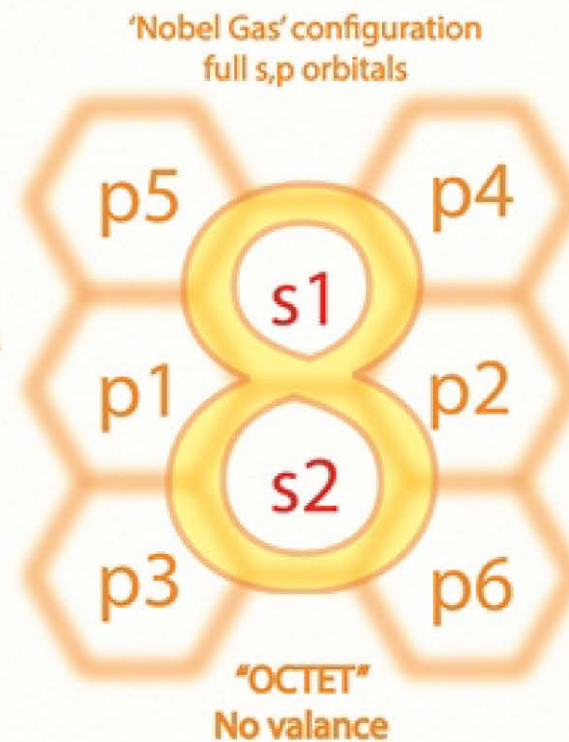
[Kr] 4d¹⁰ 5s² 5p⁶
36



[Xe] 4f¹⁴ 5d¹⁰ 6s² 6p⁶
54



[Rn] 5f¹⁴ 6d¹⁰ 7s² 7p⁶
86



'core electron' configurations are present in energy levels L [2] - [7] Q

electrons not in filled or complete atomic orbitals are valence electrons

Using core electron notation greatly reduces complexity of the electron configuration notations of larger elements in the periodic table

[Ub] 120	1s ²	2s ²	2p ⁶	3s ²	3p ⁶	3d ¹⁰	4s ²	4p ⁶	5s ²	4d ¹⁰	5p ⁶	4f ¹⁴	5d ¹⁰	6s ²	6p ⁶	5f ¹⁴	6d ¹⁰	7s ²	7p ⁶	8s ²
	2	8	18	32	32	18	8	2												

They are the electrons in the inner part of the atom that are not valence electrons and therefore do not participate in bonding

[Uuo] 8s²
118

!
Helium is a unique noble gas in that it only has filled s-orbitals suggesting that it be more appropriate to designate it as an alkaline earth gas

Helium

filled s electron configuration

168 (4-54)
He
3.9990

90,024 (4.002603253 u)
Alkaline Earth
1s²

2 [Protons (2-12) Neutrons (0-18) electrons (0-12)] n1

Neon

filled s & p electron configuration

840 (40-420)
Ne
20.9962

479,496 (20.99623832 u)
29,376 (2000 GPa)
[He] 2s² 2p⁶

10 [Protons (2-12) Neutrons (0-18) electrons (0-12)] n1-2

Argon

filled s & p electron configuration

1,512 (76-756)
Ar
39.9624

899,496 (39.96238312 u)
89,280 (3000 GPa)
[Ne] 3s² 3p⁶

18 [Protons (2-12) Neutrons (10-18) electrons (0-12)] n1-3



Noble gases all have inert core sp electron configurations

Krypton

filled s, p & d electron configuration

3,024 (150-150)
Kr
83.9413

1,876,176 (83.9413481 u)
255,744 (20,000 GPa)
[Ar] 3d¹⁰ 4s² 4p⁶

36 [Protons (2-12) Neutrons (10-18) electrons (0-12)] n1-4

Krypton

The Noble Gases

are nuclei whose electron orbitals are completely filled (and consequently have no valence electrons for bonding)

2						[He]														
10						[Ne]														
18						[Ar]														
36						[Kr]														
54						[Xe]														
86						[Rn]														
118	1s ²	2s ²	2p ⁶	3s ²	3p ⁶	3d ¹⁰	4s ²	4p ⁶	4d ¹⁰	4f ¹⁴	5s ²	5p ⁶	5d ¹⁰	5f ¹⁴	6s ²	6p ⁶	6d ¹⁰	7s ²	7p ⁶	[Uuo]

All noble gases have filled electron orbitals creating inert, chemically un-reactive elements

The noble gases are a group of chemical elements with very similar properties: under standard conditions, they are all odorless, colorless, monatomic gases, with a very low chemical reactivity.

Whilst some of the noble gases are often termed core electron configurations the large elements also have filled d & f orbitals in them

The six noble gases that occur naturally are Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), and the radioactive noble gases are Radon (Rn) and Ununoctium (Uuo).

Radon

filled s, p, d & f electron configuration

7,224 (360-360)
Rn
222.0176

4,839,864 (222.0175714 u)
968,832 (20,000 GPa)
[Xe] 4f¹⁴ 5d¹⁰ 6s² 6p⁶

86 [Protons (2-12) Neutrons (10-18) electrons (0-12)] n1-6

Radon

Xenon

filled s, p & d electron configuration

4,536 (226-226)
Xe
131.9048

2,925,288 (131.9048378 u)
494,640 (20,000 GPa)
[Kr] 4d¹⁰ 5s² 5p⁶

54 [Protons (2-12) Neutrons (10-18) electrons (0-12)] n1-5

Xenon

Ununoctium

filled s, p, d & f electron configuration

9,912 (496-496)
Uuo
306.0879

6,889,512 (306.087912 u)
1,578,096 (20,000 GPa)
[Rn] 5f¹⁴ 6d¹⁰ 7s² 7p⁶

118 [Protons (2-12) Neutrons (10-18) electrons (0-12)] n1-7

Ununoctium

Molecular Bonds

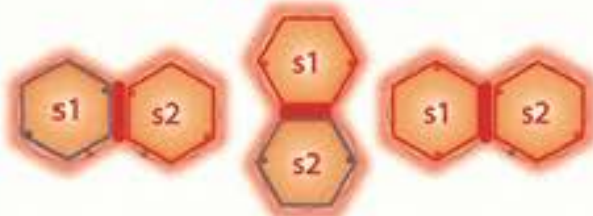
Hydrogen bonds



A weak, primarily electrostatic, bond between a hydrogen atom bound to a highly electronegative element in a given molecule and a second highly electronegative atom in another molecule

Diatomic bonds are fascia interactions between molecules with the same nuclei number [O₂, F₂, I₂, Cl₂]

Sigma bonds



The residual EM force between opposite charge fascia in nuclei holds individual nuclei together in turn resulting in larger molecules and compounds

Pi bonds



residual Strong Force

internalised EM charges

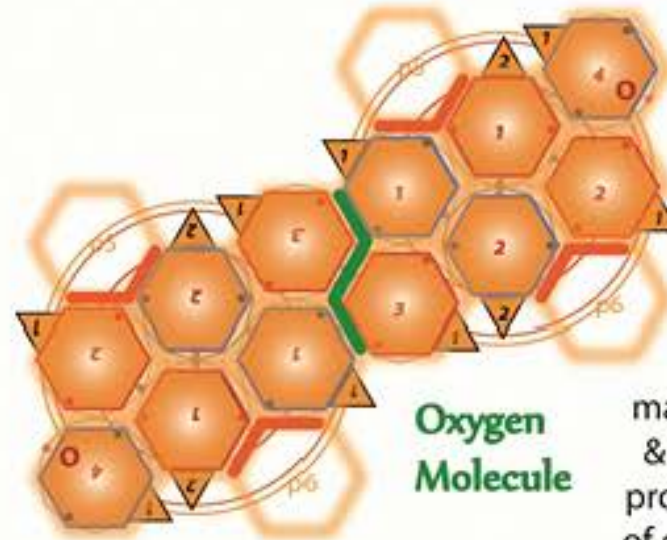
Molecular bonds



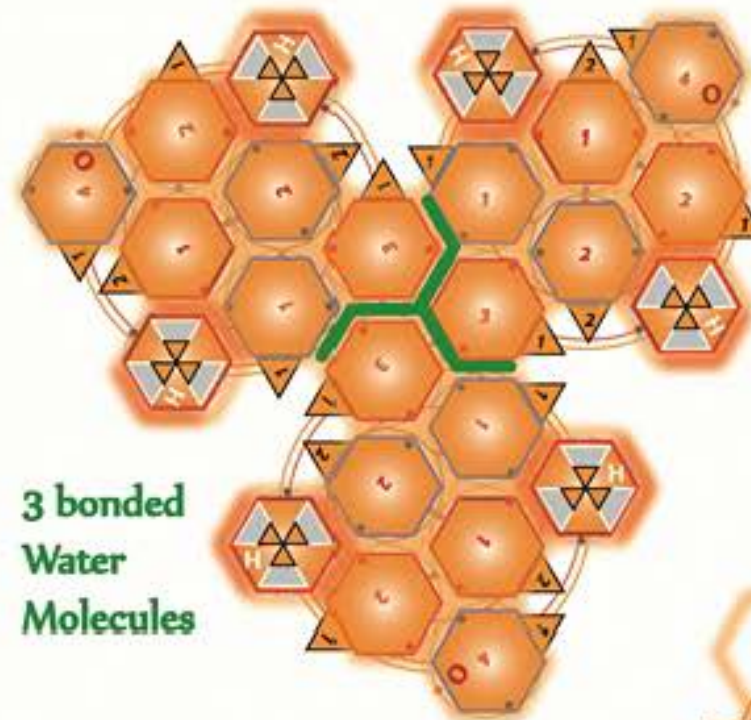
external s&p fascia interaction

Stable inert Nobel gas config

A molecular bond is an attractive force between nuclei that allows two or more elements or atoms to combine into a singular, complex compound structure

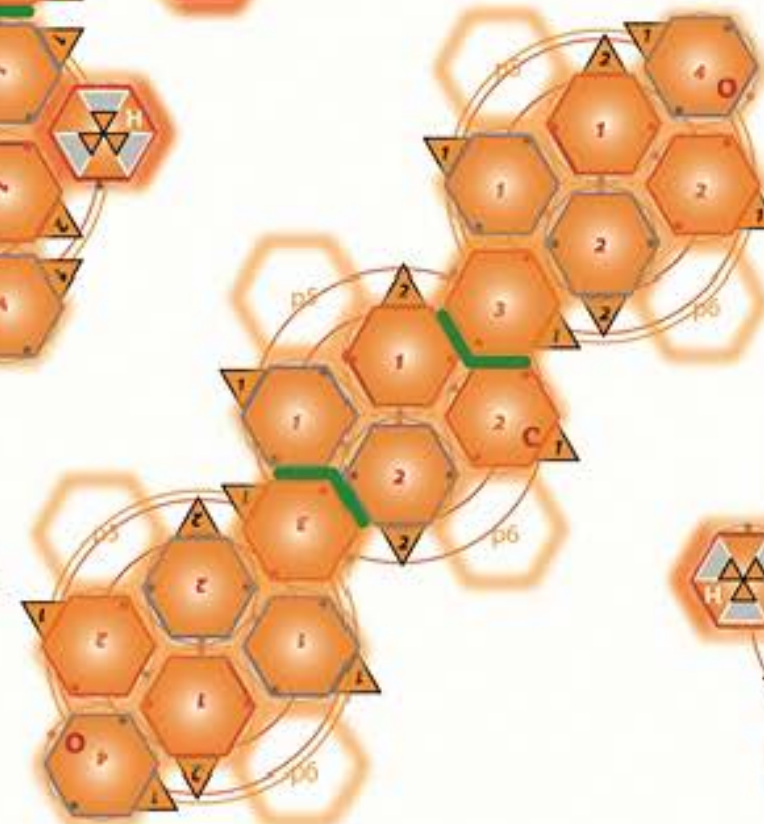


Tetryonic mass-energy geometries & 3D Matter topologies provide for the modelling of even the most complex chemical bonding arrangements

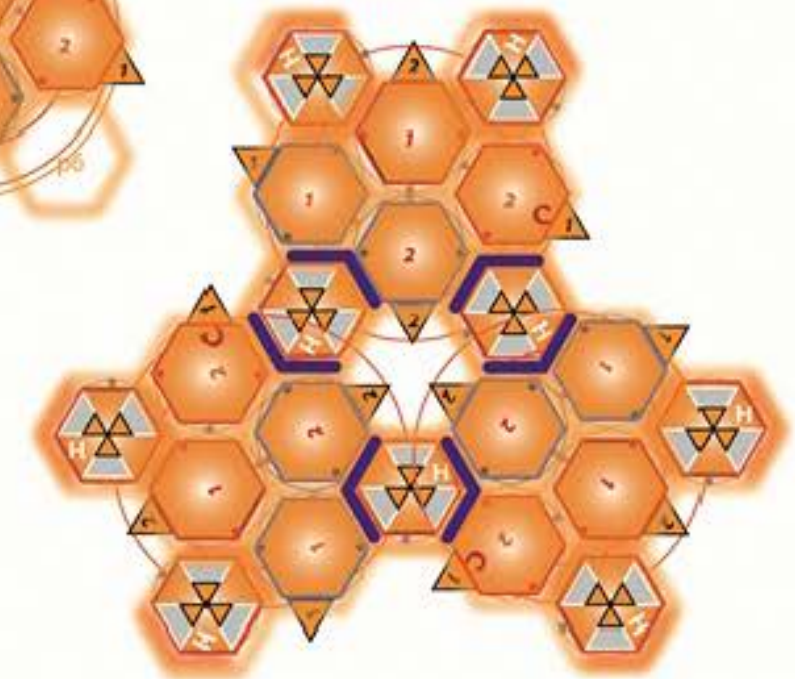


3 bonded Water Molecules

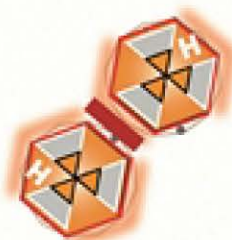
Carbon Dioxide Molecule



Trishexane Molecule



Covalent bonds are chemical links between two atoms in which electrons are shared between them.



Sigma bonds are covalent bonds formed by direct overlapping of two adjacent atom's outermost orbitals.

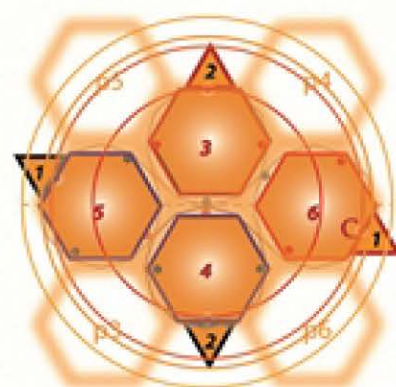


Note: sigma bonds can be formed by the bonding of either s-orbitals [or two adjacent p-orbitals]

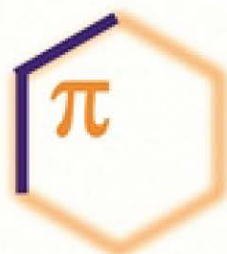
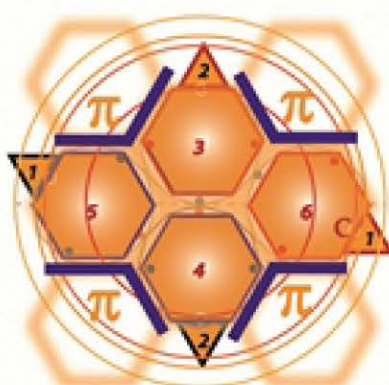
Lewis electron dot diagrams fail to illustrate reality in that molecules exist as 3D objects and not as a two dimensional systems as shown by them.

Tetryonic geometry & topologies provide a polar view of 3D atomic nuclei that can be viewed as an exact representation of what a molecule & its bonds would look like when viewed from above.

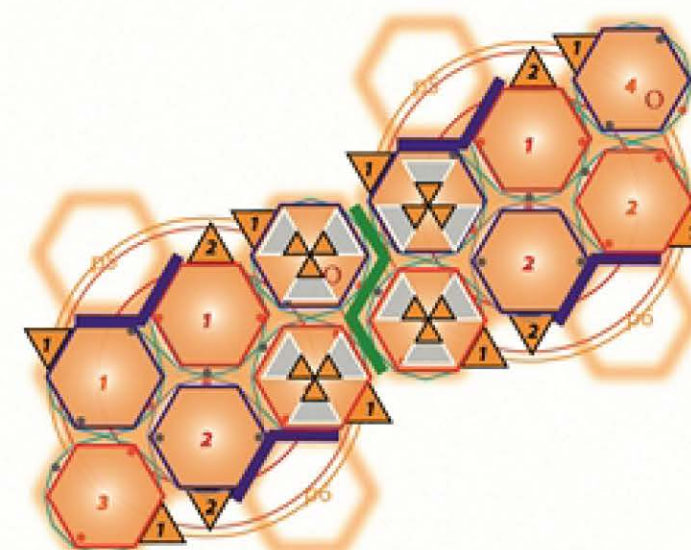
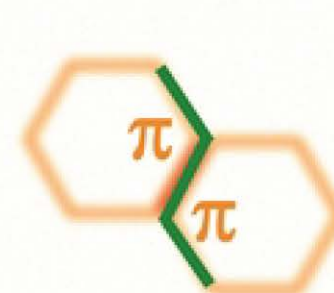
Sigma & Pi covalent bonds



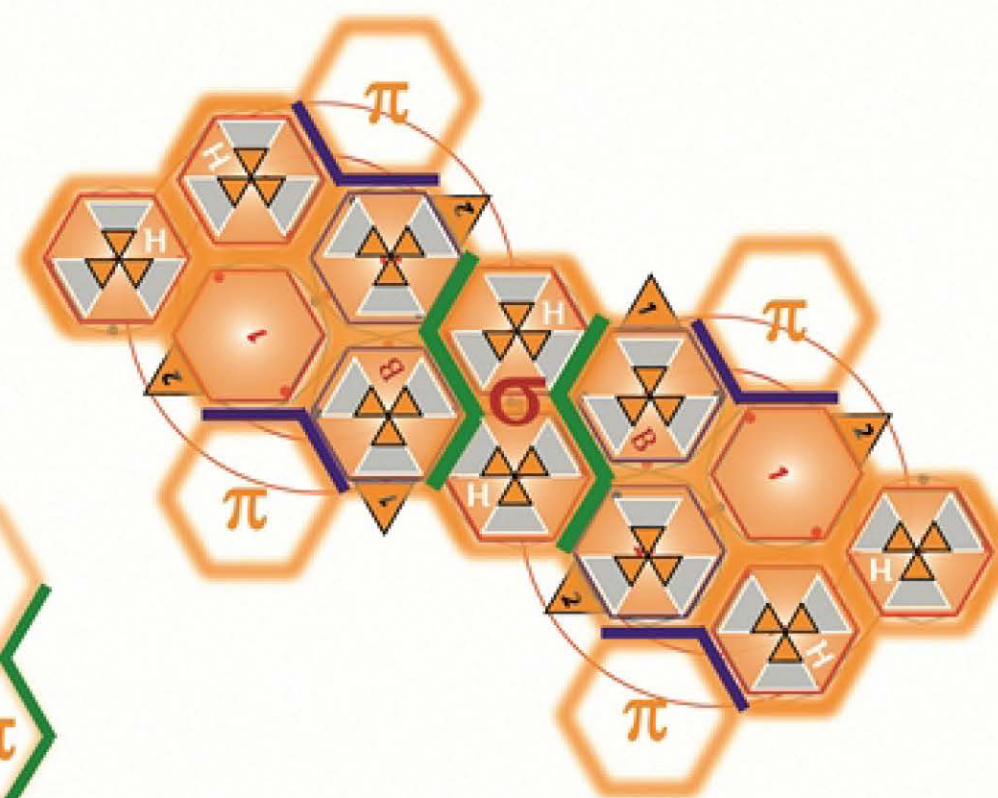
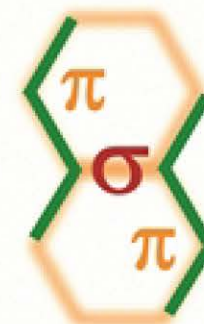
A pi bond is a covalent bond formed between two neighboring atom's unbonded p-orbitals.



The single electrons from each atom's p orbital combine to form an electron pair creating the sigma bond.



Double and triple bonds between atoms are usually made up of a single sigma bond and one or two pi bonds



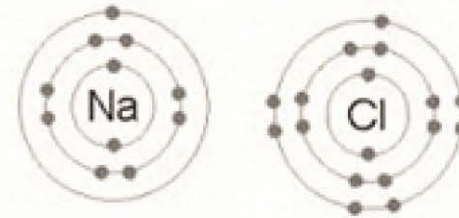
Alkali Metals

924
[462-462]

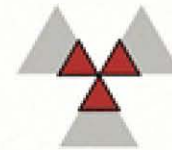
Na
23.8317

531,996
[3.924129448 e-26 kg]

36,864
[1.5253 GeV]



Valence electrons



are the highest energy electrons in an atom forming the outermost electrons of an atom, and are important in determining how the atom reacts chemically with other atoms

Historically, the number of valence electrons was reflected by the element's group number in the Mendeleev table and formed the basis of elemental families

Tetryonic topologies now replace the older, incorrect models of valence electron configurations with the full 3D modelling of all atoms, elements & compounds

[zz] are core electron configurations

providing a superior visual means of accurately determining the energies and position of any electron in chemical compounds and determining the valence numbers

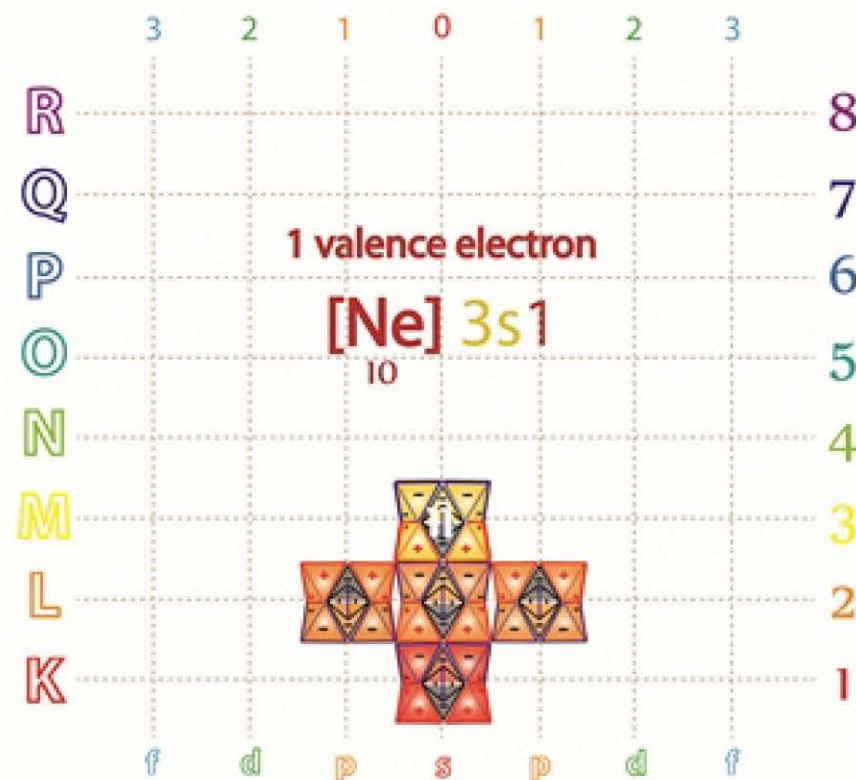
Halogens

1,428
[714-714]

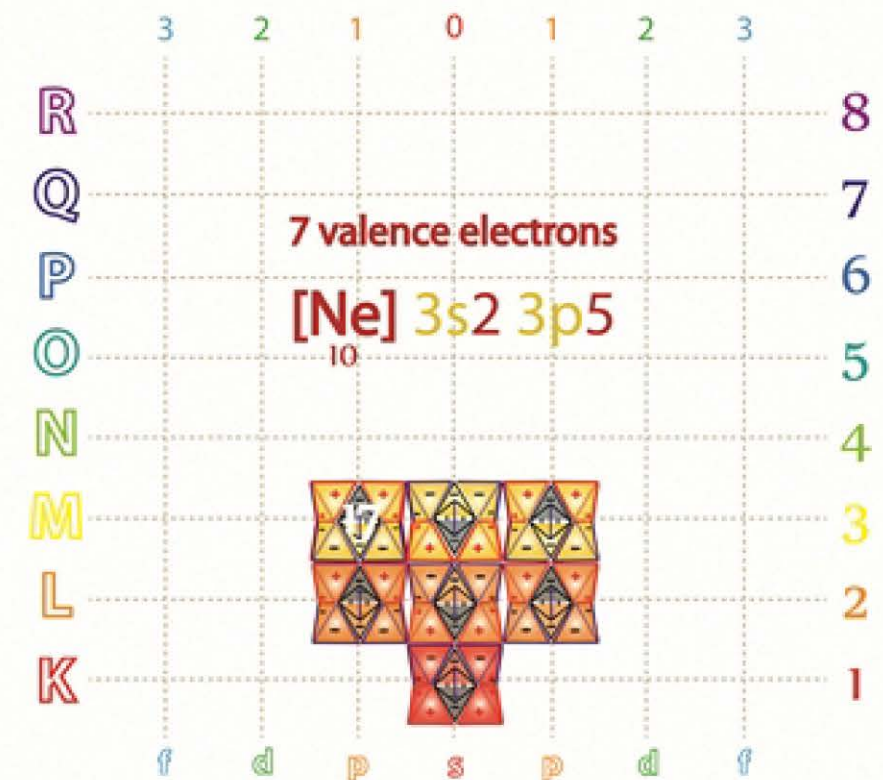
Cl
37.6242

846,996
[6.247644668 e-26 kg]

81,792
[3.6384 GeV]



Atoms with more electrons than a closed shell are also highly reactive, as the extra valence electrons are easily removed from that orbital (to form a positive ion)



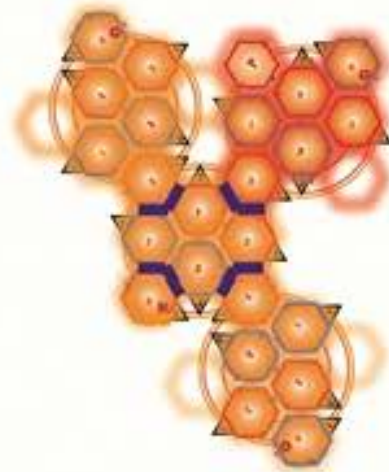
Atoms one or two valence electrons short of a closed shell are highly reactive, due to their tendency to seek to gain the missing valence electrons (thereby forming a negative ion)

Hydro-Chloric acid



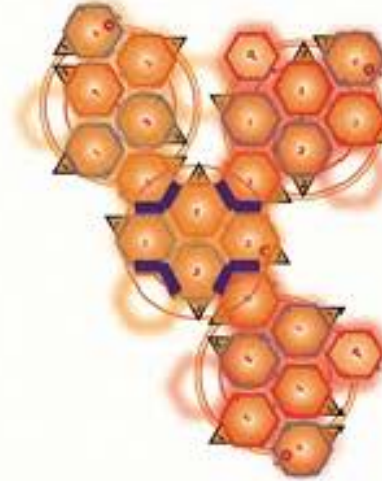
HCl

HNO3



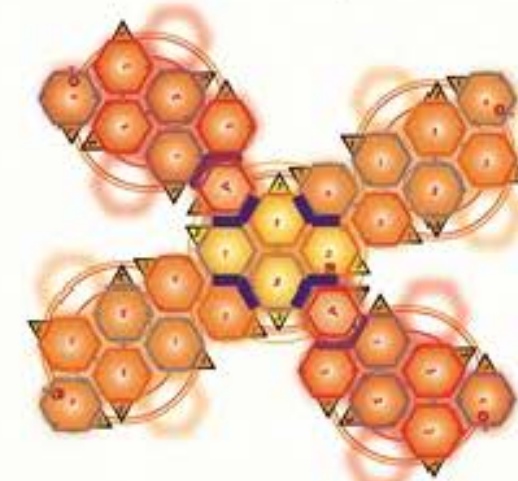
Nitric acid

Carbonic acid



H2CO3

H2SO4



Sulfuric acid

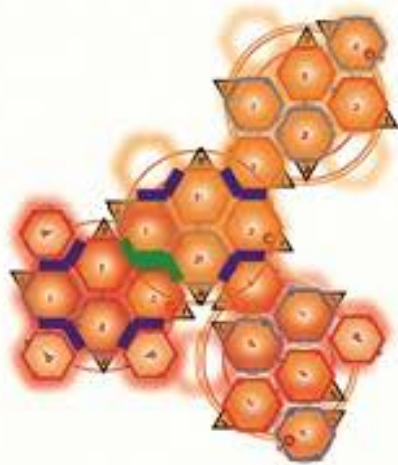
Common Acids

The Arrhenius definition defines acids as substances which increase the concentration of hydrogen ions (H⁺), or more accurately, hydronium ions (H₃O⁺), when dissolved in water.

The Brønsted-Lowry definition is the most widely used definition where acid-base reactions are assumed to involve the transfer of a proton (H⁺) from an acid to a base.

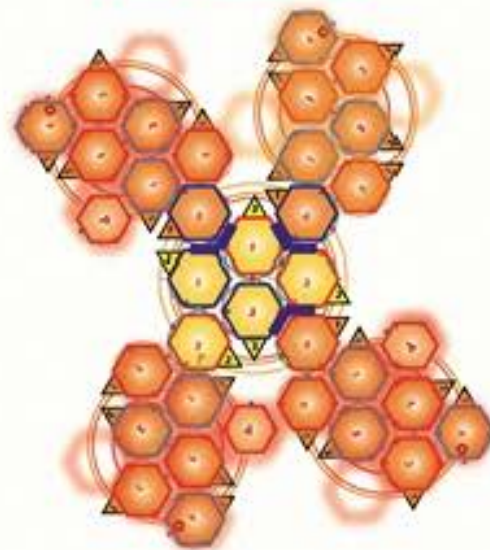
A Lewis acid is a substance that can accept a pair of electrons to form a covalent bond.

HC2H3O2



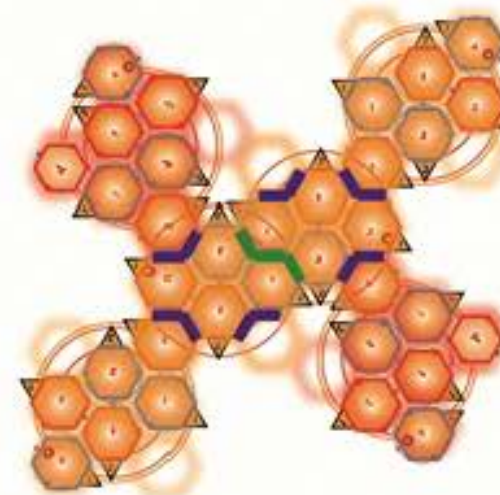
Acetic acid

Phosphoric acid



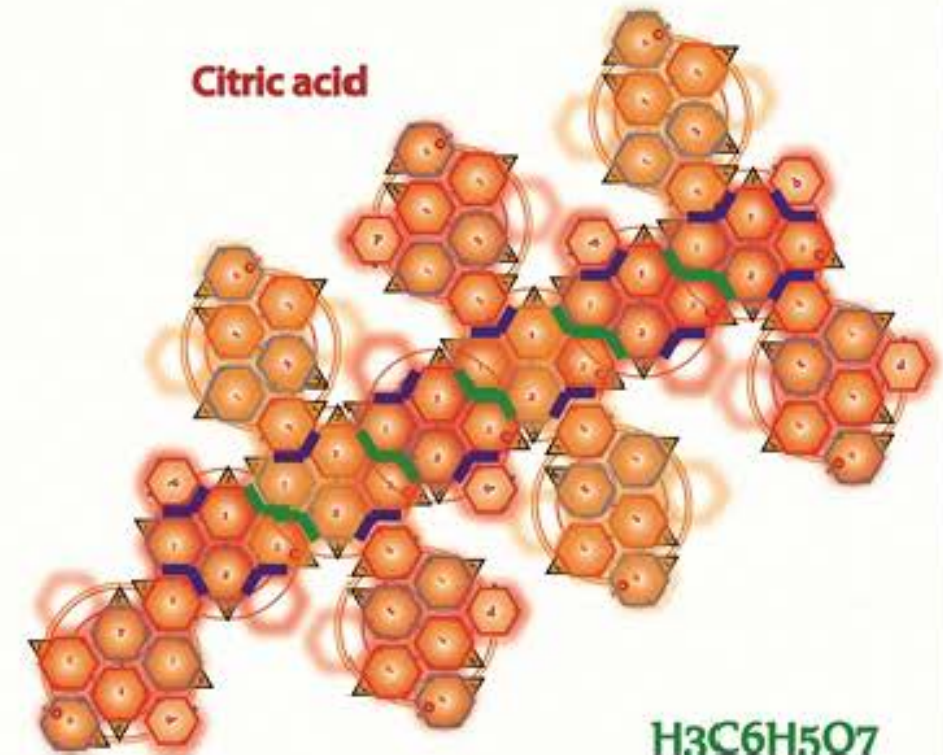
H3PO4

H2C2O4



Oxalic acid

Citric acid



H3C6H5O7

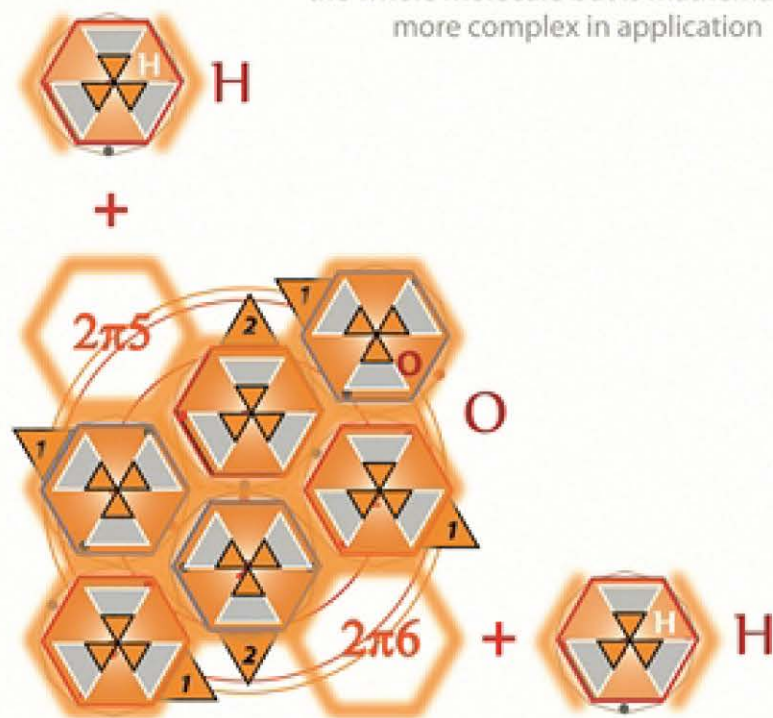
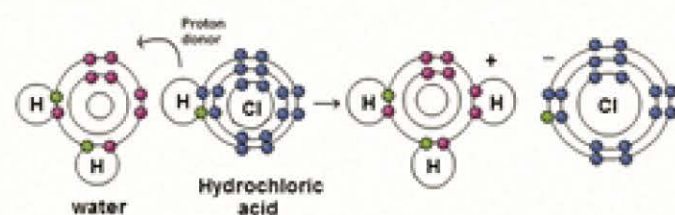
Chemical reactions

Valence Bonds & Molecular orbitals

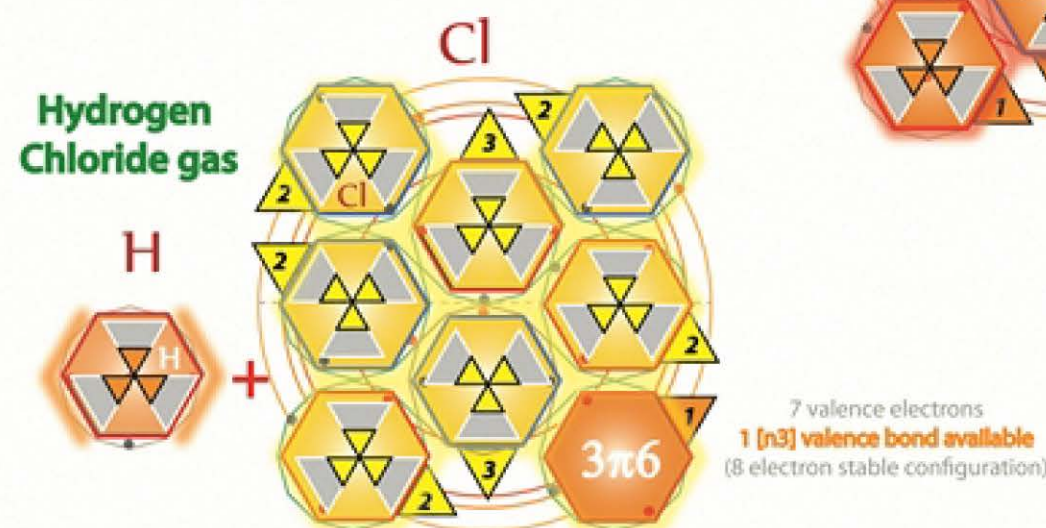
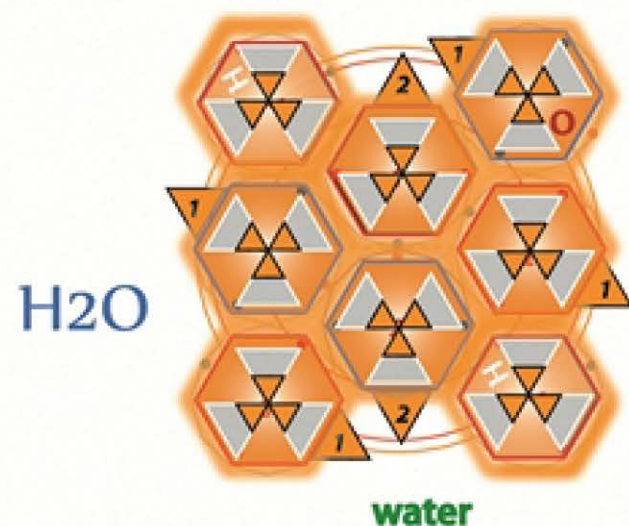
A chemical reaction is a process that leads to the transformation of one set of chemical substances to another.

In contrast, molecular orbital theory has orbitals that are designed to cover the whole molecule but is mathematically more complex in application

Valence bond theory focuses on how the atomic orbitals of the dissociated atoms combine in molecular formations to give rise to individual chemical bonds.



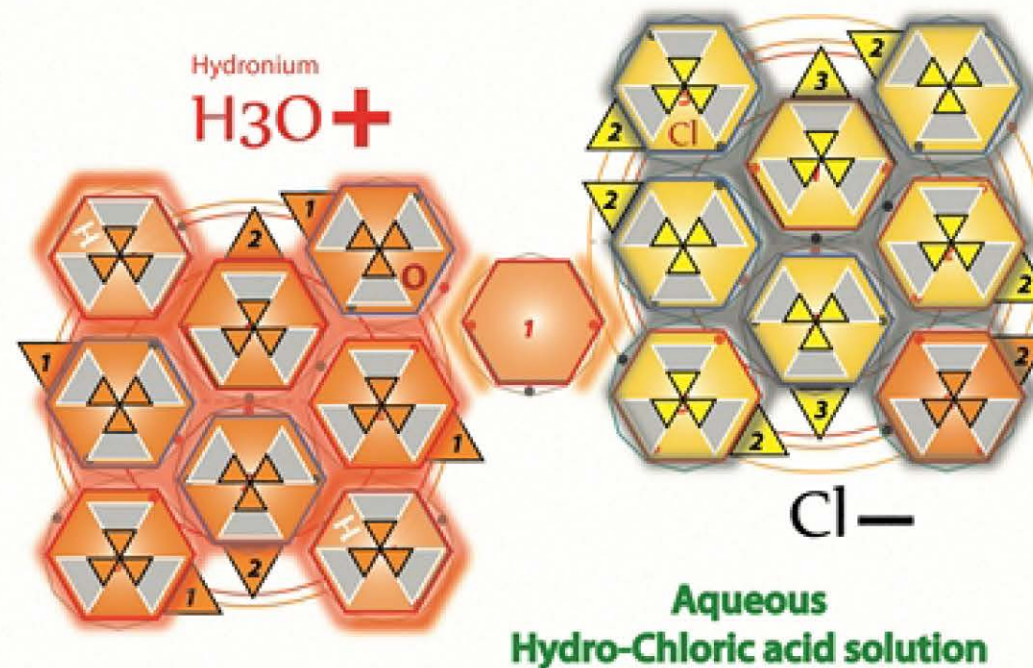
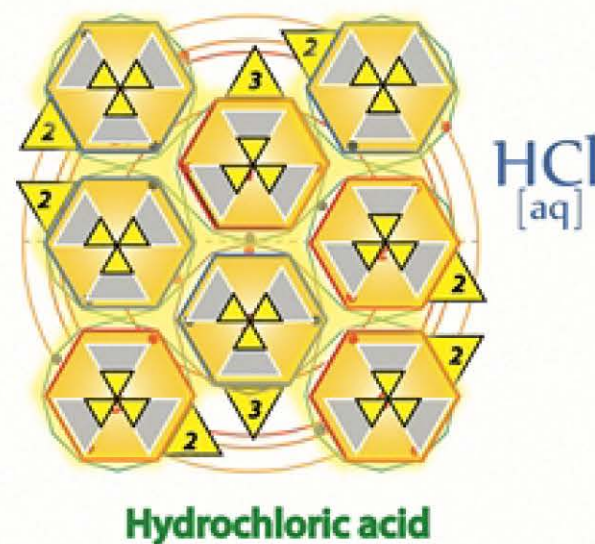
6 valence electrons
2 [n2] valence bonds available
(8 electron stable configuration)



7 valence electrons
1 [n3] valence bond available
(8 electron stable configuration)

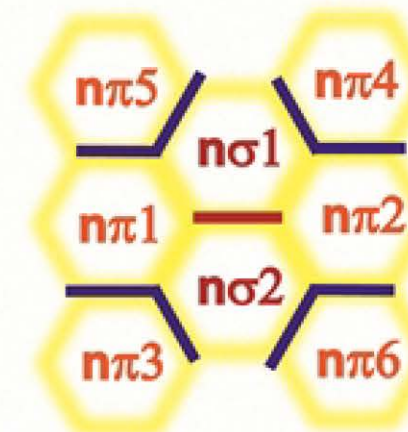
In order to form Hydro-chloric acid [HCl aq] and bond with similar water [H2O] molecules, the n2 Hydrogen atom's energy must be raised so it can migrate to the [3π6] orbital and bond

[n2] Hydrogen atom cannot bond in the [3π6] valence position so in HCl gas it forms a [n2] di-atomic bond instead and its electron migrates to the [π6] orbital



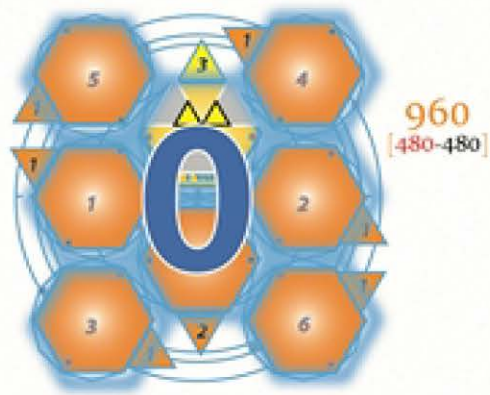
Tetryonic theory replaces both VB & MO theories by modelling the physical quantum charge topologies and rest mass-energy geometry of all elements and compounds

Valence configurations seek to create stable filled orbital configurations



Building on existing electron configuration nomenclature tetryonic theory provides a new bonding schema for elements and complex compounds alike that is fully reflective of the physical quantum charge interactions

Ionic Bonding



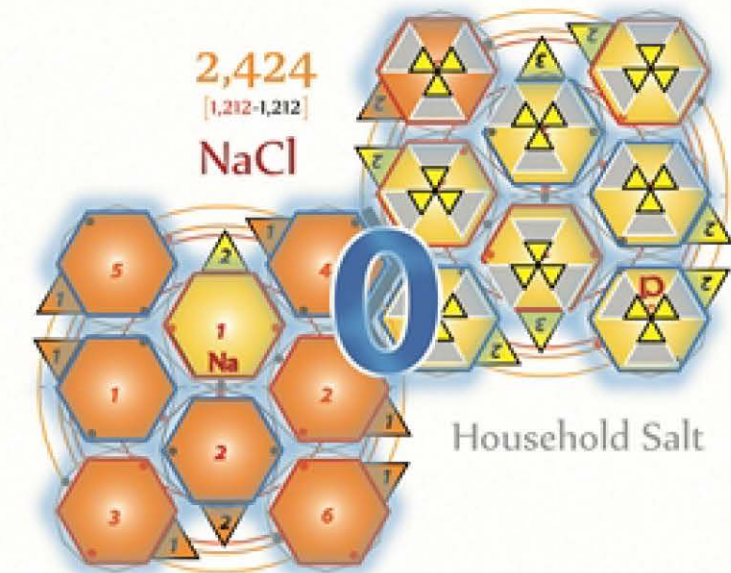
Alkaline Metal

Sodium atom gives up an electron in order to create a stable [Ne] noble gas configuration

Sodium atom develops into a net **POSITIVE** charge ion



OPPOSITES ATTRACT



Household Salt

Resultant salt [NaCl] molecule has a **NEUTRAL** charge with the n3 electron migrating to fill the 3p6 orbital



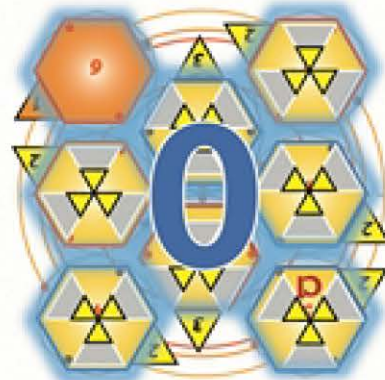
Chlorine atom seeks an electron to order to create a stable [Ar] noble gas configuration



Chlorine atom develops into a net **NEGATIVE** charge ion

Halogen

1,464
[732-732]

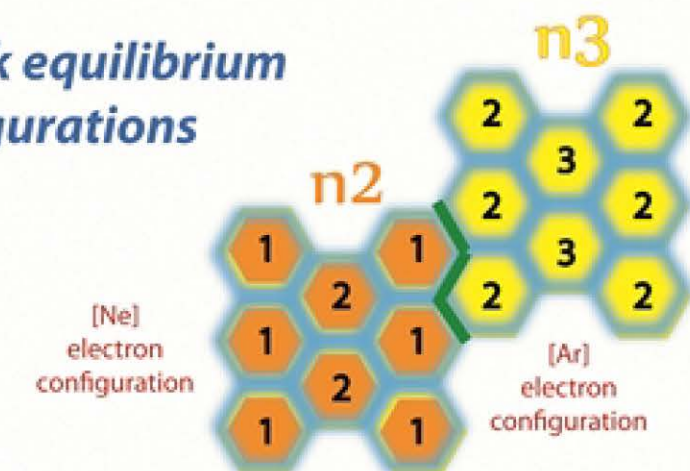


All atoms and molecules seek equilibrium via stable electron configurations

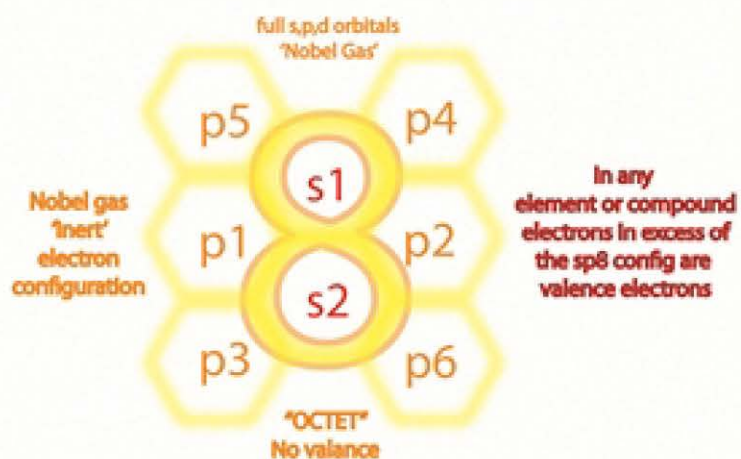
In short, it is a bond formed by the attraction between two oppositely charged ions.

An ionic bond (or electrovalent bond) is a type of chemical bond that can often form between metal and non-metal ions (or polyatomic ions such as ammonium) through electrostatic attraction.

The metal donates one or more electrons, forming a positively charged ion or cation with a stable electron configuration. These electrons then enter the non metal, causing it to form a negatively charged ion or anion which also has a stable electron configuration. The electrostatic attraction between the oppositely charged ions causes them to come together and form a bond.



Valence electron rules



In any element or compound electrons in excess of the sp⁸ config are valence electrons

sp⁸ - core electron orbital grouping

Tetryonic quantum charge topologies provide the complete picture

Valence electrons are the highest quantum level electrons in elemental or compound atom nuclei in excess of the core sp⁸ 'noble gas' electron configuration

They are located in the outer most shells (ie K-Q or Quantum 1-7) making them easily ionised from the elemental nuclei

s 1-2 [electron orbital pair]

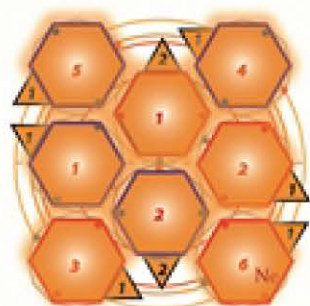
p 1-2, 3-4, 5-6 [electron orbital pairs]

d 1-2, 3-4, 5-6, 7-8, 9-10 [electron orbital pairs]

f 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14 [electron orbital pairs]

Valence electron configurations always include 's' orbital electrons due to their higher quantum levels

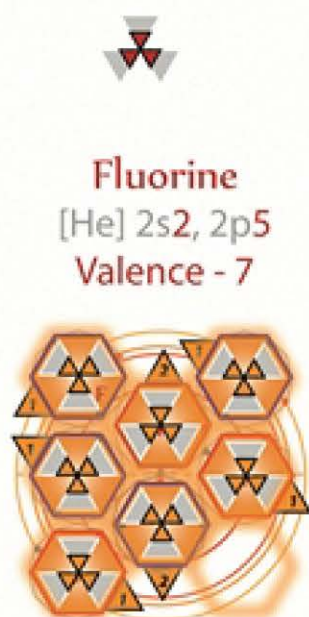
Developed from Lewis diagrams is usually only useful for elements Z < 20



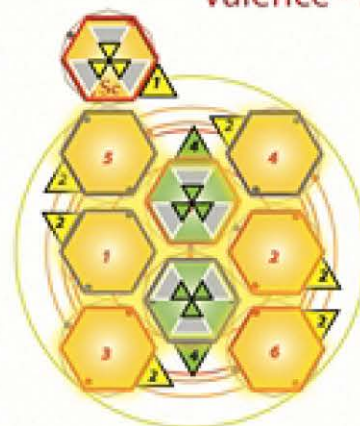
Neon
[He] 2s², 2p⁶



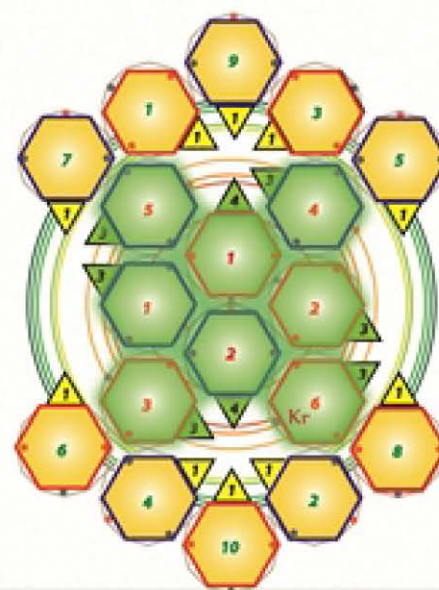
Sodium
[Ne] 3s¹
Valence - 1



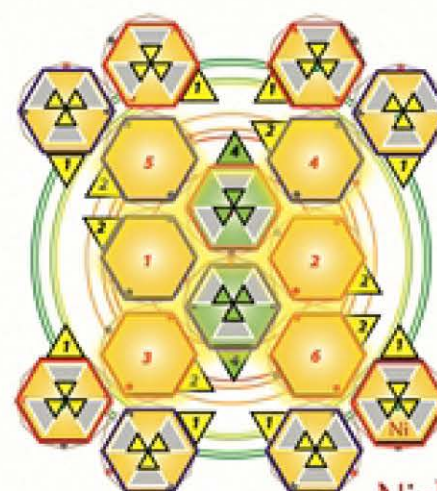
Fluorine
[He] 2s², 2p⁵
Valence - 7



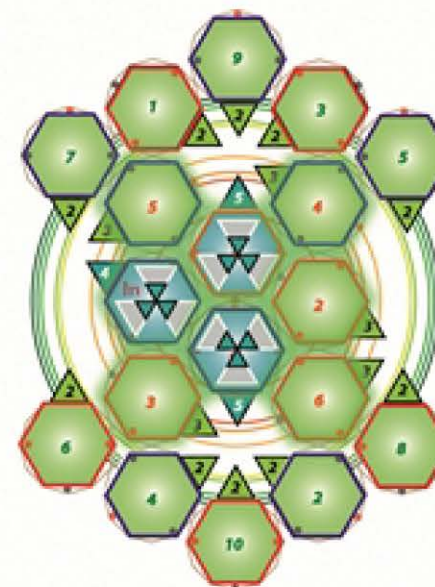
Scandium
[Ar] 3d¹, 4s²
Valence - 3



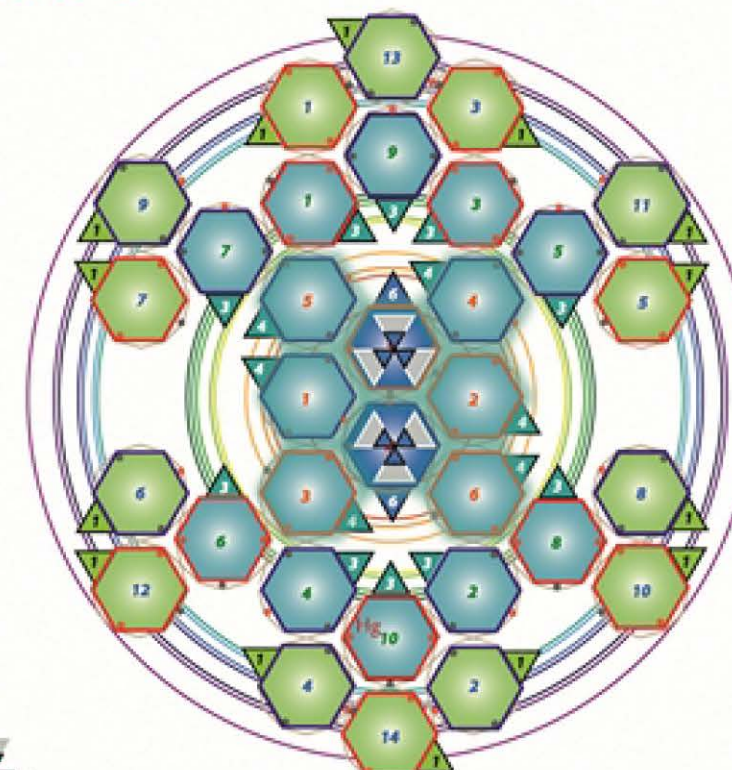
Krypton
[Ar] 4s², 4p⁶



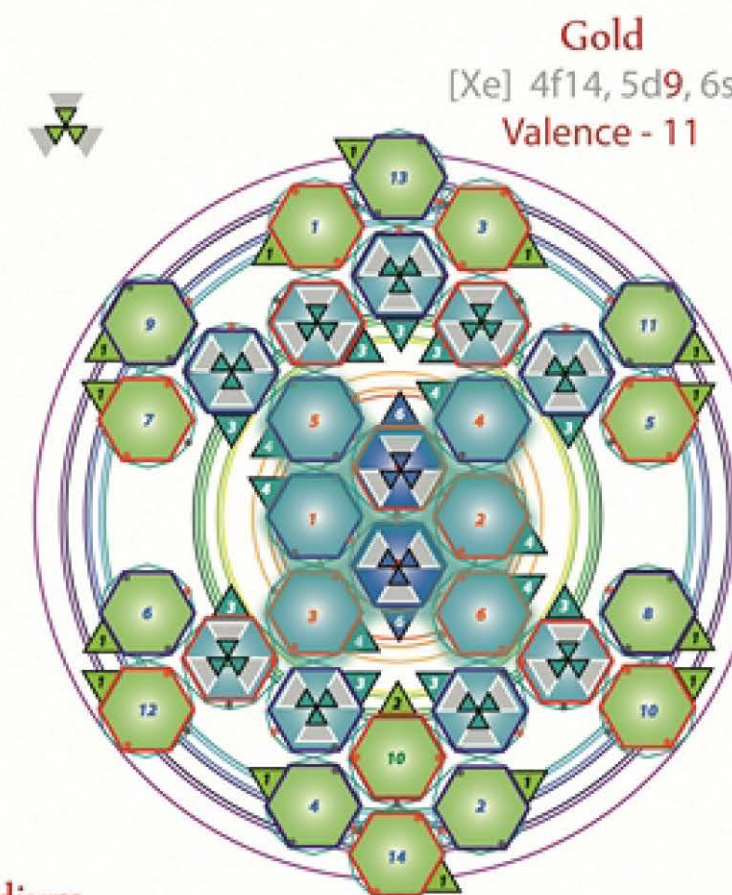
Nickel
[Ar] 3d⁸, 4s²
Valence - 10



Indium
[Kr] 4d¹⁰, 5s², 5p¹
Valence - 3



Mercury
[Xe] 4f¹⁴, 5d¹⁰, 6s²



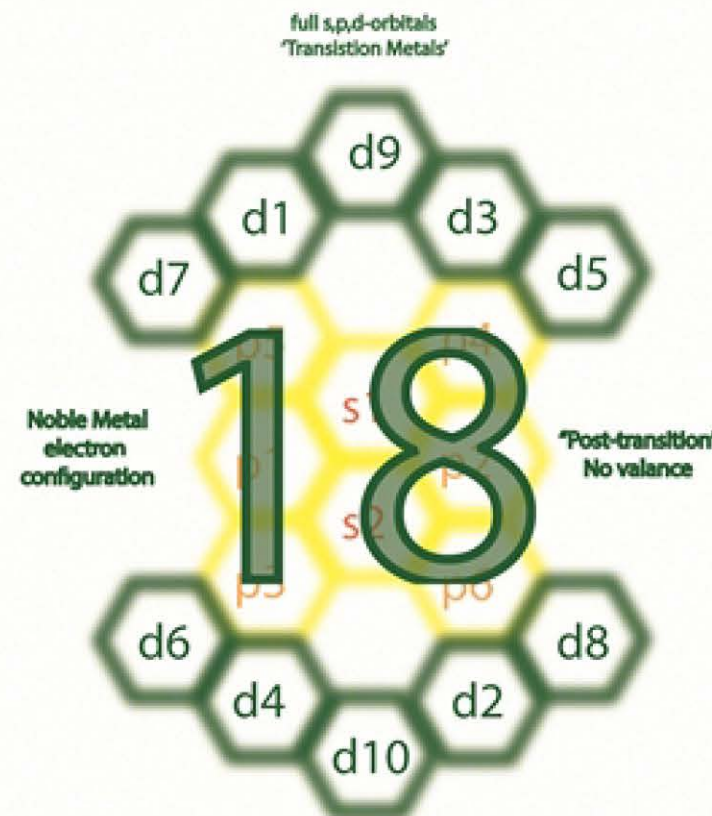
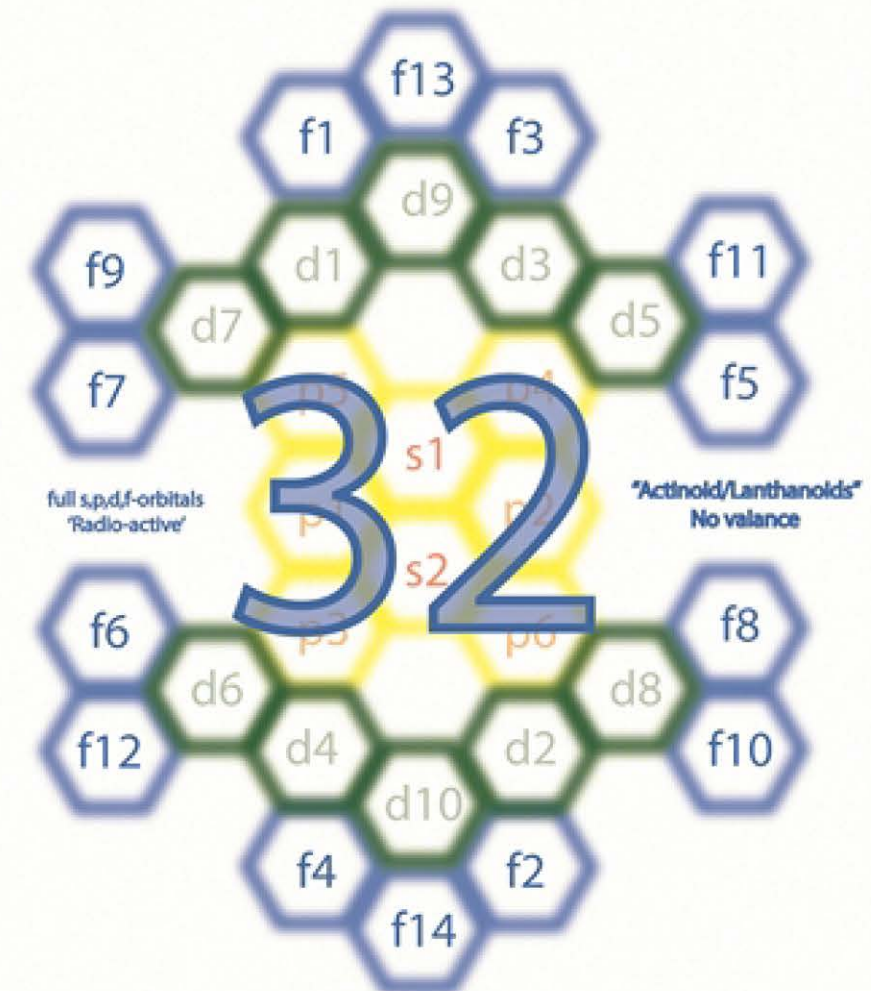
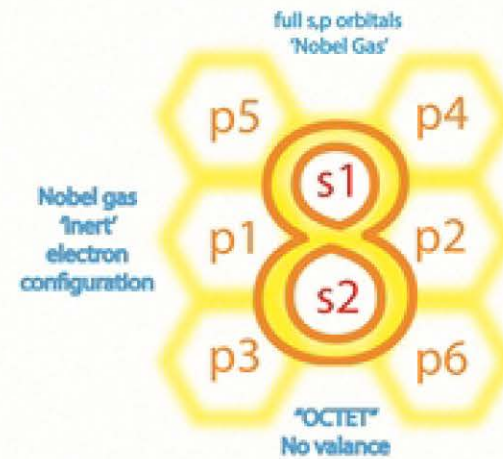
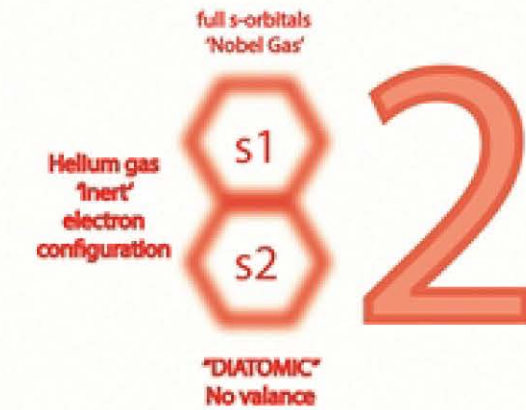
Gold
[Xe] 4f¹⁴, 5d⁹, 6s²
Valence - 11

Filled electron orbitals

Once 8 valence electrons are reached a stable valence configuration is created

Once sub-orbit 8 (P7-8) is reached sequential valence numbering switches to paired valence numbering (as per orbital energies)

Valence numbers can be calculated by adding the 2 highest energy orbitals together (and subtracting 8 - if the total is higher than 8)



The octet rule is a simple chemical rule of thumb that states that atoms tend to combine in such a way that they each have eight electrons in their valence shells, giving them the same electronic configuration as a noble gas.

The rule is applicable to the main-group elements, especially carbon, nitrogen, oxygen, and the halogens, but also to metals such as sodium or magnesium. In simple terms, molecules or ions tend to be most stable when the outermost electron shells of their constituent atoms contain eight electrons.

In short, an element's valence shell is full and most stable when it contains eight electrons, corresponding to an s2p6 electron configuration.

CORE ELECTRONS

This stability is the reason that the noble gases are so unreactive, for example neon with electron configuration 1s2 2s2 2p6. (Helium is an exception as explained).

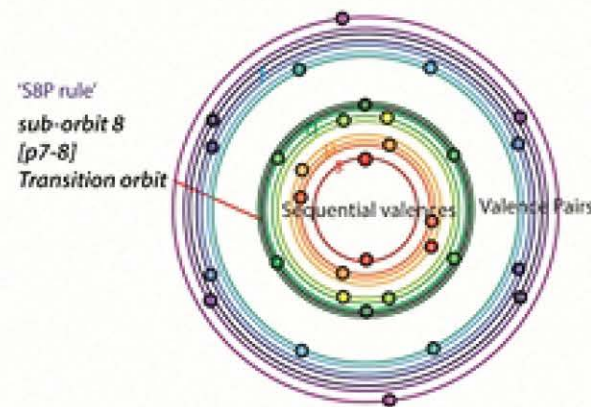
Note that a "full shell" means that there are the eight electrons in the valence shell when the next shell starts filling, even though higher subshells (d, f, etc.) have not been filled.

There can be at most eight valence electrons in a ground-state atom because p subshells are always followed by the s subshell of the next shell.

OCTET RULE

This means that once there are 8 valence electrons (when the p subshell is filled), the next additional electron goes into the next shell, which then becomes the valence shell.

A consequence of the octet rule is that atoms generally react by gaining, losing, or sharing electrons in order to achieve a complete octet of valence electrons. Reaction of atoms occurs primarily in two ways: ionically and covalently.



Once 8 valence electrons are reached the sub-orbits are stable and form a stable, non-reactive valence configuration.

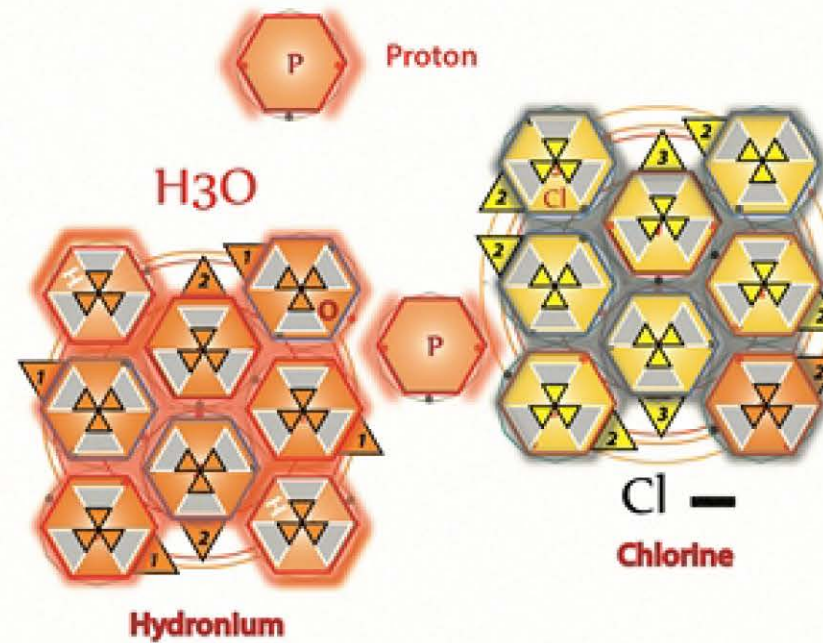
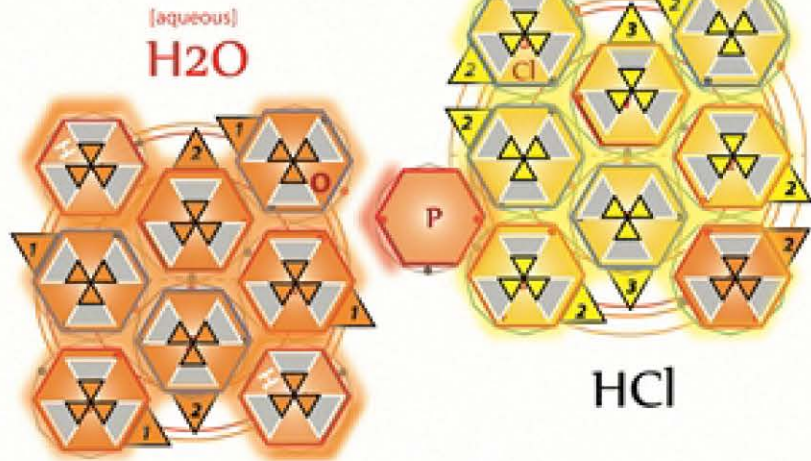
Additionally, valence numbers proceed sequentially (1,2,3,4,5,6,7) up to sub-orbit 8 (P7-8) at which point all sub-orbit valences number in valence pairs (1-2, 3-4, 5-6, 7-8, 9-10, 11-2, 13-14)

The significance is that sub-orbit 8 is the middle sub-orbit (of 16 total sub-orbits possible)

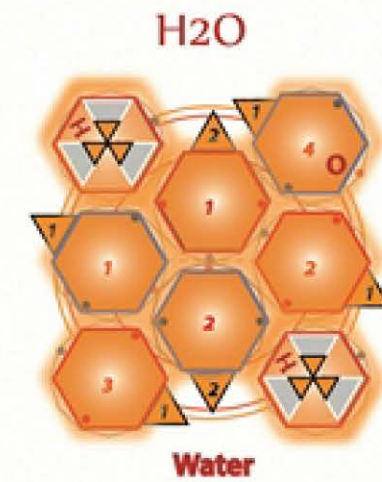
ACID

Hydrochloric acid is a clear, colourless solution of hydrogen chloride in water, it is a highly corrosive, strong mineral acid

Aqueous Hydro-Chloric acid solution



The H(+) cation of the acid combines with the OH(-) anion of the base to form water.



+

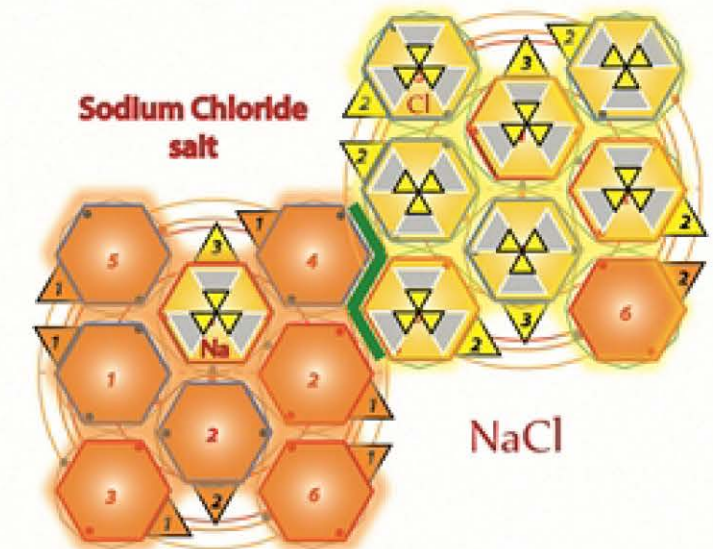
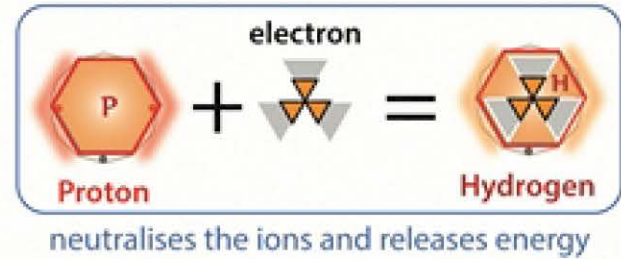
all charges seek equilibrium

When an acid and a base are placed together, they react to neutralize the acid and base properties, producing a salt.



⇒

combining the free Protons & electrons



The compound formed by the cation of the base and the anion of the acid is called a salt.

BASE

Sodium hydroxide, also known as caustic soda, or lye, has the molecular formula NaOH and is a highly caustic metallic base and alkali salt.

Geometric Molecular Topology

Molecules are most often held together with covalent bonds involving single, double, and/or triple bonds, where a "bond" is a pair of electrons shared between elements as they seek equilibrium (another method of bonding is ionic bonding and involves a positive cation and a negative anion).

Hydrogen



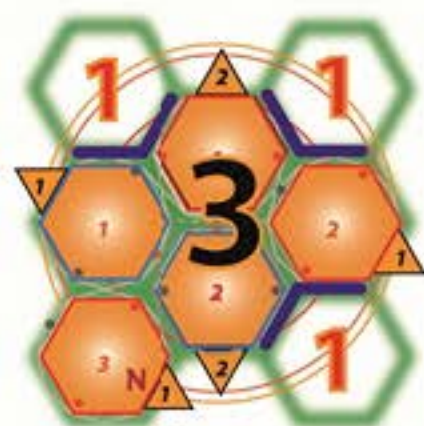
A Hydrogen bond is a chemical bond in which a hydrogen atom of one molecule is attracted to an electronegative atom, especially nitrogen, oxygen, or fluorine atoms, usually of another molecule.

The hydrogen bond is often described as an electrostatic dipole-dipole interaction.

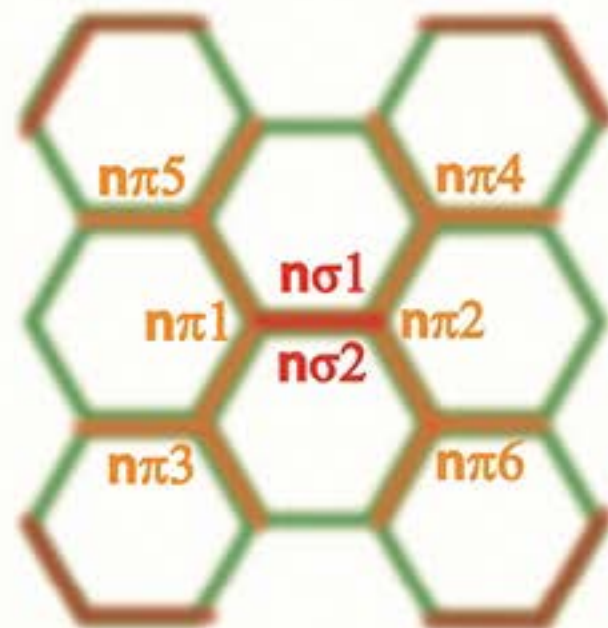
However, it also has some features of covalent bonding: it is directional and strong, acting over interatomic distances shorter than that of van der Waals radii.

All molecules seek KEM'ical charge and energy equilibrium

Common nitrogen functional groups include: amines, amides, nitro groups, imines, and enamines.



Nitrogen



Geometric Molecular Topology is the overall arrangement of the atoms in a molecule, where the bonded atoms in a molecule are responsible for determining the final molecular topology of a chemical system of bonded elements.

As the numbers of atoms in molecules increases, the quantum molecular topology of a system grows increasingly complex and can only be modelled accurately using Tetryonic charged geometries

Molecular Octets

The concept of the Expanded Octet occurs in any system that has an atom with more than four electron pairs attached to it.

Most commonly, atoms will expand their octets to contain a total of five or six electron pairs, in total. In theory, it is possible to expand beyond those number.

The large amounts of negative charge concentrated in small volumes of space prevent those larger expanded octets from forming.

When an atom expands its octet, it does so by making use of empty d-orbitals that are available in the valence level of the atom doing the expanding.

The atom that expands its octet in a structure will usually be located in the center of the structure and the system will not use any multiple bonds in attaching atoms to the central atom.

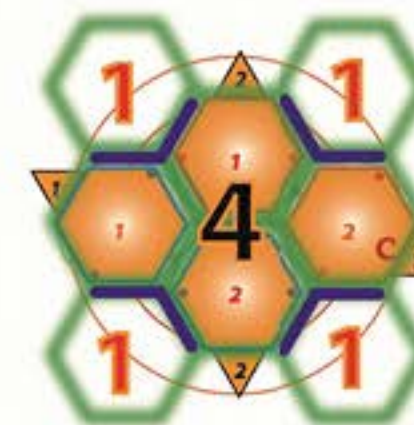


The oxidation state of oxygen is -2 in almost all known compounds.

Oxides of Oxygen & oxygen molecules are found throughout the range of Organic & inorganic compounds.

by bonding together and forming larger complex molecules

Compounds of Carbon form the 'backbones' of Organic & inorganic compounds.

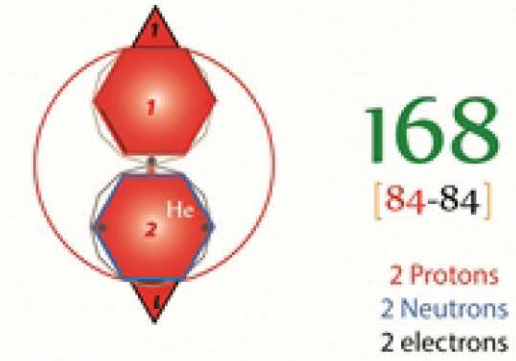
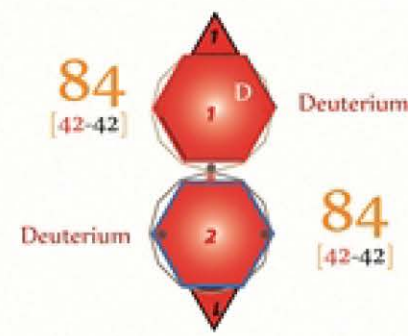


Carbon

48
[24-24]

96
[48-48]

1 Proton
1 electron

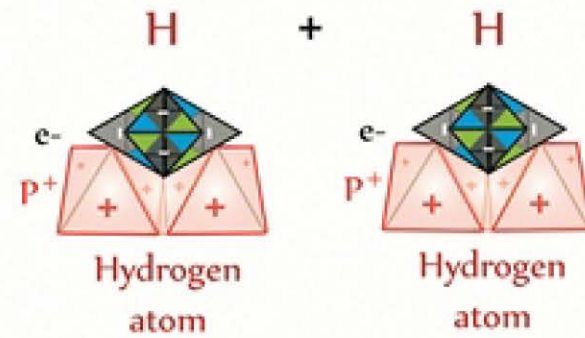


bonds

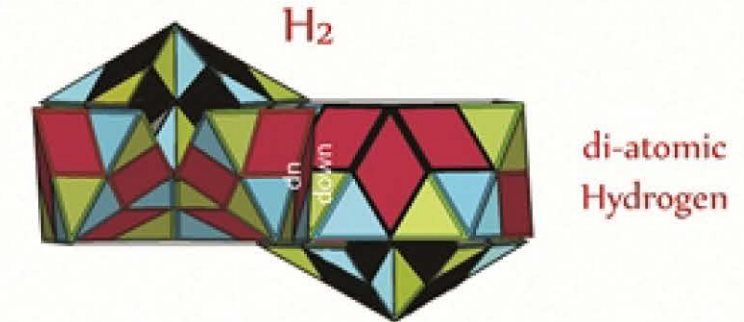
Hydrogen is a
'free radical' atom

H2 has a smaller s-orbital
[lower energy level]
compared to Helium

Deuterium is the
building block of elements

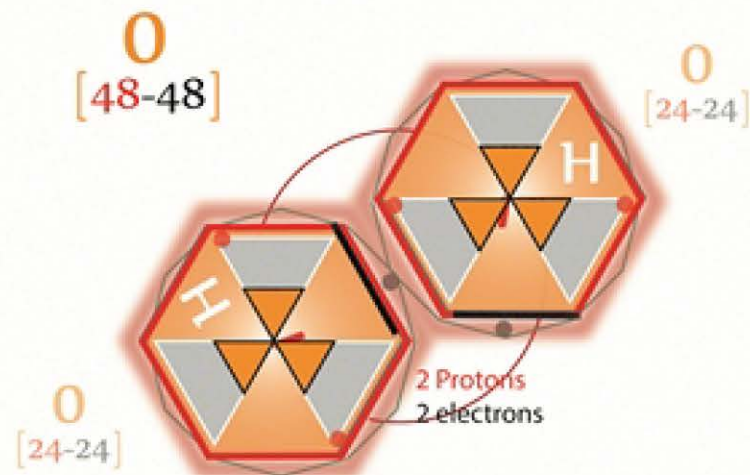


Hydrogen atoms
form Covalent bonds

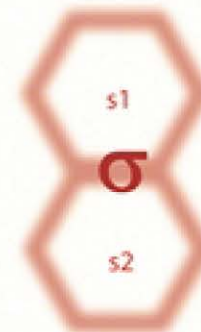


Hydrogen, bound mostly to carbon and nitrogen, is part of almost every molecule in your body: DNA, proteins, sugars, fats.
Hydrogen bonds - which form between atoms that "share" a hydrogen atom, is one of the most important interactions that makes biological molecules behave as they do.

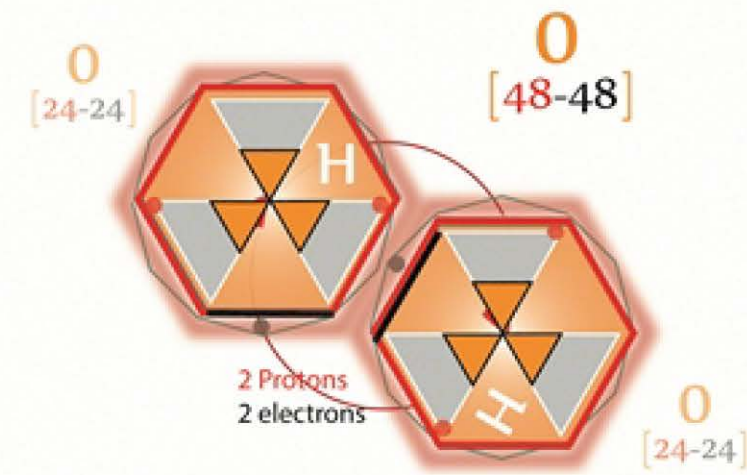
Hydrogen



Hydrogen bonds are sigma bonds



note: n2 energy level Hydrogen is illustrative only
[Hydrogen bonds can be of any energy level]

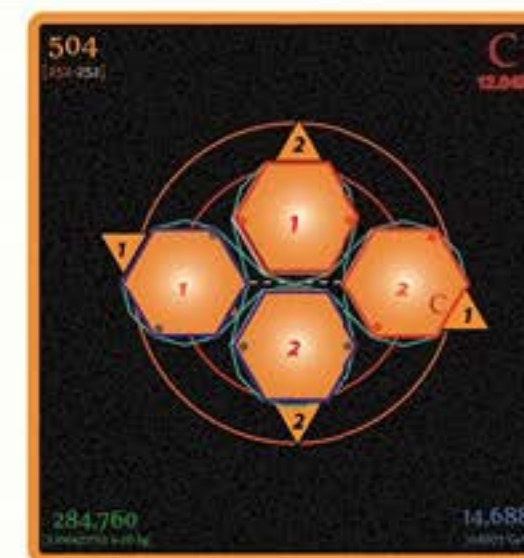


H

The charged fascia of Baryonic quarks facilitates
chemical [hydrogen] bonding in molecules

504
[252-252]

Carbon can bond in four places, and it can bond to itself so it's easy to make lots of different molecules.

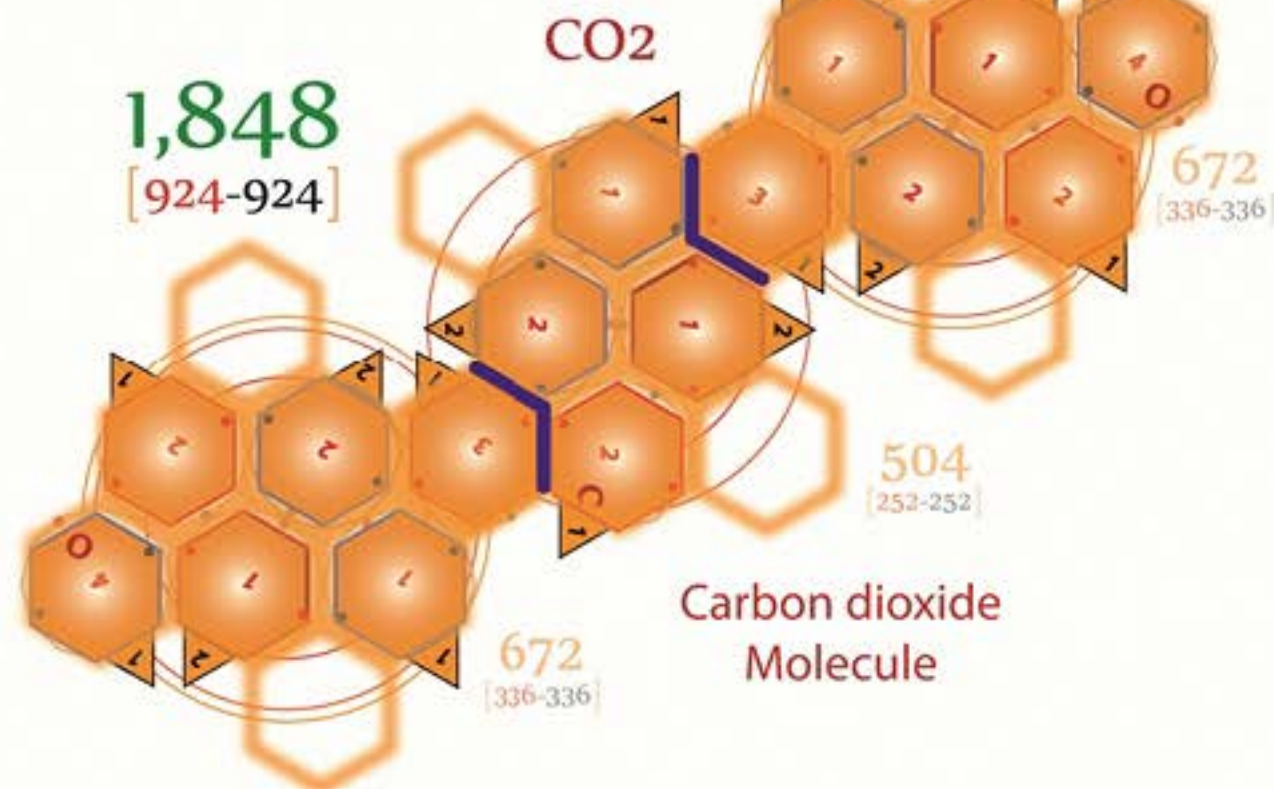


[He] 2s² 2p²

Carbon Compounds

Many carbon compounds are essential for life as we know it.

Some of the most common carbon compounds are: carbon dioxide (CO₂), carbon monoxide (CO), carbon disulfide (CS₂), chloroform (CHCl₃), carbon tetrachloride (CCl₄), methane (CH₄), ethylene (C₂H₄), acetylene (C₂H₂), benzene (C₆H₆), ethyl alcohol (C₂H₅OH) and acetic acid (CH₃COOH) to name just a few.

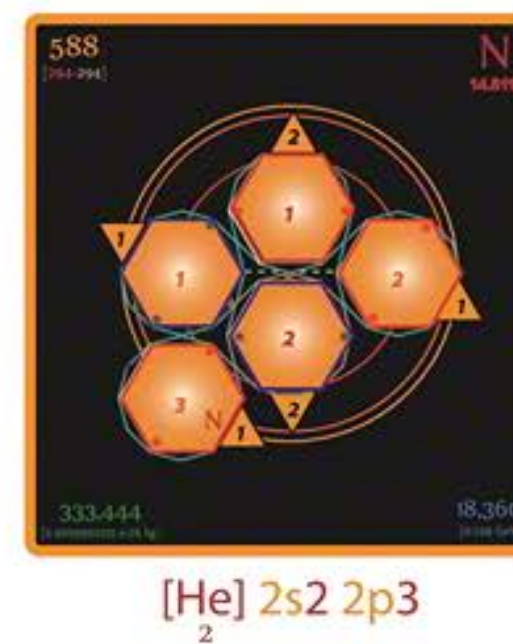
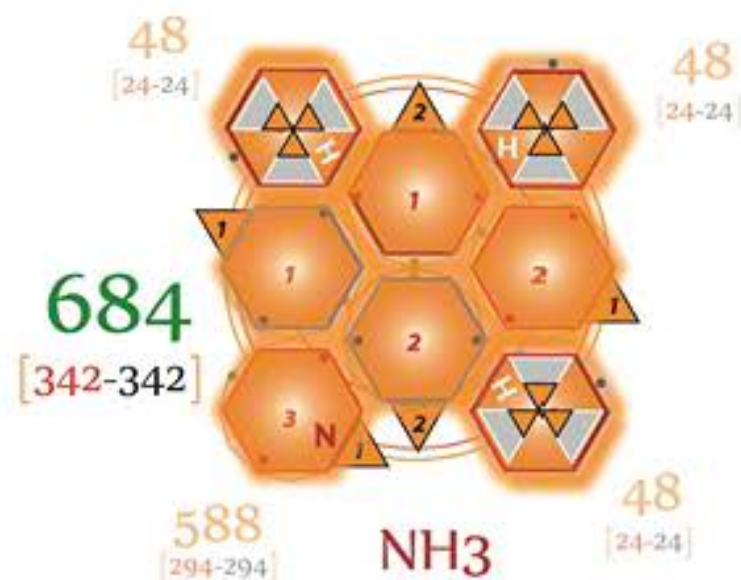
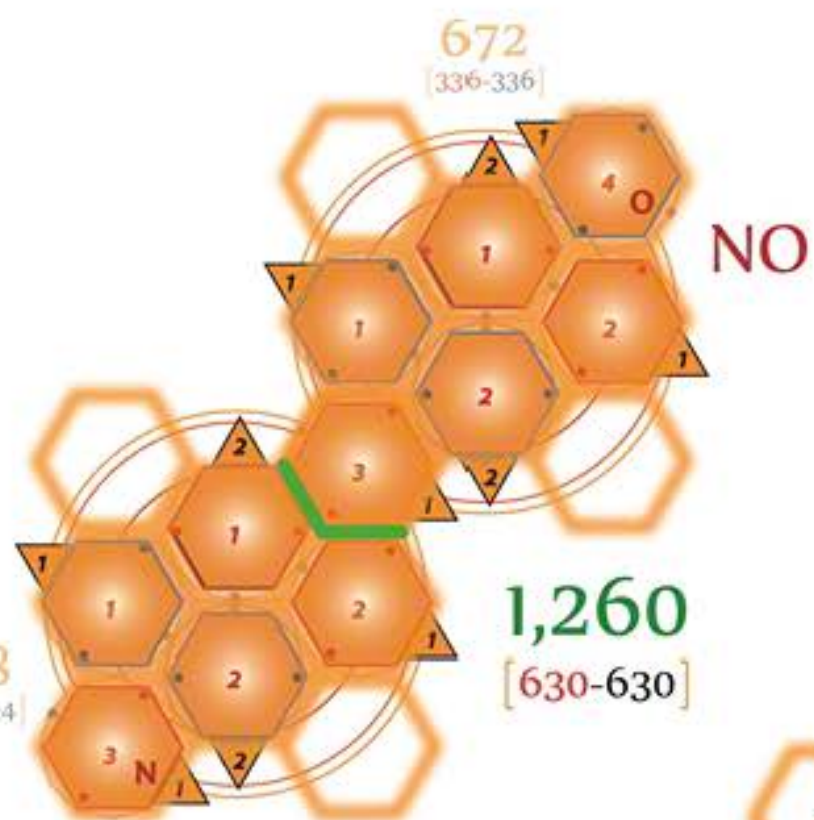


There are nearly ten million known carbon compounds and an entire branch of chemistry, known as organic chemistry, is devoted to their study.

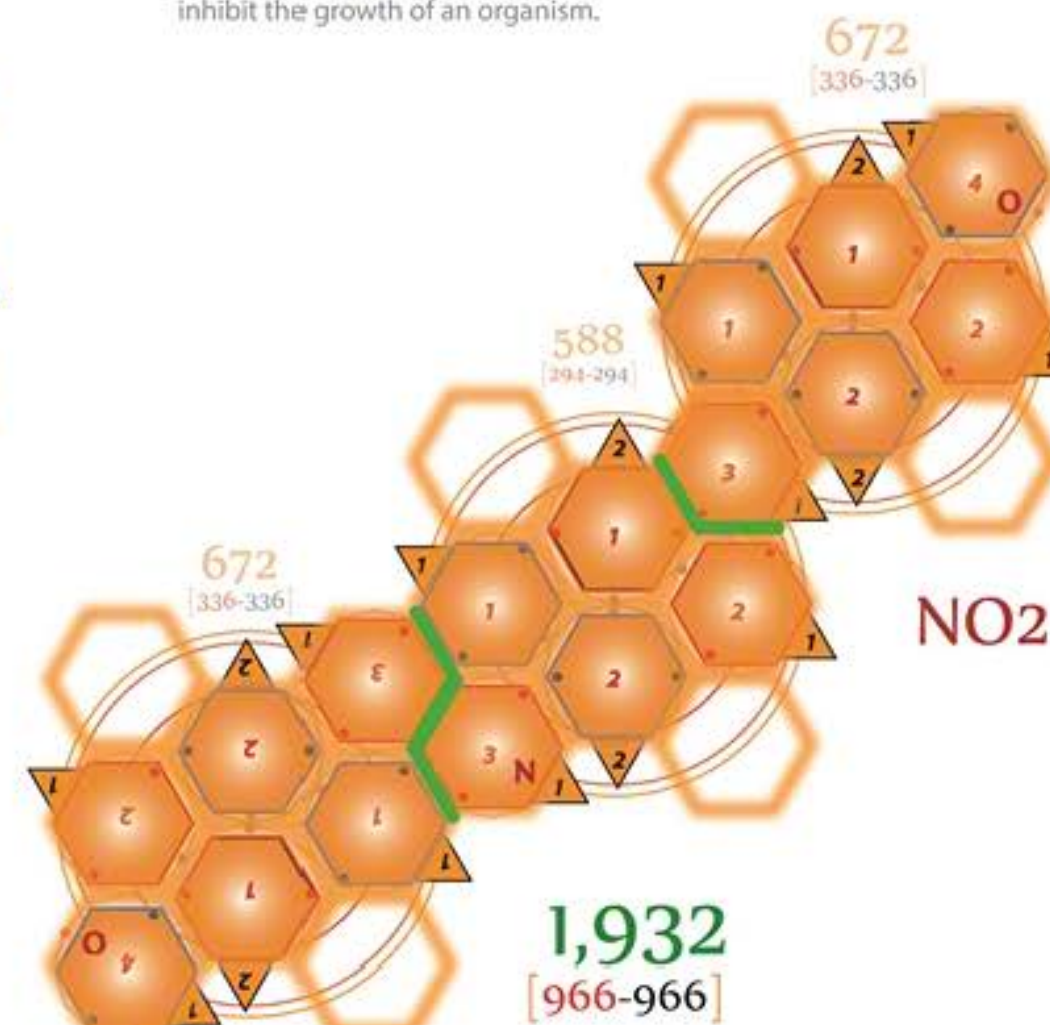
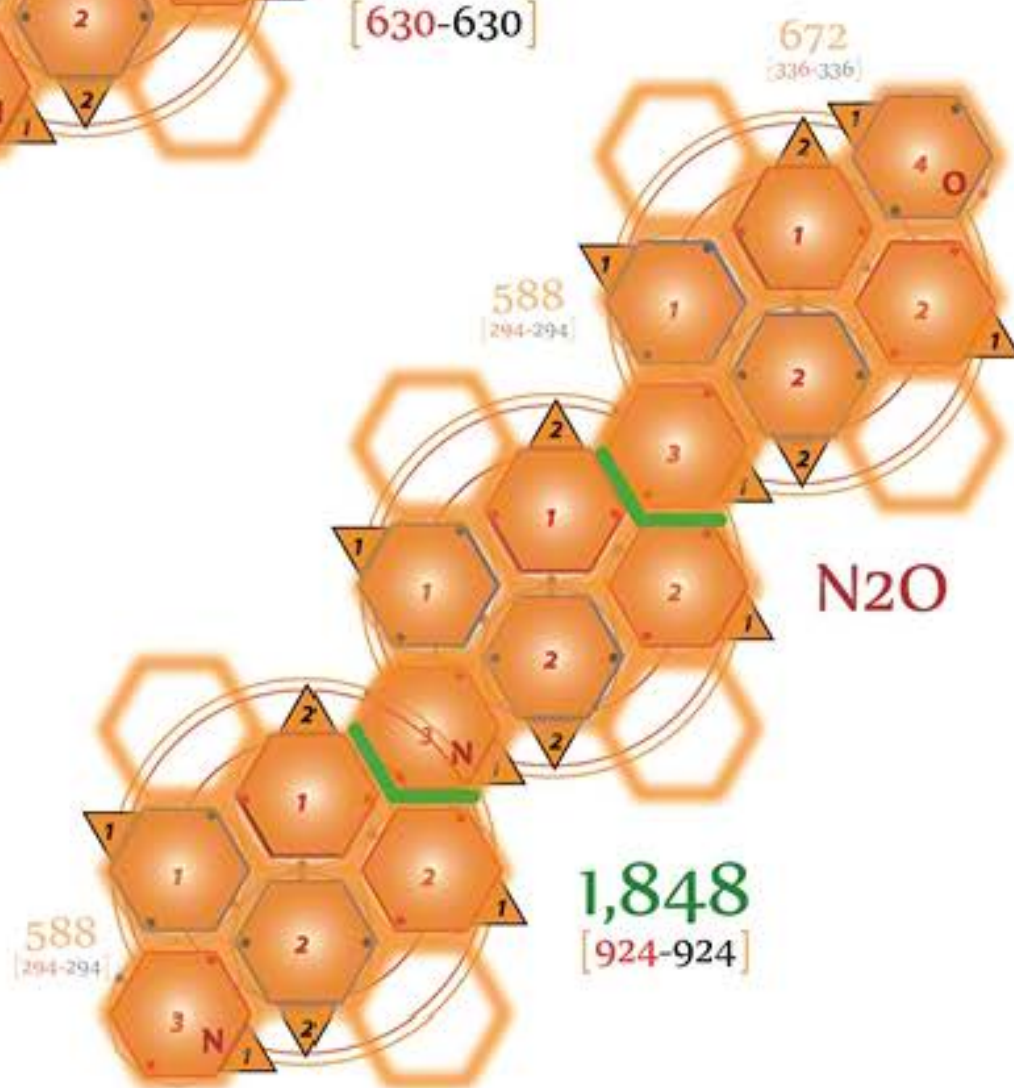
C

Nitrogen Compounds

588
[294-294]



Nitrogen is a component of many biological molecules including proteins, lipids, nucleic acids, and carbohydrates. Nitrogen is so important that a shortage of nitrogen will inhibit the growth of an organism.



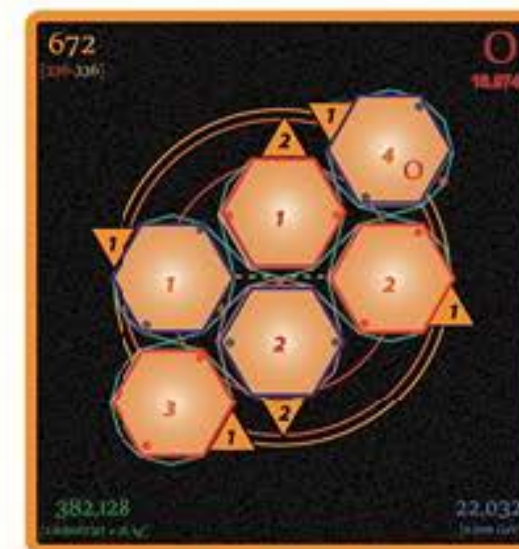
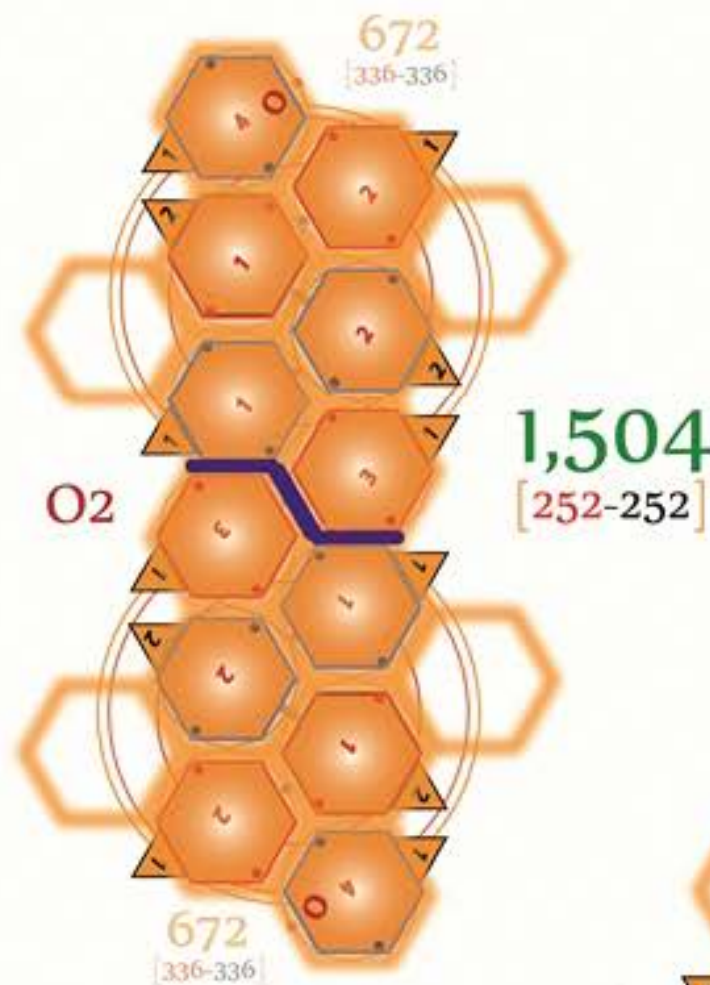
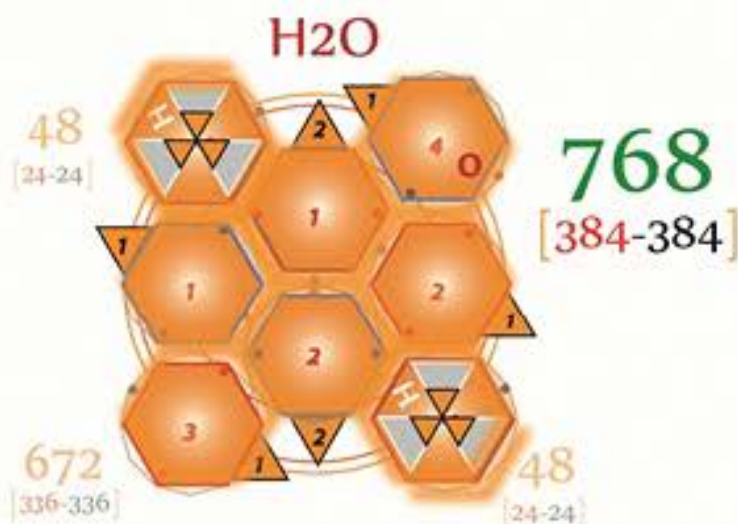
N

672

[336-336]

Oxygen Compounds

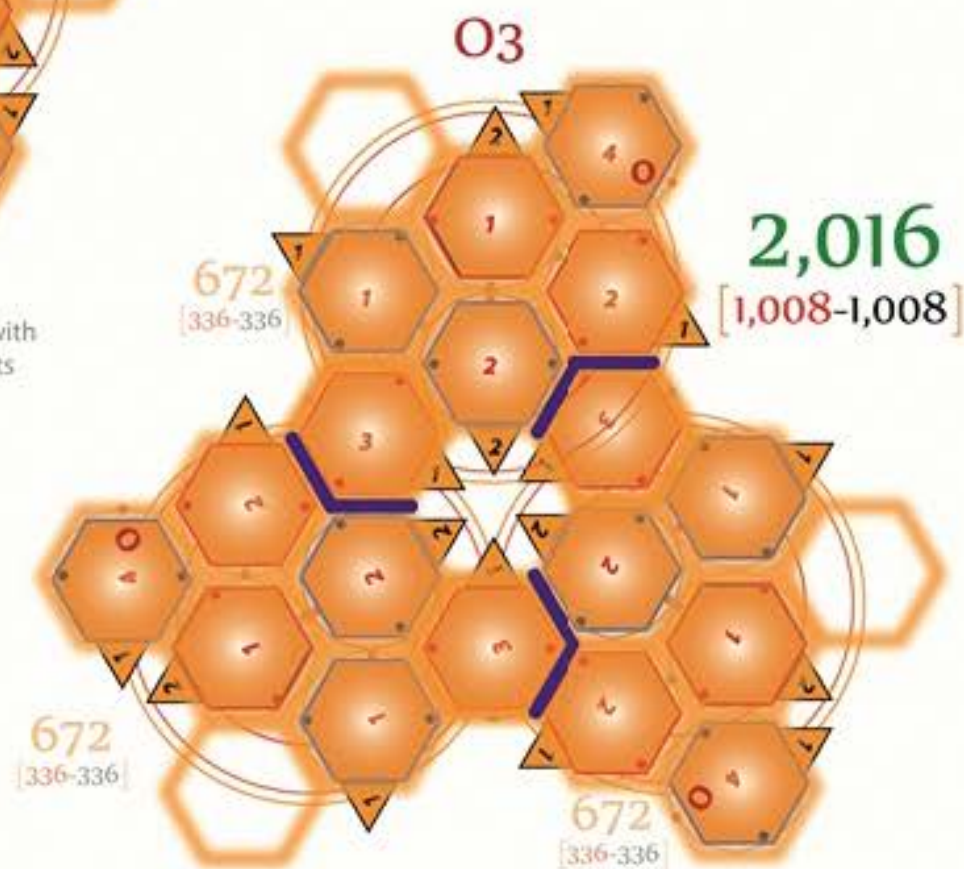
O



[He] 2s² 2p⁴
2

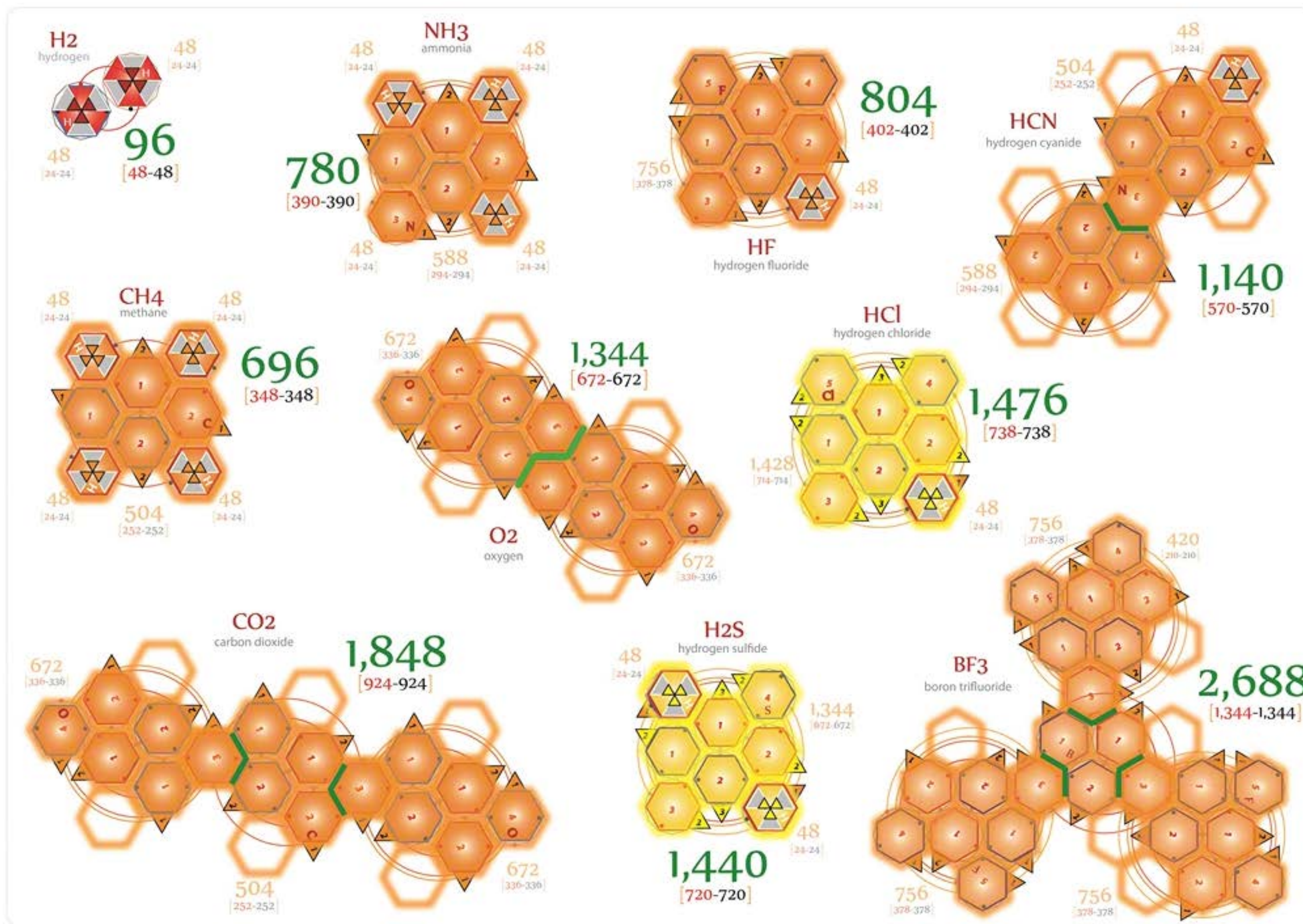


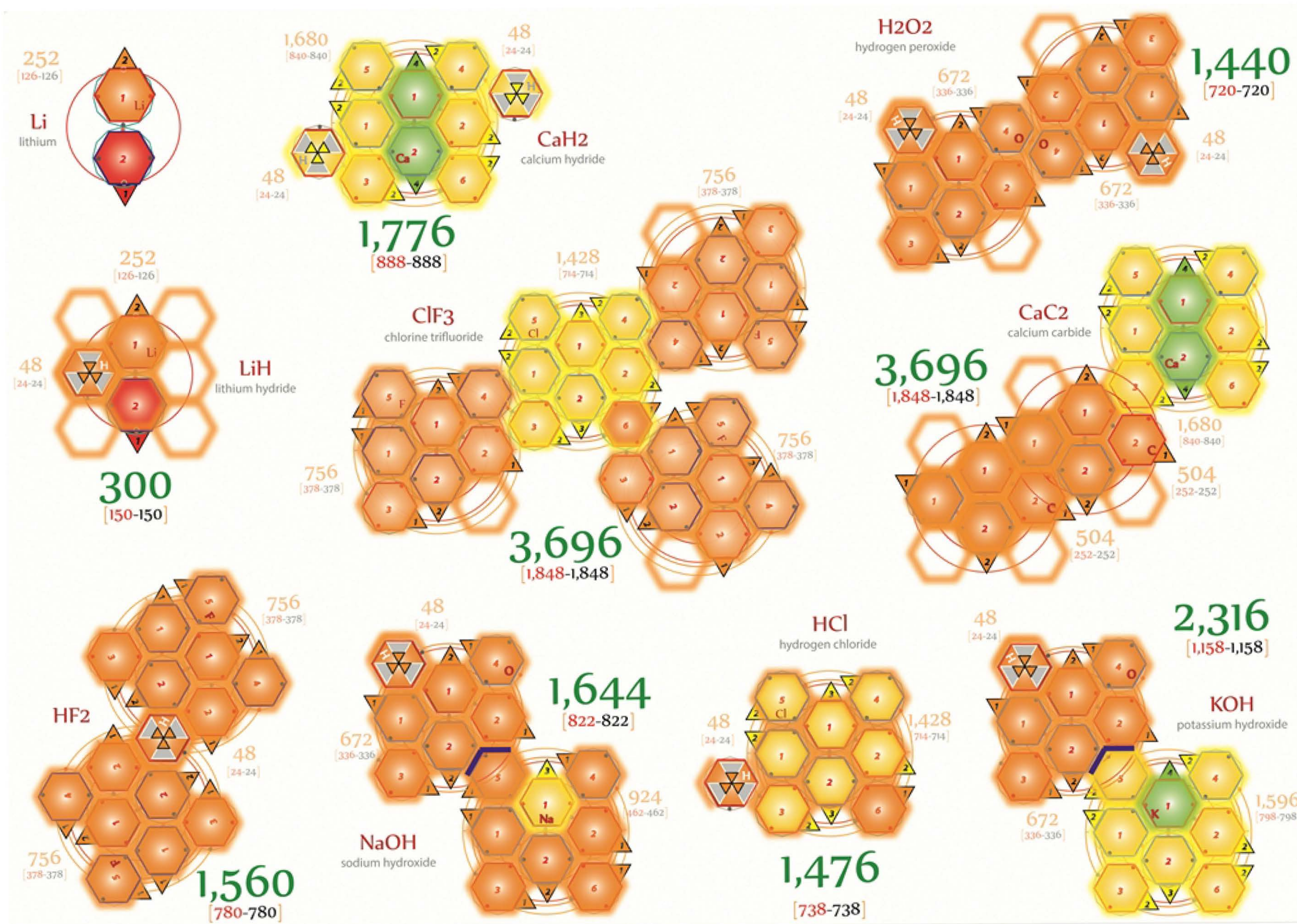
Oxygen forms oxide compounds with almost all of the known elements



As soon as the oxygen enters your blood, a passing protein molecule called hemoglobin picks it up. Each molecule of hemoglobin can transport four molecules of oxygen to almost anywhere in the body.

The hemoglobin transport the oxygen to your cells where another protein, called cytochrome C oxidase makes two molecules of water out of every molecules of oxygen delivered to it

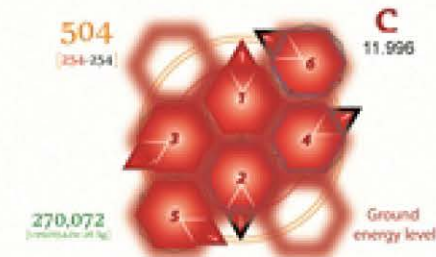
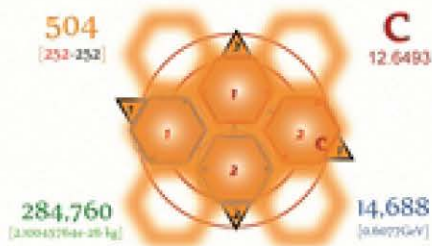




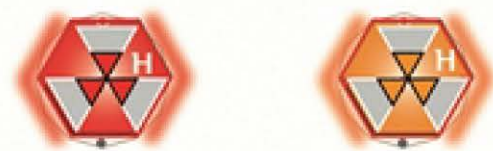
Chemistry

is a branch of physical science, concerning the study of the composition, properties and behavior of Matter

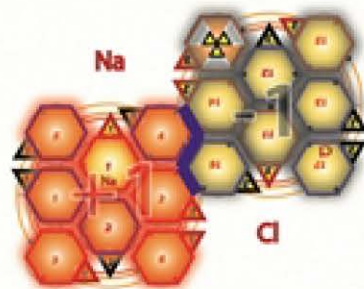
Compounds containing bonds between carbon and a metal are called organometallic compounds.



Inorganic compounds are produced by non-living natural processes or in the laboratory.



Inorganic compounds can form salts.

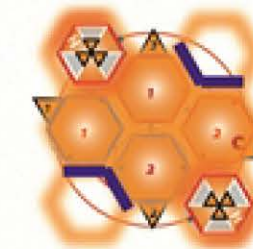


Inorganic compounds contain metal atoms.

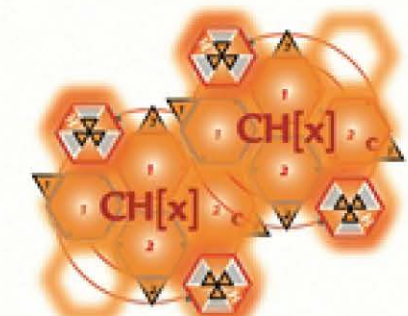
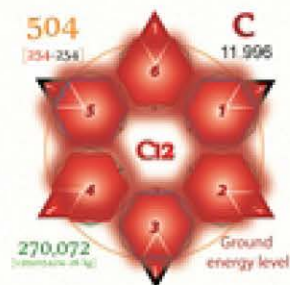
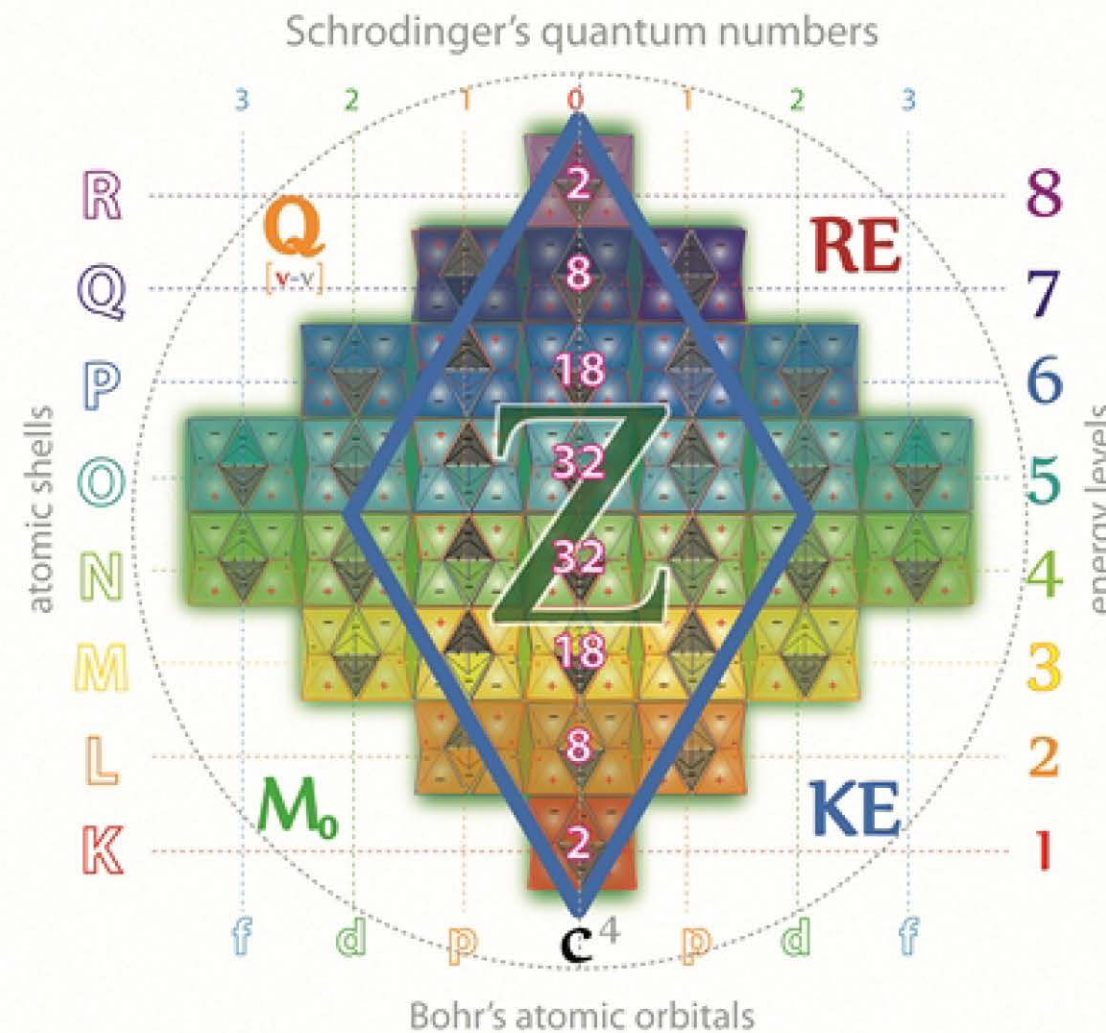
Organic compounds are produced by living things.



Organic compounds can't form salts.



Organic compounds contain carbon-hydrogen bonds.



Tetryonic theory unifies and expands upon the currently disjointed physical and chemical theories through the application of 2D equilateral charged mass-energy geometries in 3D standing-wave mass-Matter topologies

Inorganic

Typically the difference is defined as being whether or not a substance contains carbon or carbon-hydrogen bonds

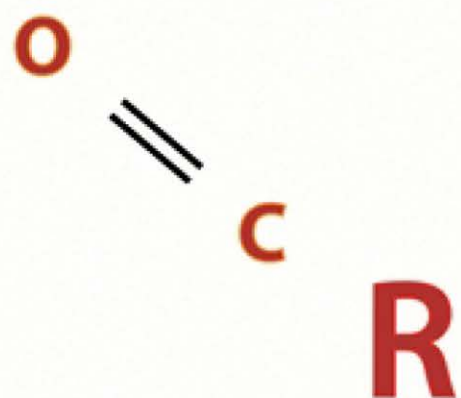
Organic

A chemical compound is a collection of elements bonded together in a way that the resultant ions, atoms or molecules form a 3D material geometric structure. Tetryonic chemical geometries, along with its firm definition and distinction between EM mass & Matter provide a clear visual path for the differentiation between both branches of modern chemistry - as well as the source of animation in living Matter

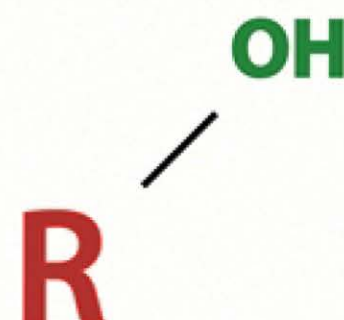
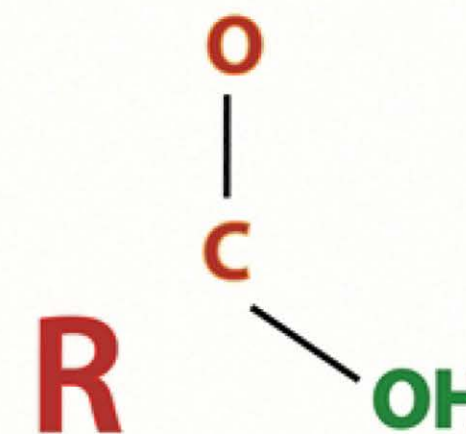
Functional Groups

A functional group is a reactive portion of a molecule.

carbonyl group



carboxyl group

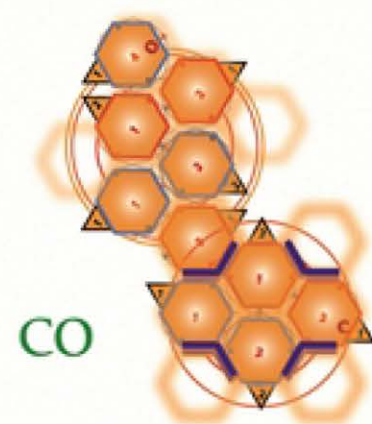


hydroxyl group

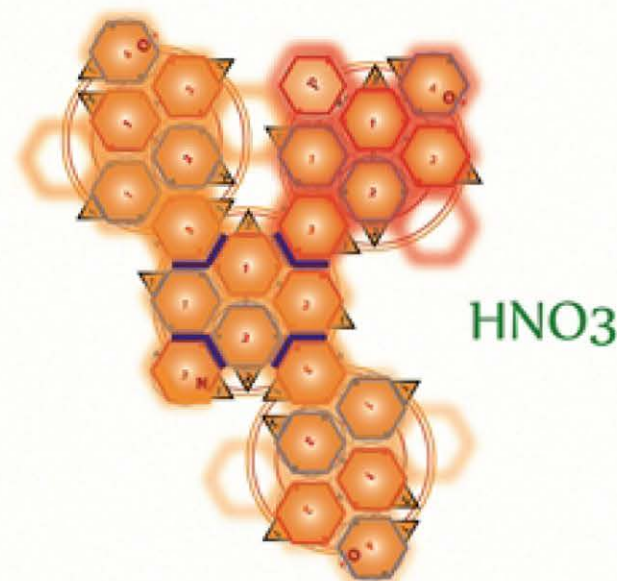
Organic molecules containing a hydroxyl group are known as alcohols.

The combinations of functional groups with hydrocarbons produce a vast number of compounds.

Carbon monoxide

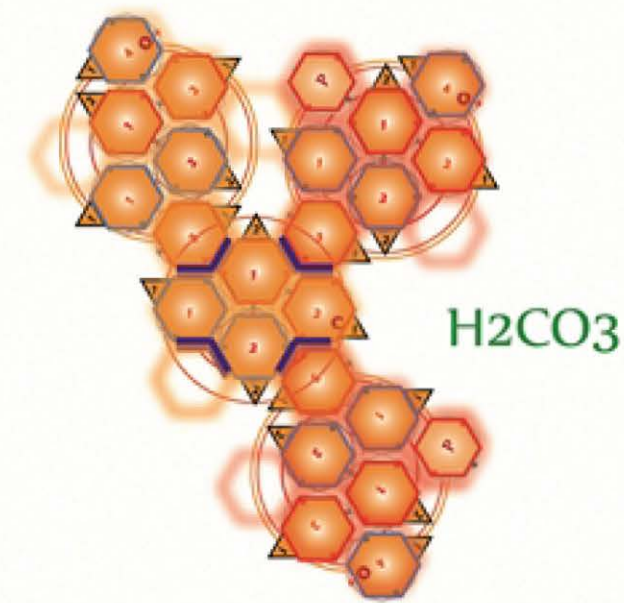


carbonyl group is composed of a carbon atom double-bonded to an oxygen atom



Nitric acid

Carbonic acid

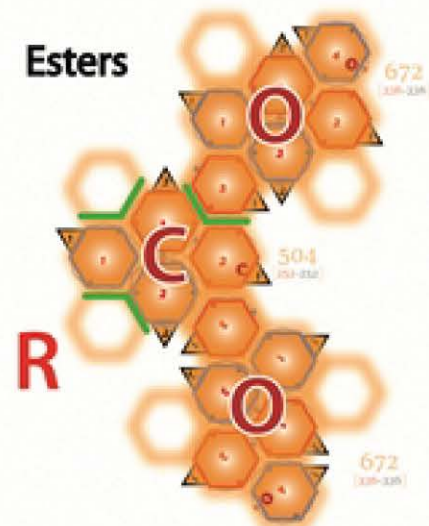


The carboxyl group is present in amino acids and carboxylic acids.

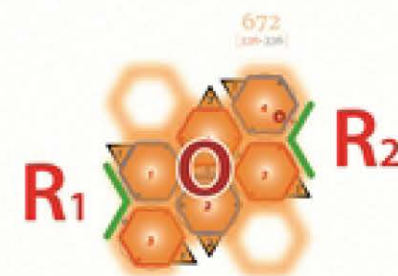
Derivatives of Hydrocarbons

An almost unlimited number of carbon compounds can be formed by the addition of a functional group to a hydrocarbon

Esters

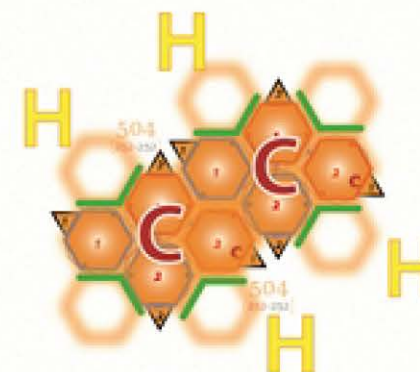


Most esters have pleasant odors. Esters are responsible for the fragrances of many flowers & the tastes of ripened fruits.



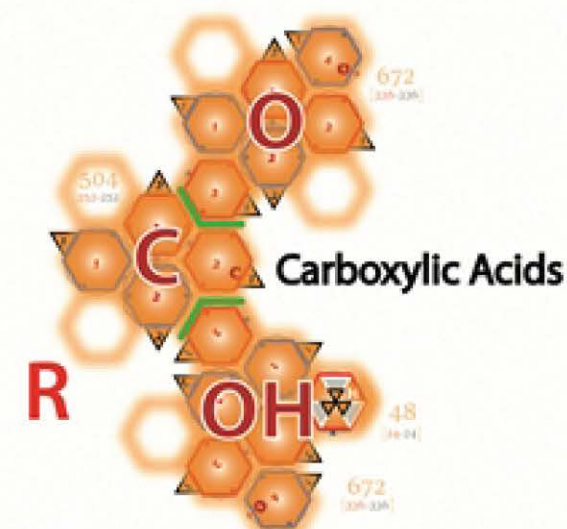
Ethers

The best known ether is diethyl ether. It is a volatile, highly flammable liquid that was used as an anesthetic in the past.



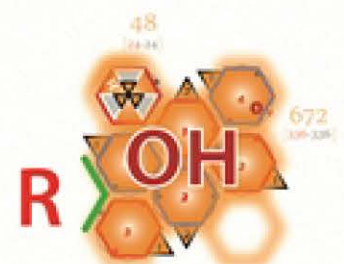
Alkyl Halides - haloalkanes

Common alkyl halides include medical anesthetics, chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs).



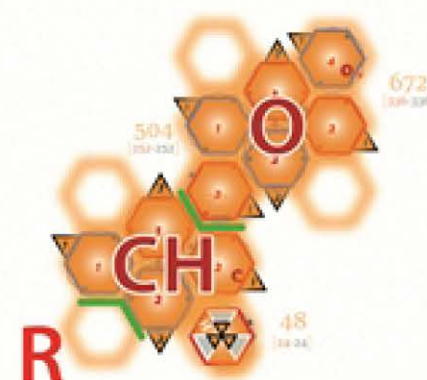
Carboxylic Acids

The simplest of the carboxylic acids is formic acid and is a constituent of bee stings and the bites of other insects including mosquitos.



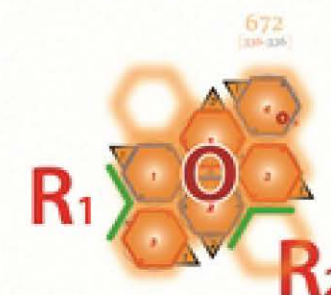
Alcohols

Alcohols are organic compounds containing a hydroxyl group, [-OH], substituted for a hydrogen atom. Ethanol is the alcohol in alcoholic beverages and it is also widely used as a solvent.



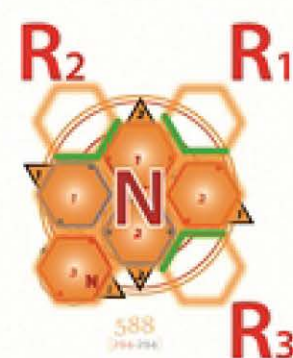
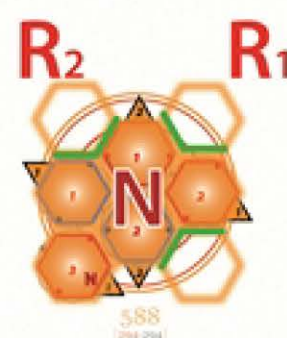
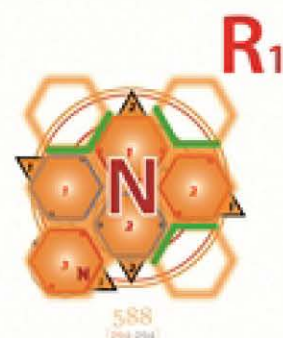
Aldehydes

An aldehyde is a compound containing a carbonyl group with at least one hydrogen attached to it. With a Hydrogen in place of the R group it forms Formaldehyde



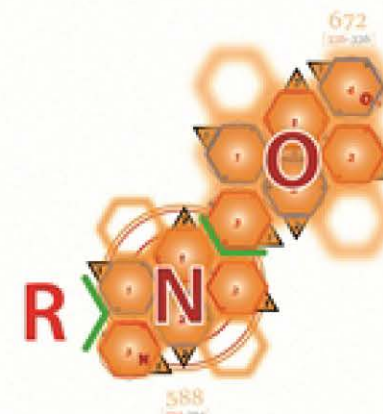
Ketones

Acetone is the simplest of the ketones. Acetone is a commonly used solvent and is the active ingredient in nail polish remover and some paint thinners.



Amines

Amines are organic compounds that contain nitrogen, they are basic compounds with strong odors, often described as "fishy"



Amides

Amides are nitrogen-containing organic compounds and are formed when amino acids react to form proteins.

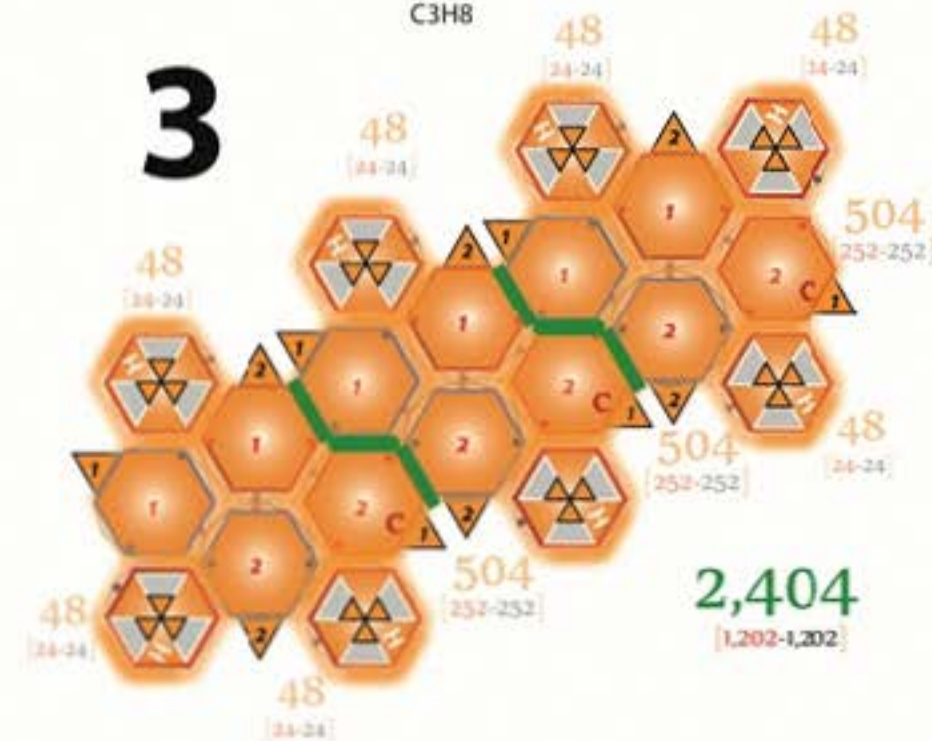
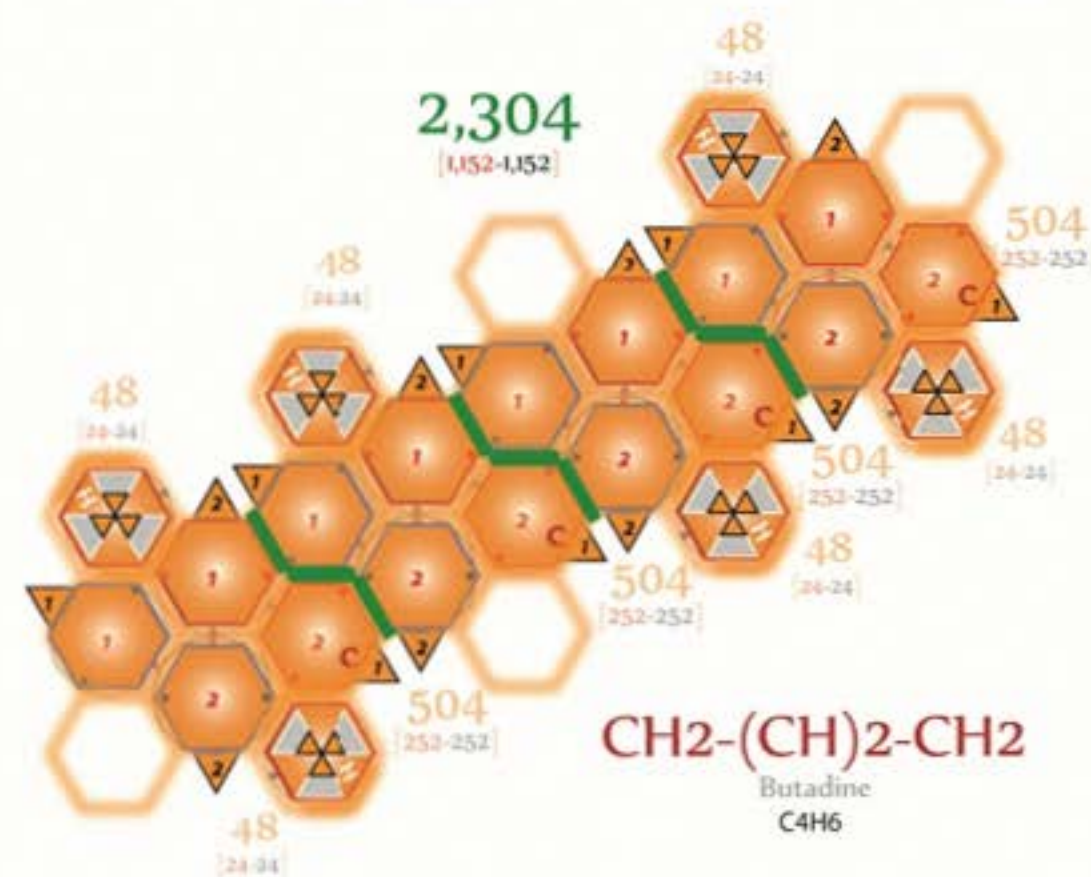
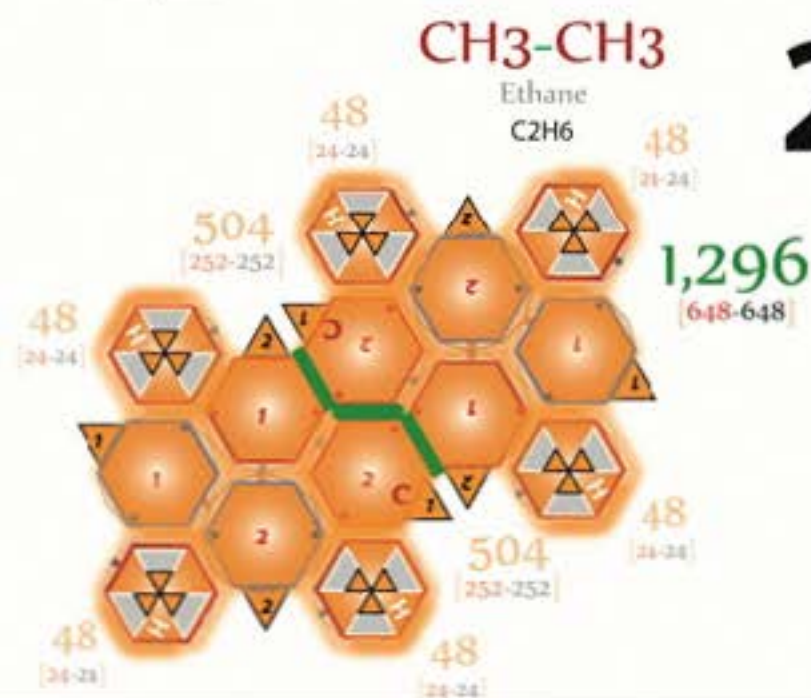
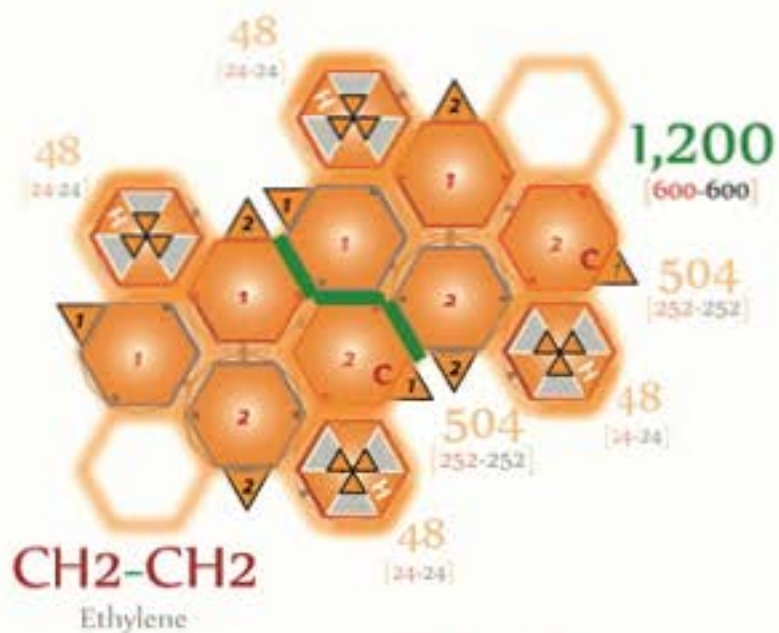
***R's* stand for carbon substituents or hydrogen atoms.**

Hydrocarbons

In organic chemistry, a methylene group is any part of a molecule that consists of two hydrogen atoms bound to a carbon atom, which is connected to the remainder of the molecule



The methylene group should be distinguished from the free methylene radical, also called carbene, whose molecule is a methylene group all by itself.



2,496
[1,248-1,248]

3,096
[1,548-1,548]

4

5

6

3,696
[1,848-1,848]

CH₃-(CH₂)₂-CH₃
Butane
C₄H₁₀

CH₃-(CH₂)₃-CH₃
Pentane
C₅H₁₂

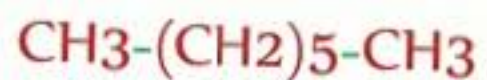
CH₃-(CH₂)₄-CH₃
Hexane
C₆H₁₄

Butane, also called n-butane, is the unbranched alkane with four carbon atoms, CH₃-(CH₂)_n-CH₃.

Butane is also used as a collective term for n-butane together with its only other isomer, isobutane (also called methylpropane), CH(CH₃)₃.

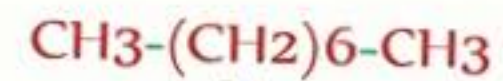
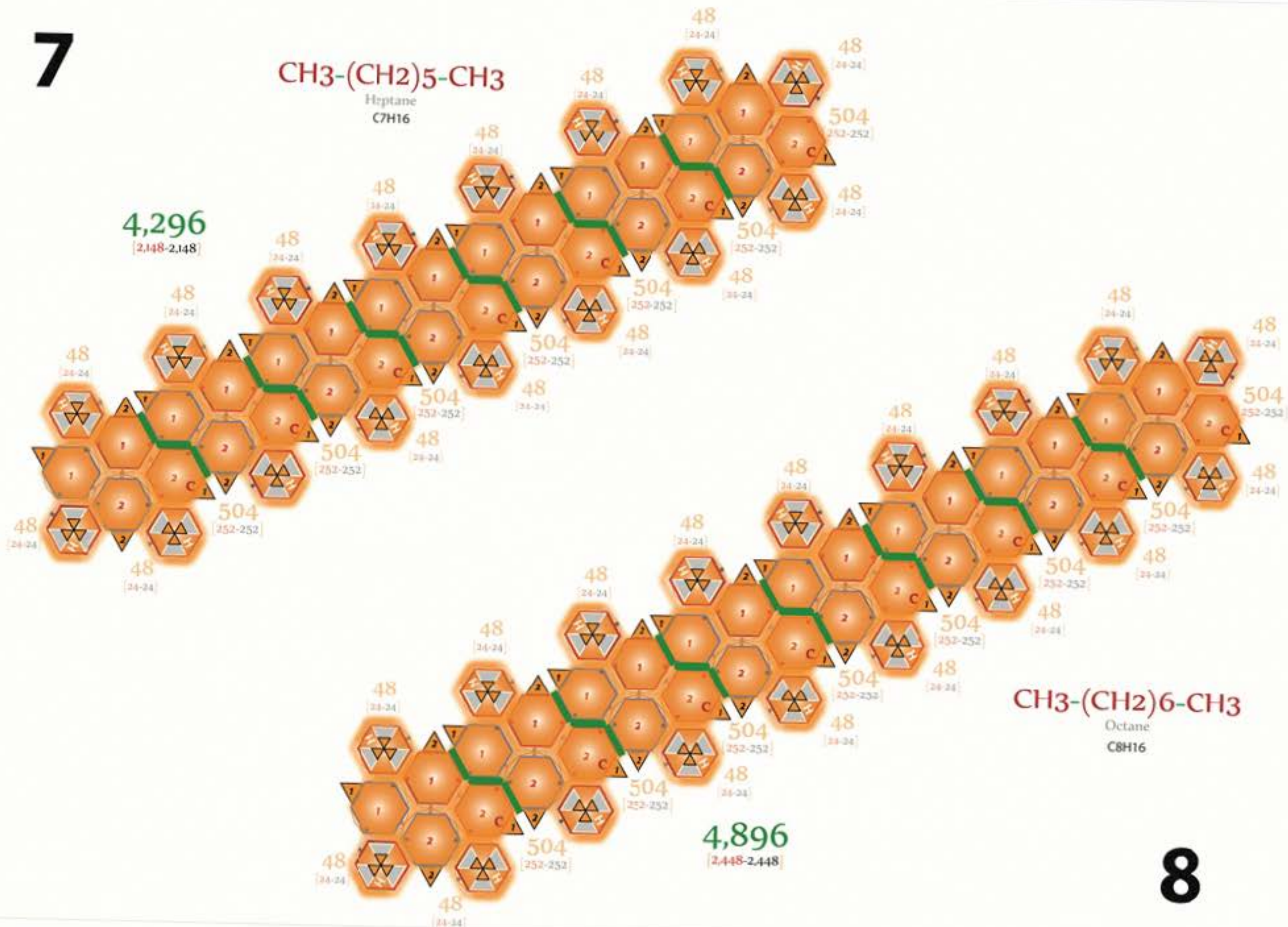
Butanes are highly flammable, colorless, odorless, easily liquefied gases.

7



Heptane
 C_7H_{16}

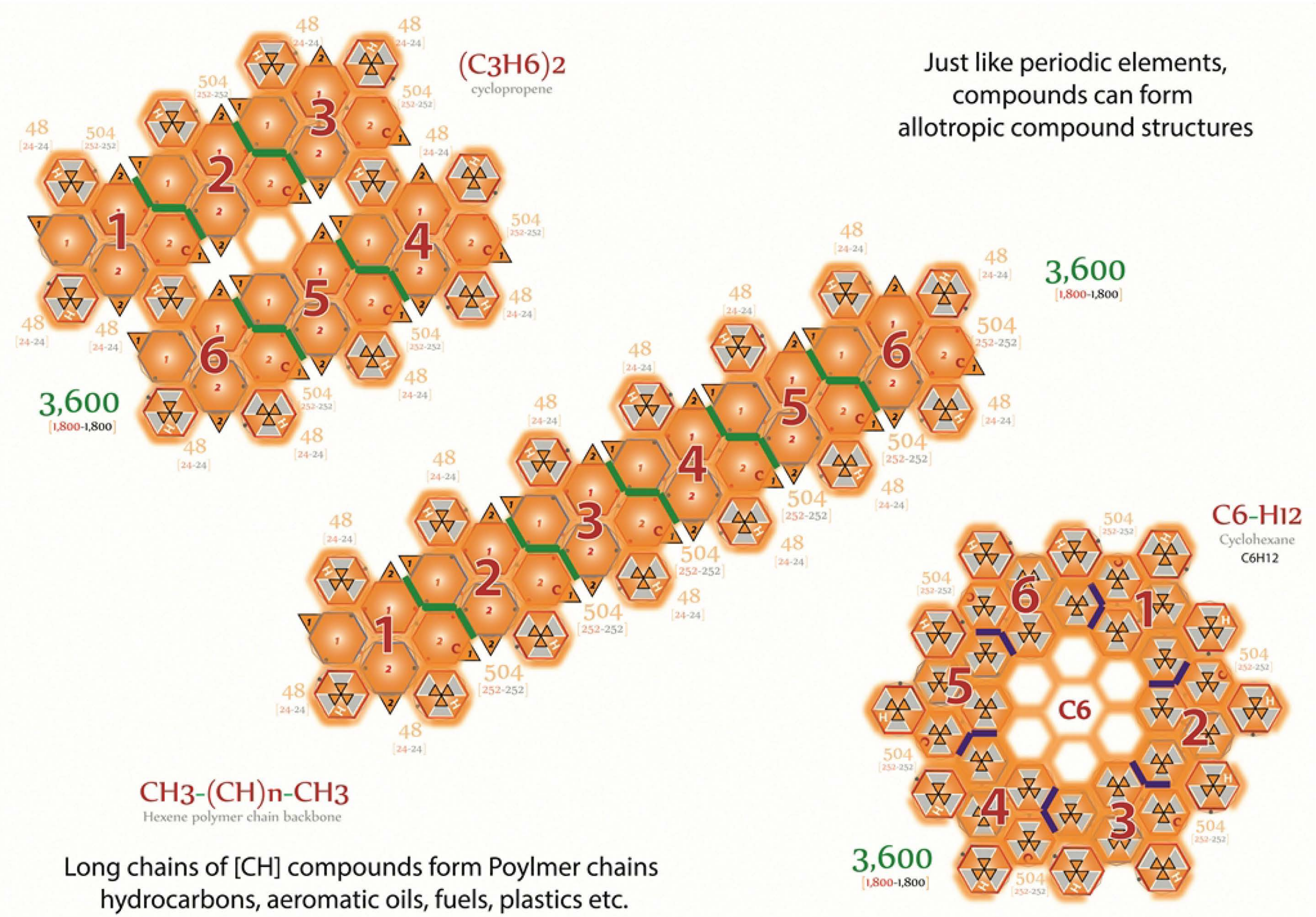
4,296
[2,148-2,148]

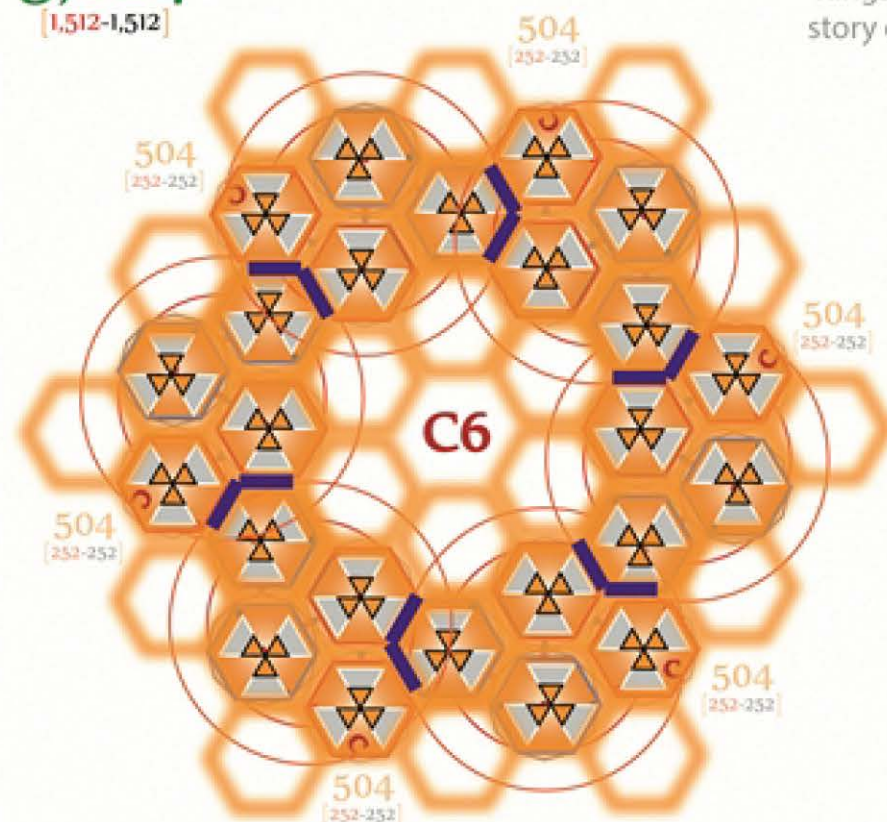


Octane
 C_8H_{16}

4,896
[2,448-2,448]

8



3,024
[1,512-1,512]

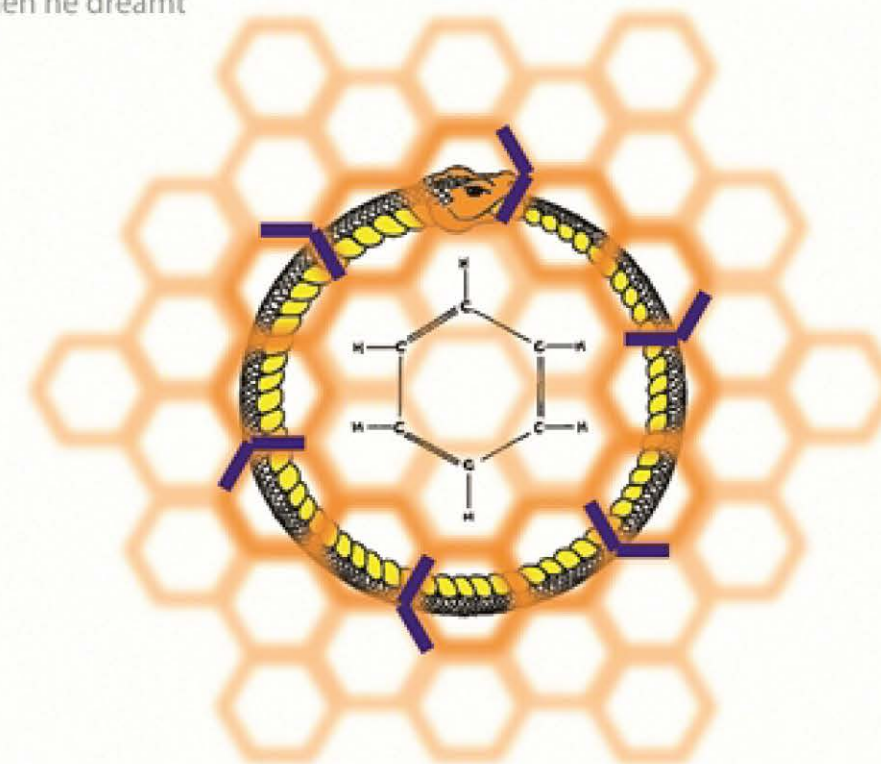
Carbon ring

Rings of atoms are also common in organic structures. You may have heard the famous story of Auguste Kekulé first realizing that benzene has a ring structure when he dreamt of snakes biting their own tails.

Friedrich August Kekulé



(7 September 1829 - 13 July 1896)

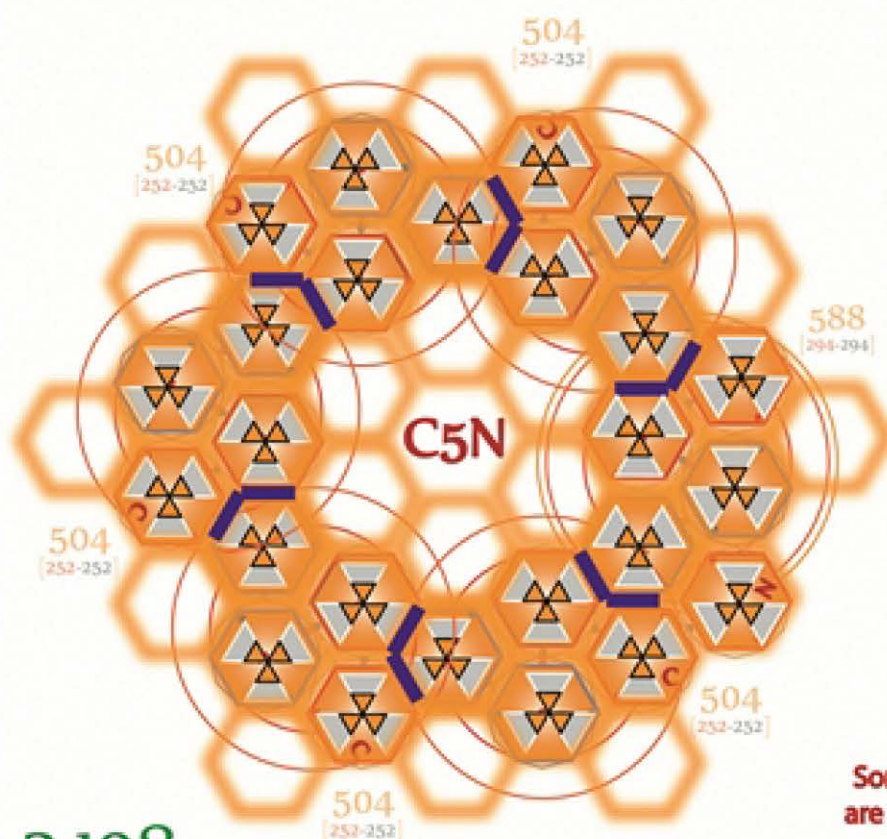


Organic Chemistry

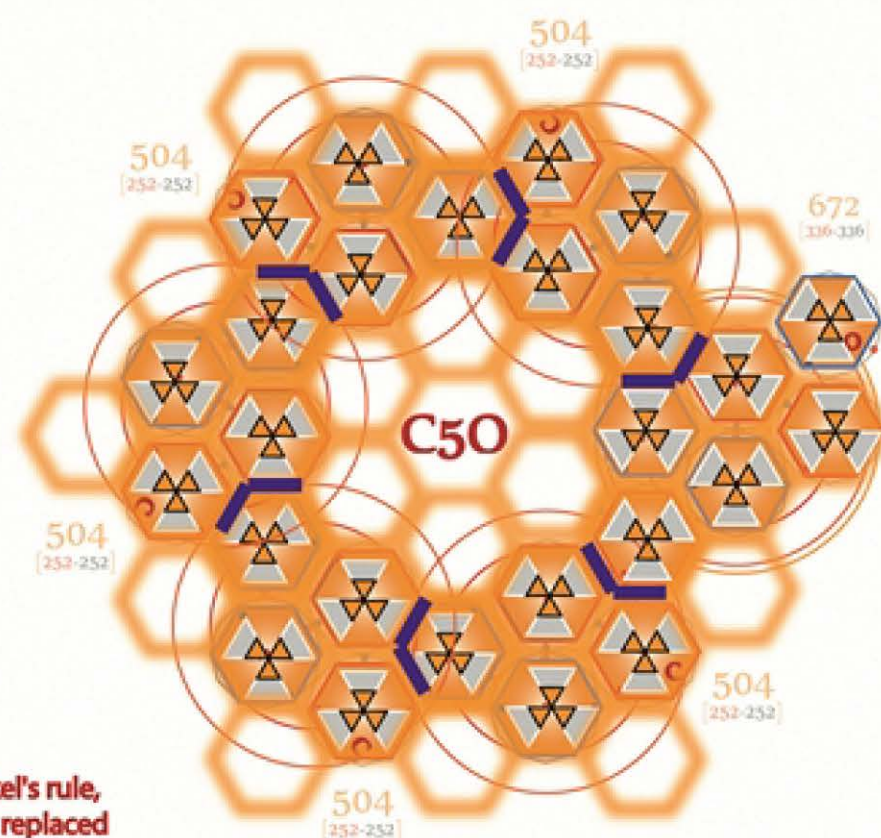
In 1865, August Kekulé presented a paper at the Academie des Sciences in Paris suggesting a cyclic structure for benzene, the inspiration for which he ascribed to a dream. However, was Kekulé the first to suggest that benzene was cyclic. Some credit an Austrian schoolteacher, Josef Loschmidt with the first depiction of cyclic benzene structures.

In 1861, 4 years before Kekulé's dream, Loschmidt published a book in which he represented benzene as a set of rings. It is not certain whether Loschmidt or Kekulé—or even a Scot named Archibald Couper—got it right first

Some non-benzene-based compounds called heteroarenes, which follow Hückel's rule, are also aromatic compounds. In these compounds, at least one carbon atom is replaced by one of the heteroatoms oxygen, nitrogen, or sulfur.

3,108
[1,554-1,554]

Carbon-Nitrogen ring



Carbon-Oxygen ring

3,192
[1,596-1,596]

Benzene molecules

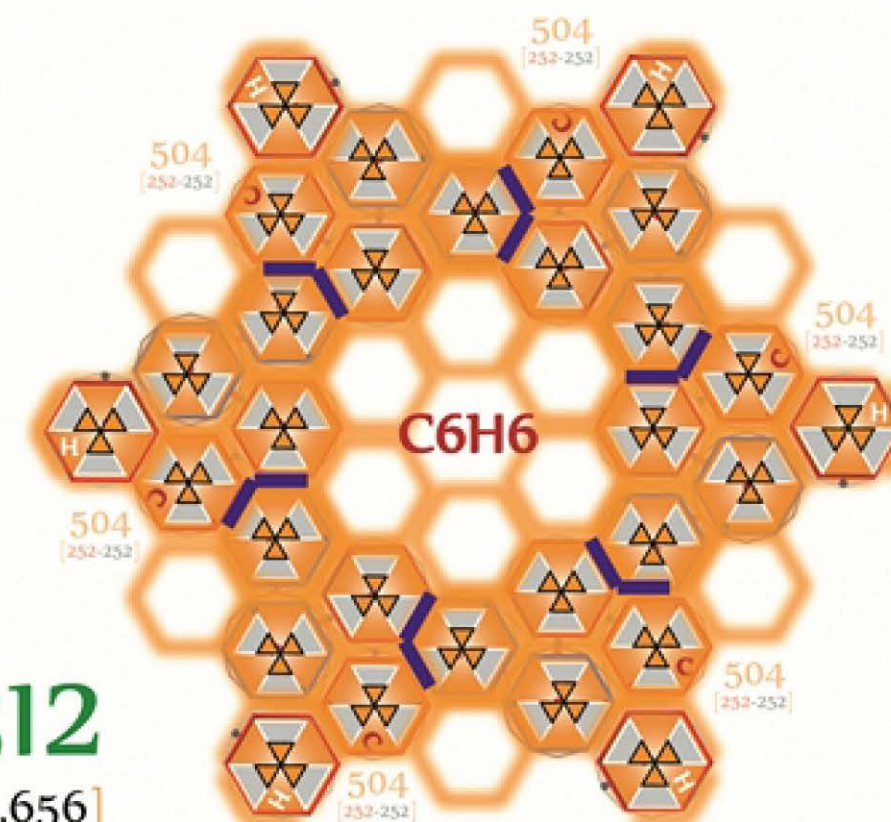
Benzene, or benzol, is an organic chemical compound and a known carcinogen with the molecular formula C₆H₆.

It is sometimes abbreviated Ph-H.
Benzene is a colorless and highly flammable liquid with a sweet smell and a relatively high melting point.

Because it is a known carcinogen, its use as an additive in gasoline is now limited, but it is an important industrial solvent and precursor in the production of drugs, plastics, synthetic rubber, and dyes. Benzene is a natural constituent of crude oil, and may be synthesized from other compounds present in petroleum.

Benzene is an aromatic hydrocarbon and the second [n]-annulene ([6]-annulene), a cyclic hydrocarbon with a continuous pi bond.

Cyclic hydrocarbon compounds are often referred to as Aromatic compounds due to their sweet smell



3,312
[1,656-1,656]

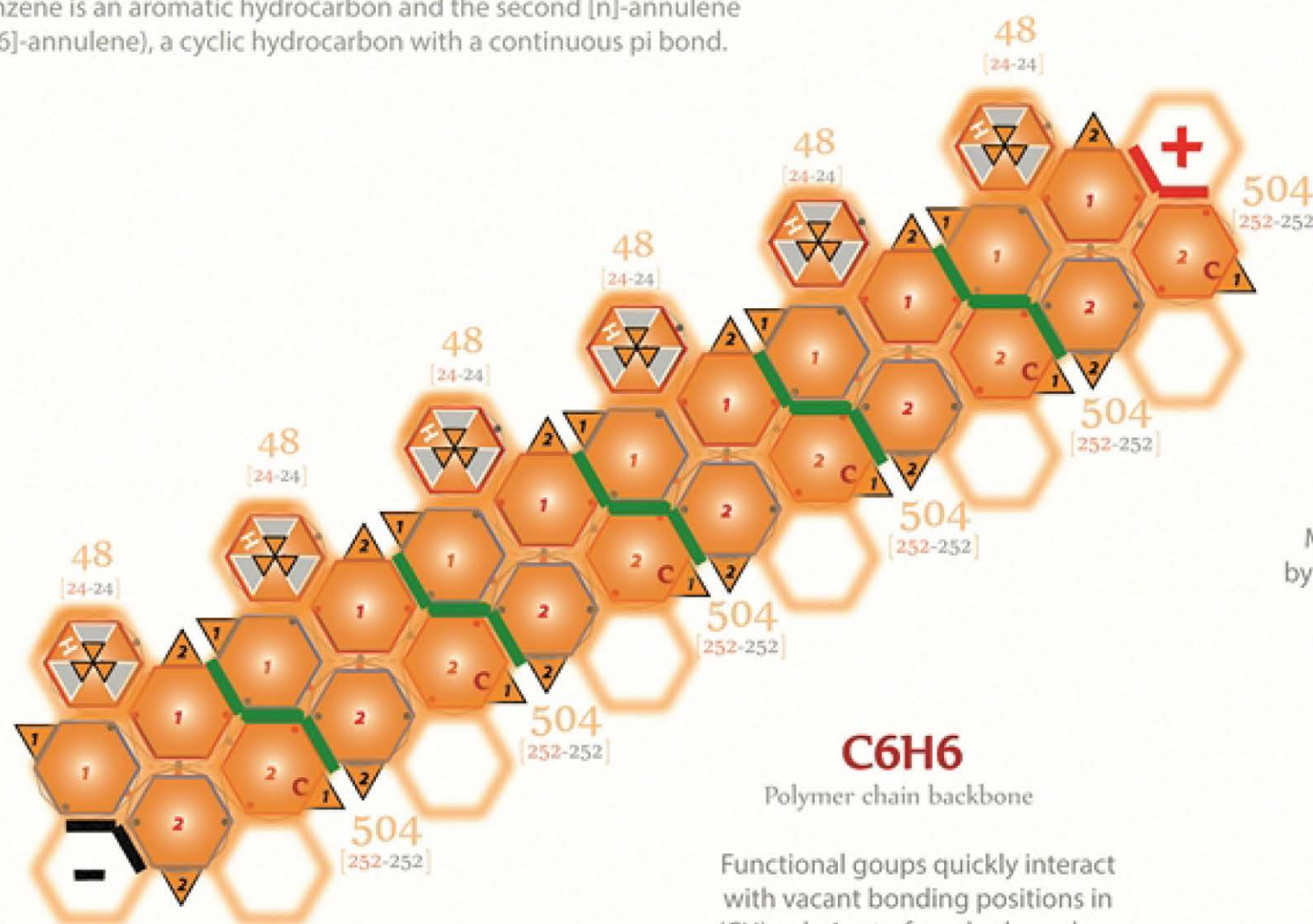
(CH)₆
Benzene ring
C₆H₆

A aromatic hydrocarbon is formed when CH compounds form a cyclic molecule

Many important additional chemical compounds are derived from benzene by replacing one or more of its hydrogen atoms with another functional group.

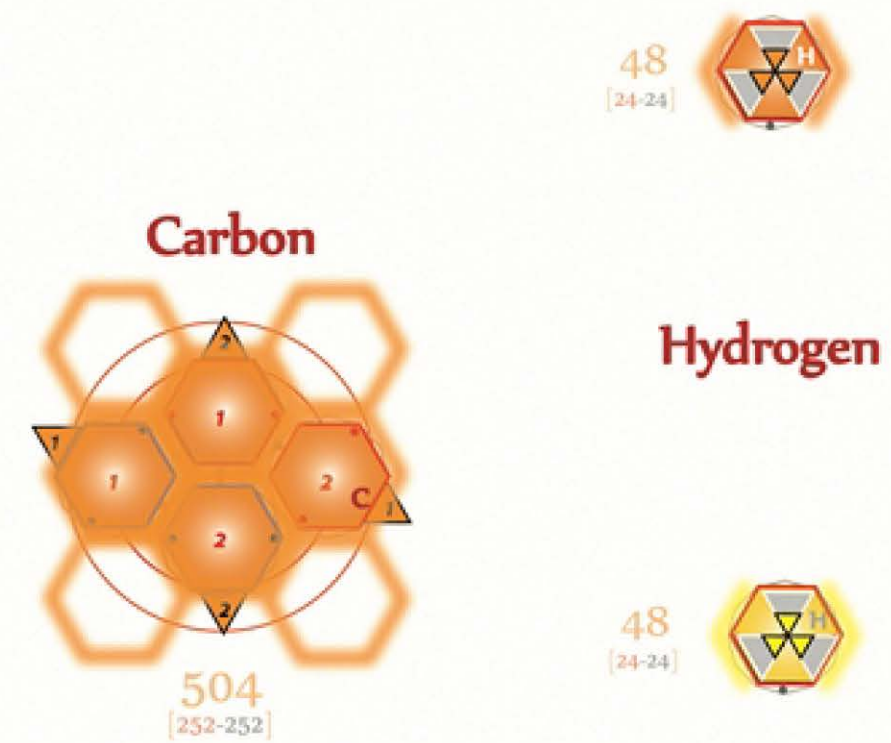
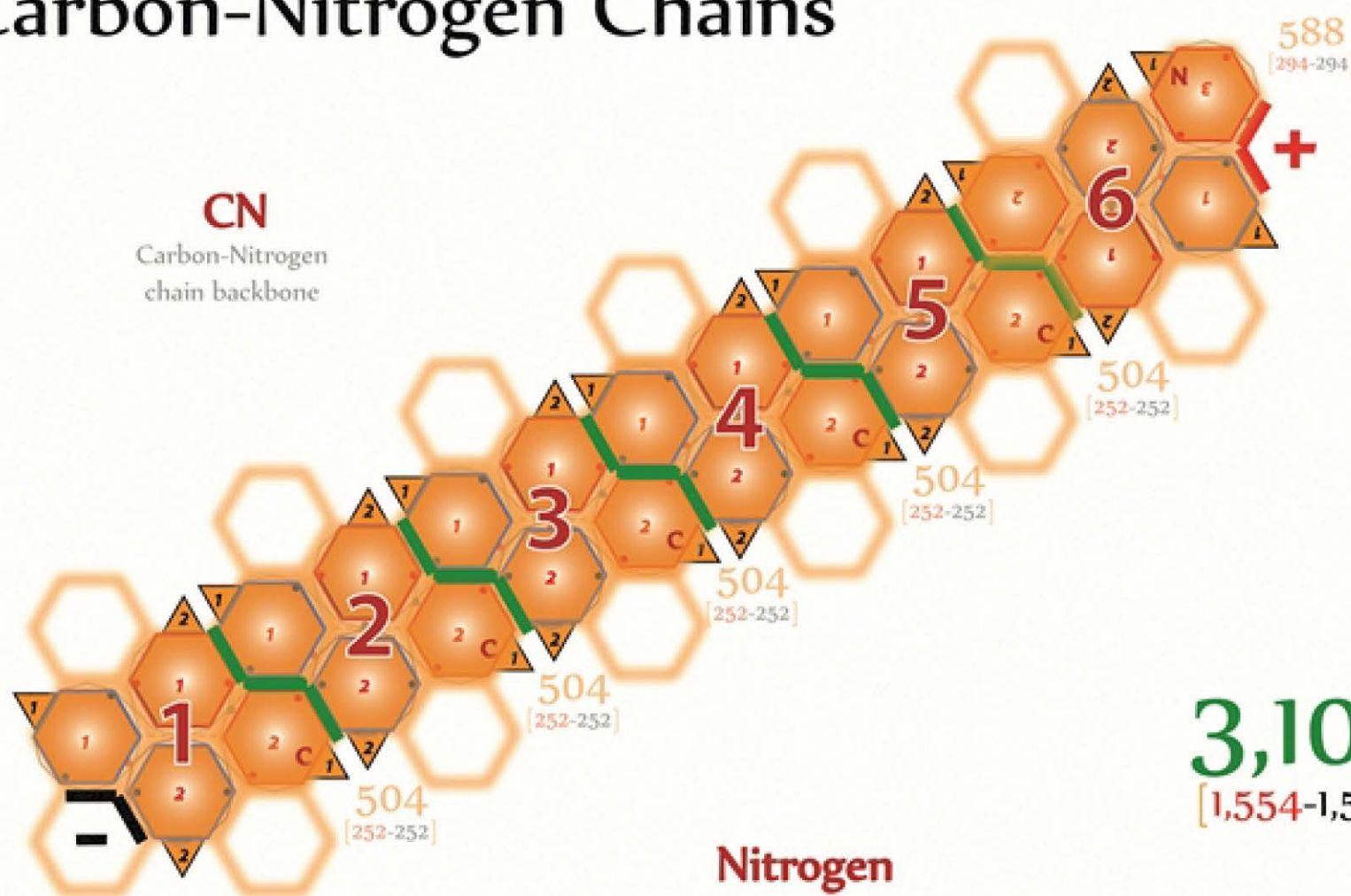
Examples of simple benzene derivatives are phenol, toluene, and aniline, abbreviated PhOH, PhMe, and PhNH₂, respectively

Linear (CH)_n chains are rarely found in nature as the Positive and Negative tail ends of Hydrocarbon chain interact and bond to form cyclic compounds.

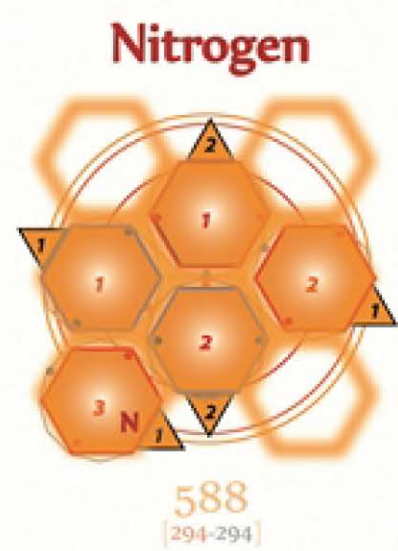
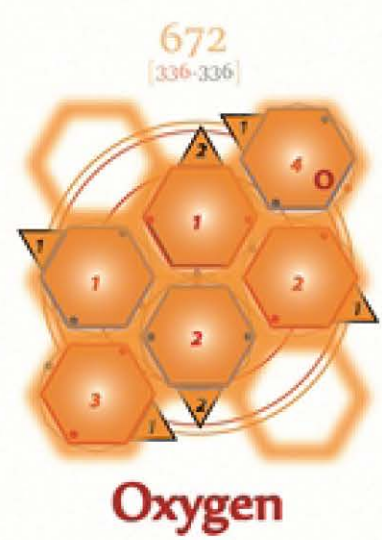


C₆H₆
Polymer chain backbone
Functional groups quickly interact with vacant bonding positions in (CH)_n chains to form hydrocarbon compounds

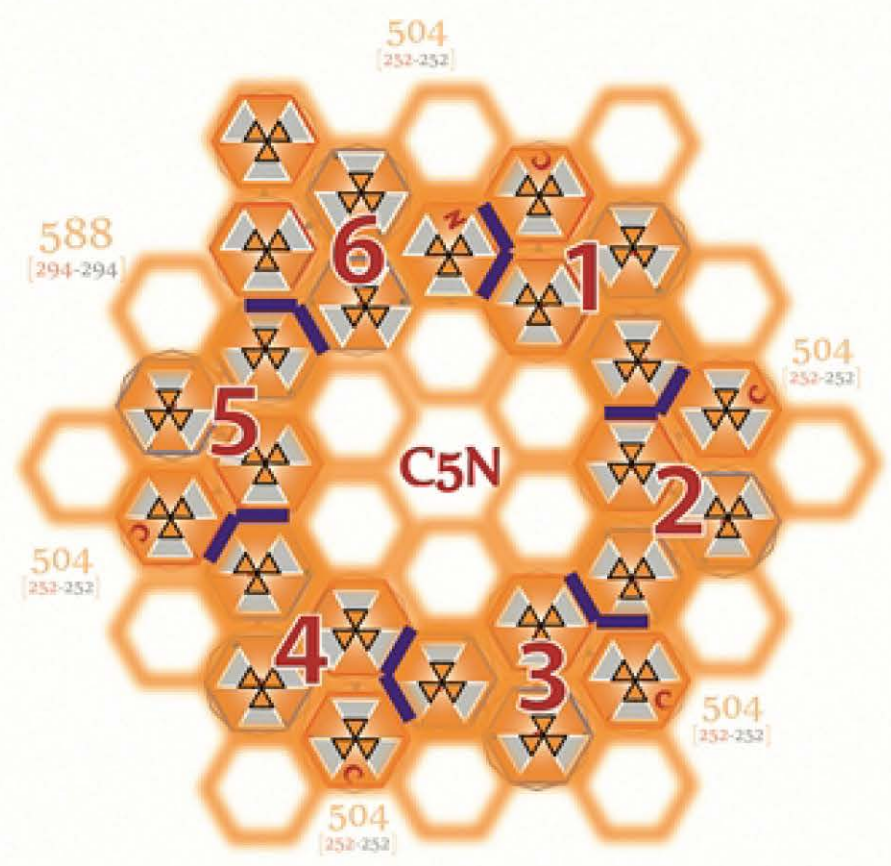
Carbon-Nitrogen Chains



3,108
[1,554-1,554]



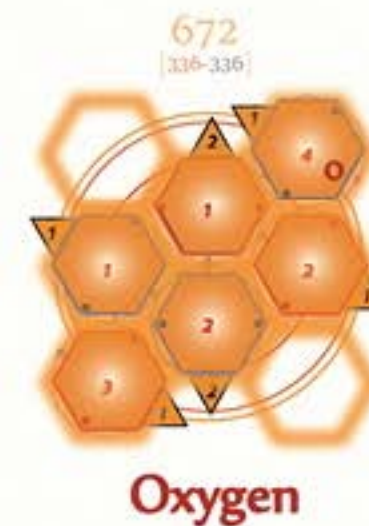
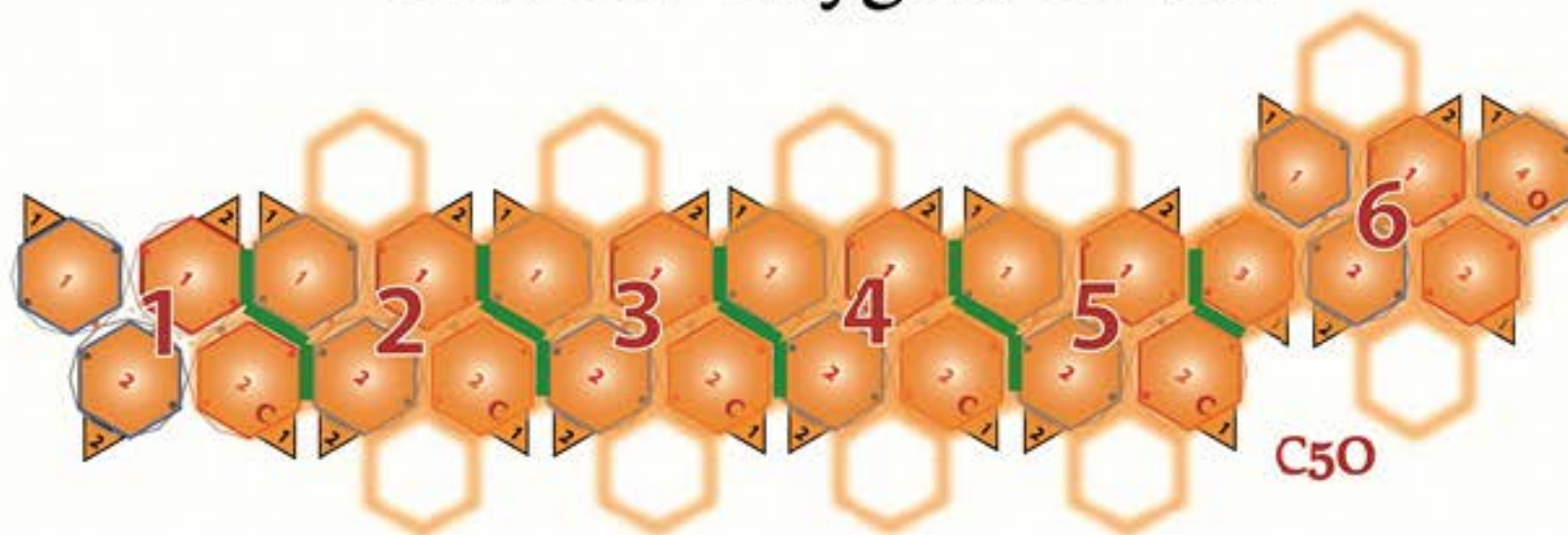
37 Protons
37 electrons
37 Neutrons



Carbon-Oxygen Chains

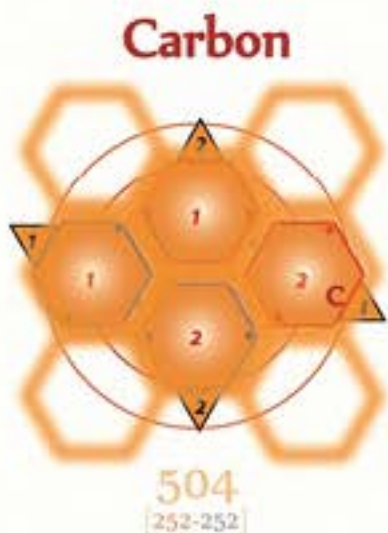


Hydrogen



Heterocyclic Rings

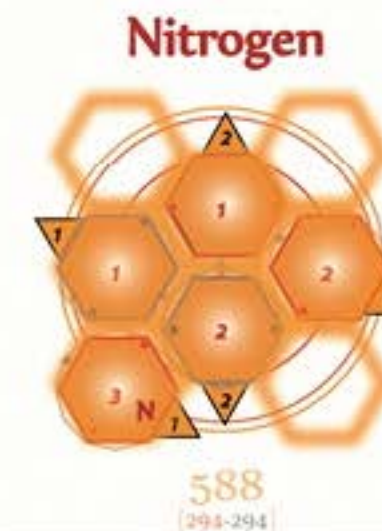
Tetrahydropyran is the organic compound consisting of a saturated six-membered ring containing five carbon atoms and one oxygen atom.



3,192
[1,596-1,596]

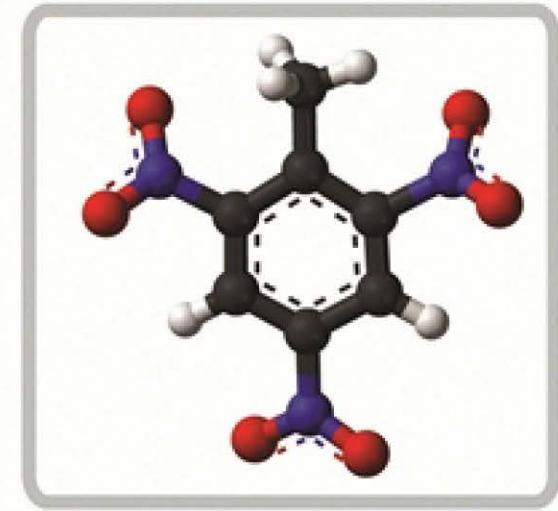
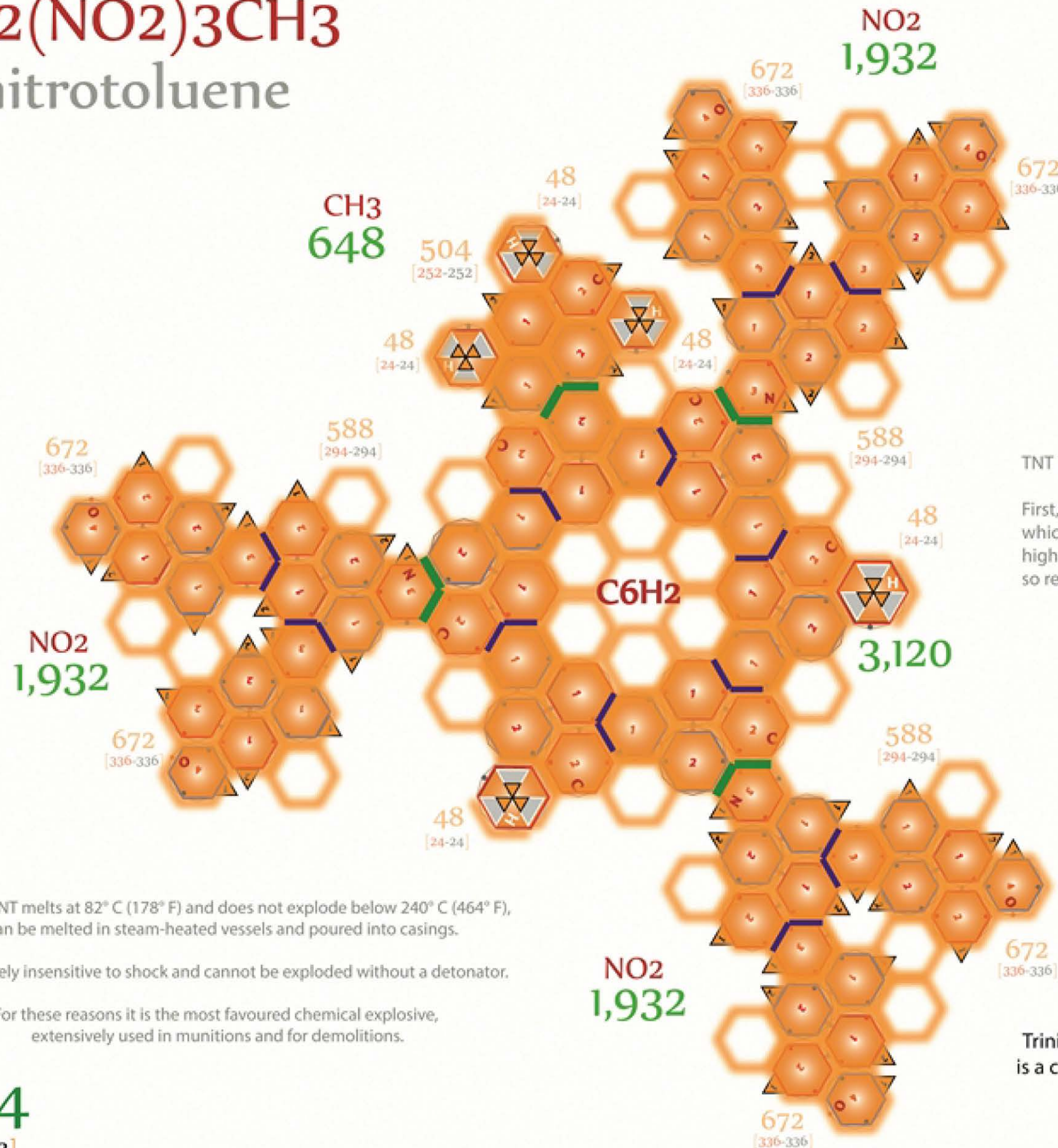


38 Protons
38 electrons
38 Neutrons



C6H2(NO2)3CH3

Trinitrotoluene



2,4,6-trinitrotoluene is better known by its initials, TNT. It is an important explosive, since it can very quickly change from a solid into hot expanding gases.

TNT is explosive for two reasons;

First, it contains the elements carbon, oxygen and nitrogen, which means that when the material burns it produces highly stable substances (CO, CO2 and N2) with strong bonds, so releasing a great deal of energy.

Secondly, TNT is chemically unstable - the nitro groups are so closely packed that they experience a great deal of strain and hindrance to movement from their neighbouring groups.

Thus it doesn't take much of an initiating force to break some of the strained bonds, and the molecule then flies apart.

Because TNT melts at 82° C (178° F) and does not explode below 240° C (464° F), it can be melted in steam-heated vessels and poured into casings.

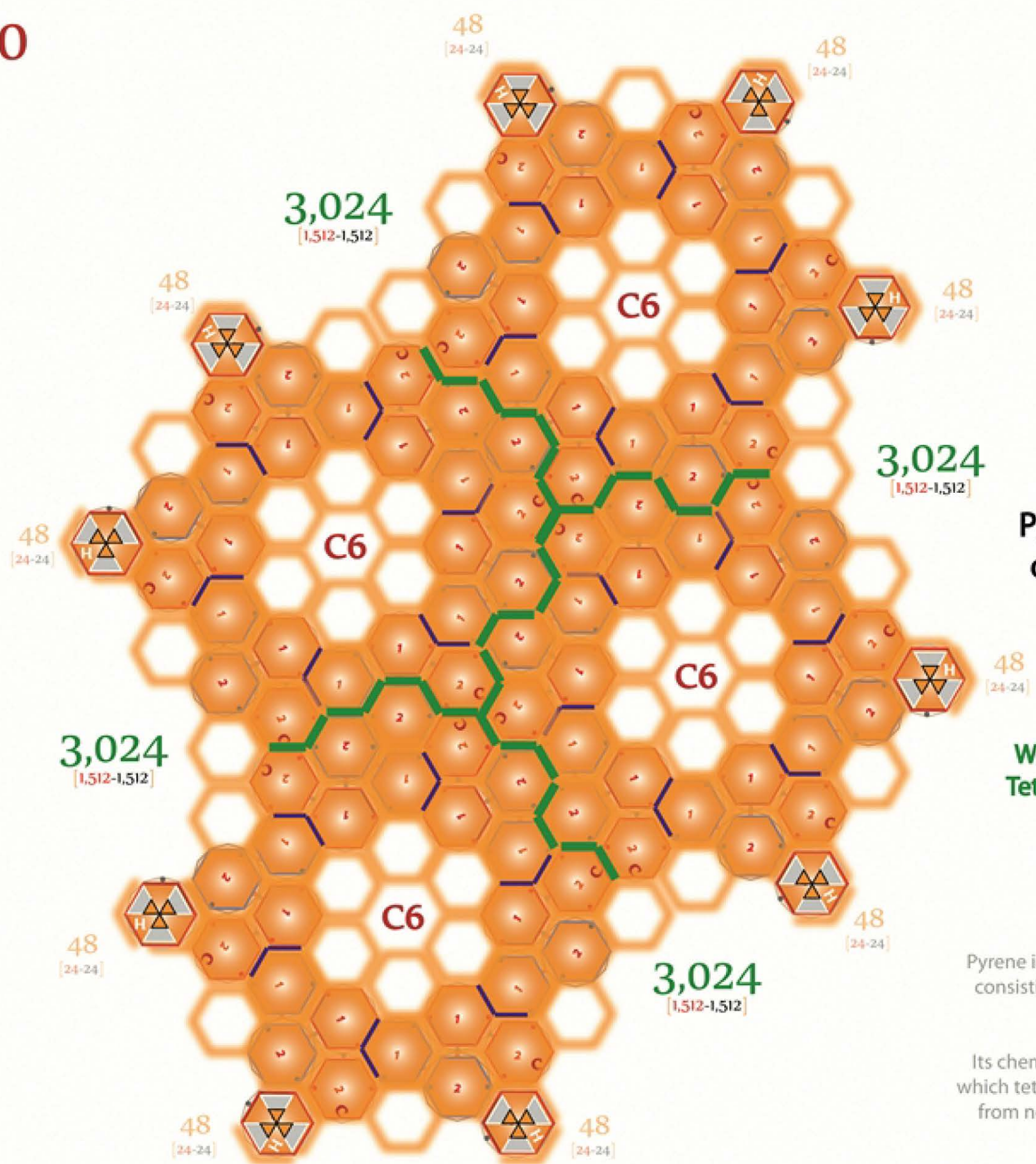
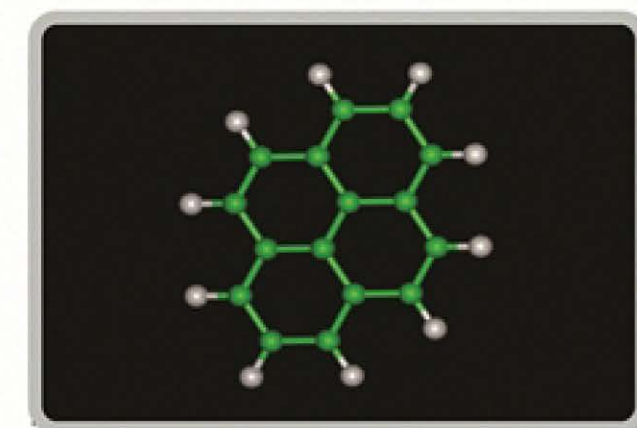
It is relatively insensitive to shock and cannot be exploded without a detonator.

For these reasons it is the most favoured chemical explosive, extensively used in munitions and for demolitions.

Trinitrotoluene, or more specifically, 2,4,6-trinitrotoluene, is a chemical compound with the formula C6H2(NO2)3CH3

9,564
[4,782-4,782]

(C6)₄-H₁₀ Pyrene



Pyrene highlights the failings of Lewis diagram structures

Which can be rectified using charged Tetryonic geometric Matter topologies for all elements and compound interactions & modelling

Pyrene is a polycyclic aromatic hydrocarbon (PAH) consisting of four fused benzene rings, resulting in a flat aromatic system.

Its chemical formula as is often stated as C₁₆H₁₀, which tetryonic geometry shows is an error resulting from not using equilateral quantum geometries in chemical topology modelling.

Four cyclic carbon rings cannot be formed with only 16 C-atoms

12,576
[6,288-6,288]

Ammonium Nitrate

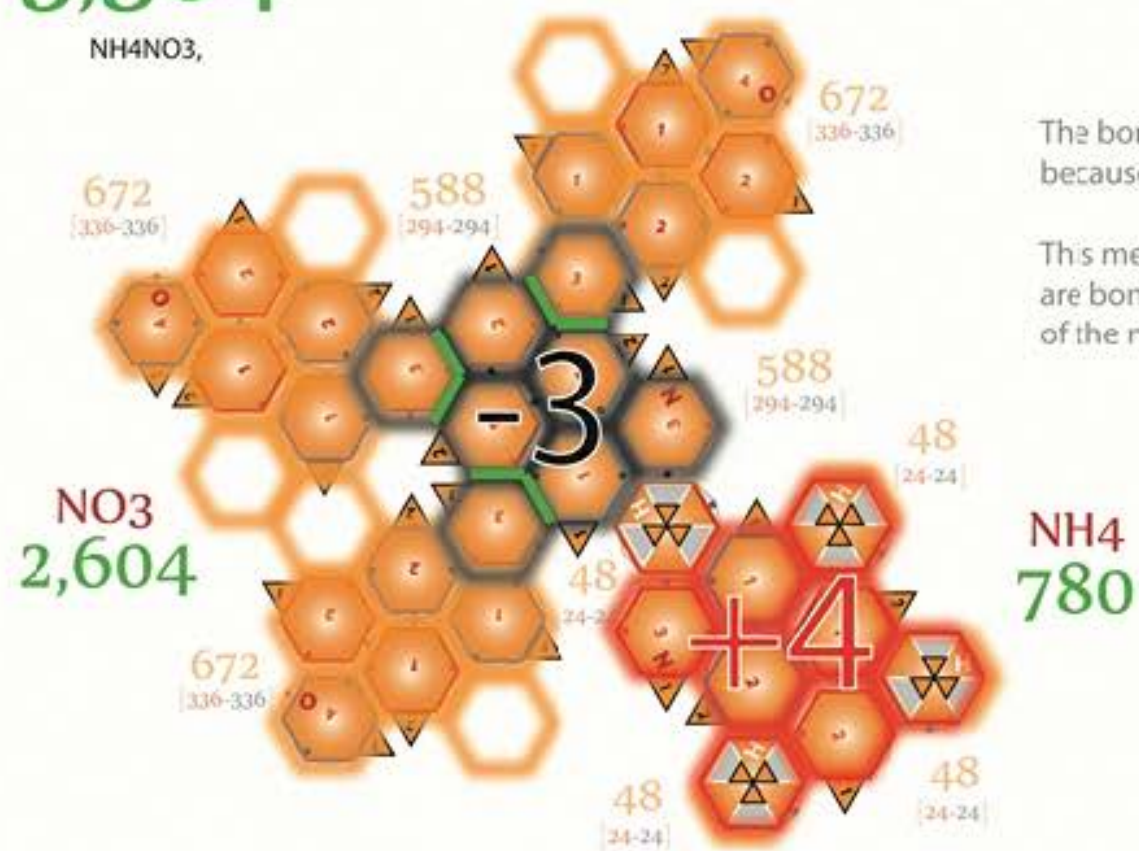
3,384

NH₄NO₃,

Ammonium nitrate is composed of two polyatomic ions:

- 1) Ammonium ion (NH₄⁺)
- 2) Nitrate ion (NO₃⁻)

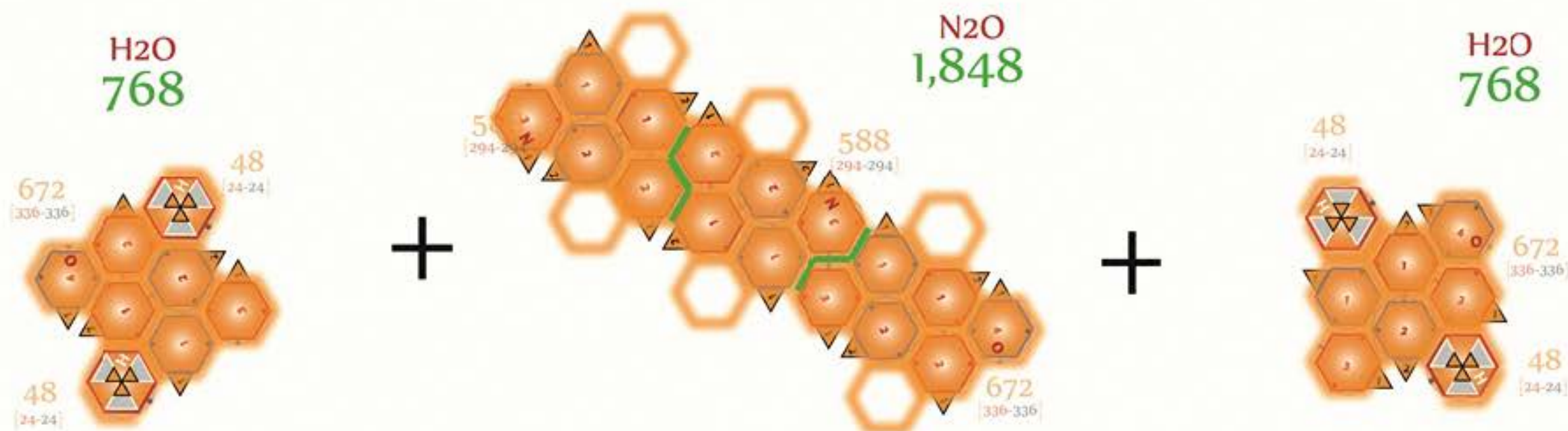
The bond between these ions is an ionic bond meaning the ammonium ion transfers an electron to the nitrate ion.



The bonds in a polyatomic atomic ion are covalent because they take place between gases.

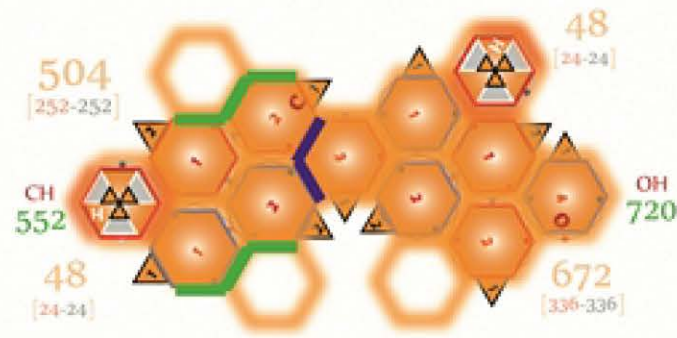
This means that the hydrogens of the ammonium ion are bonded to the nitrogen covalently and that the oxygens of the nitrate are bonded to the nitrogen covalently

Ammonium nitrate decomposes into the gases nitrous oxide and water vapor when heated (non-explosive reaction); however, ammonium nitrate can be induced to decompose explosively by detonation.



Carbohydrates

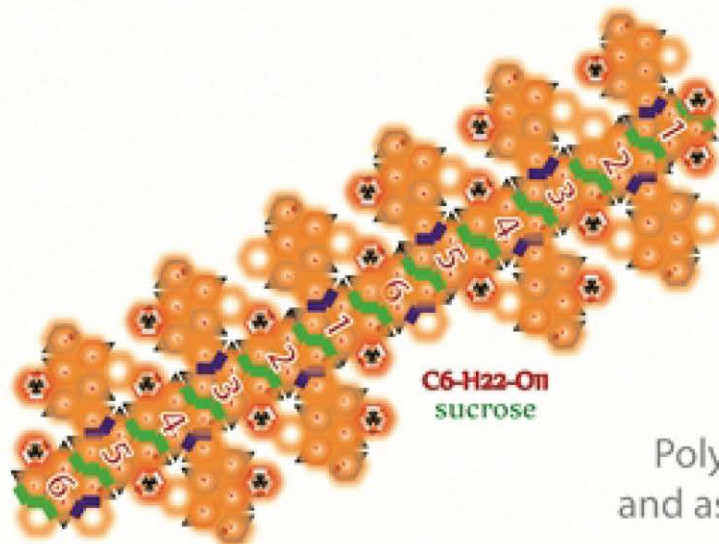
A carbohydrate is an organic compound that consists only of carbon, hydrogen, and oxygen (with a hydrogen:oxygen ratio of 2:1) in other words, with the empirical formula $C_m(H_2O)_n$



Monosaccharides



Oligosaccharides



Ribose

Glucose

Lactose

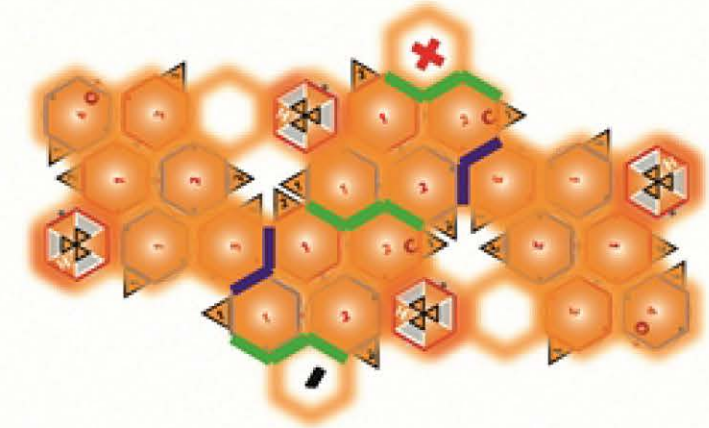


Fructose

Sucrose

Deoxyribose

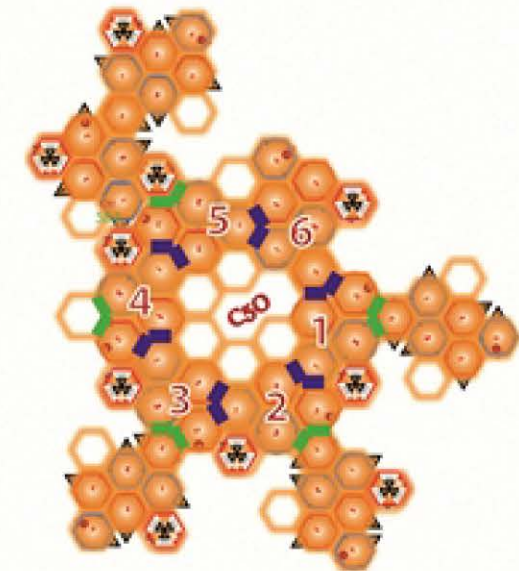
Carbohydrates perform numerous roles in living organisms. Polysaccharides serve for the storage of energy (e.g., starch and glycogen), and as structural components (e.g., cellulose in plants and chitin in arthropods)



Disaccharides



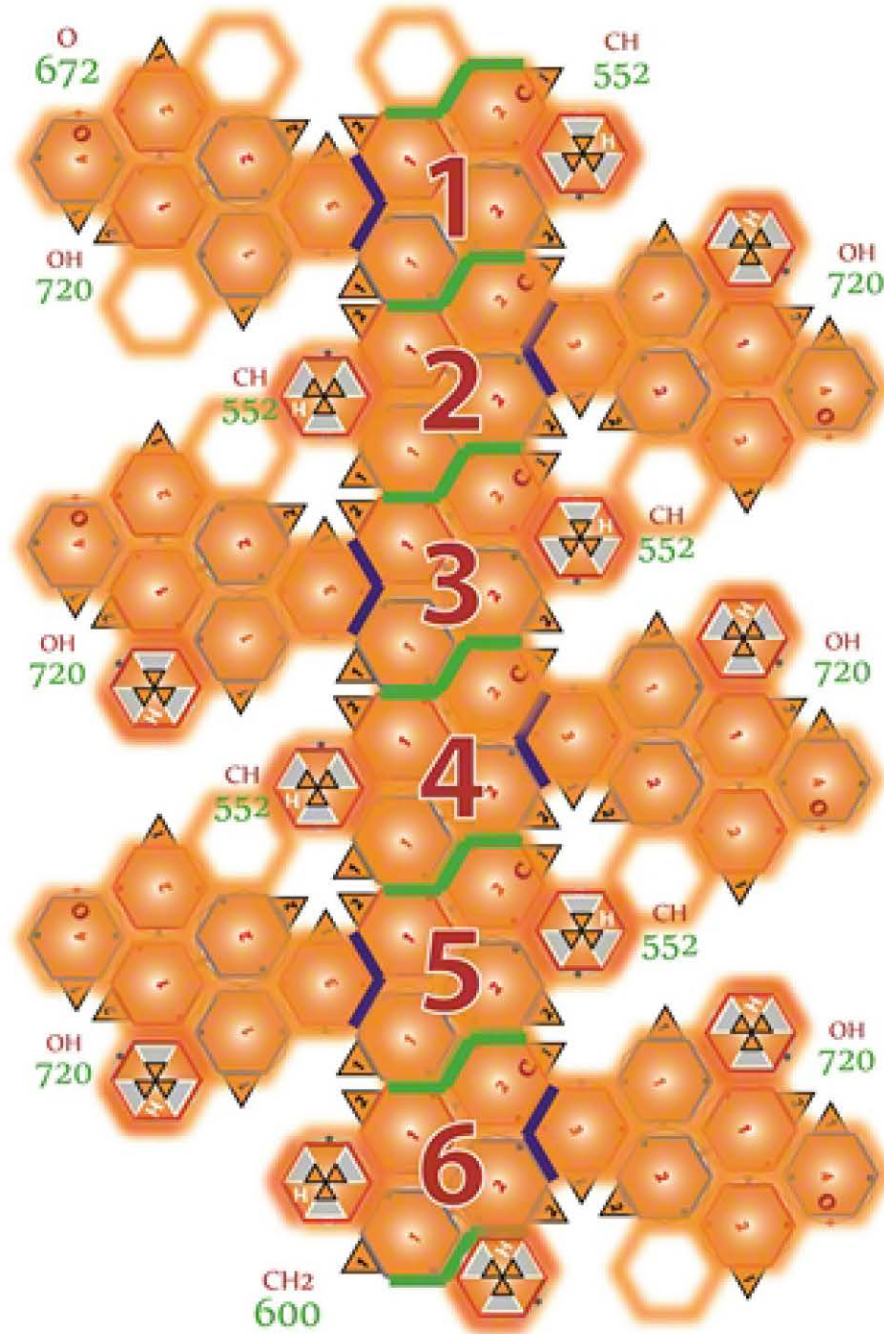
Polysaccharides



Monosaccharides are the simplest carbohydrates in that they cannot be hydrolyzed to smaller carbohydrates

Monosaccharides

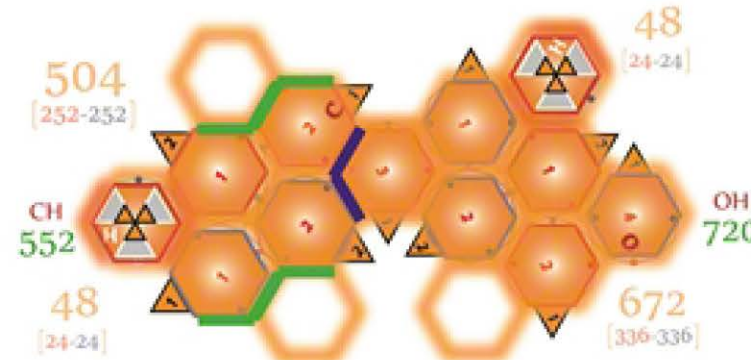
The Carbon nuclei in Monosaccharides join together to form chains of biologically important carbohydrates



C(H₂O)₆
D-glucose
 C₆-H₁₂-O₆

1,272

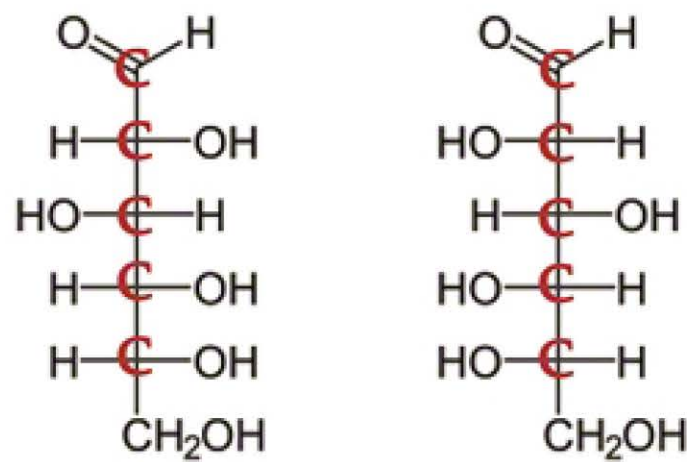
[636-636]



C(H₂O)

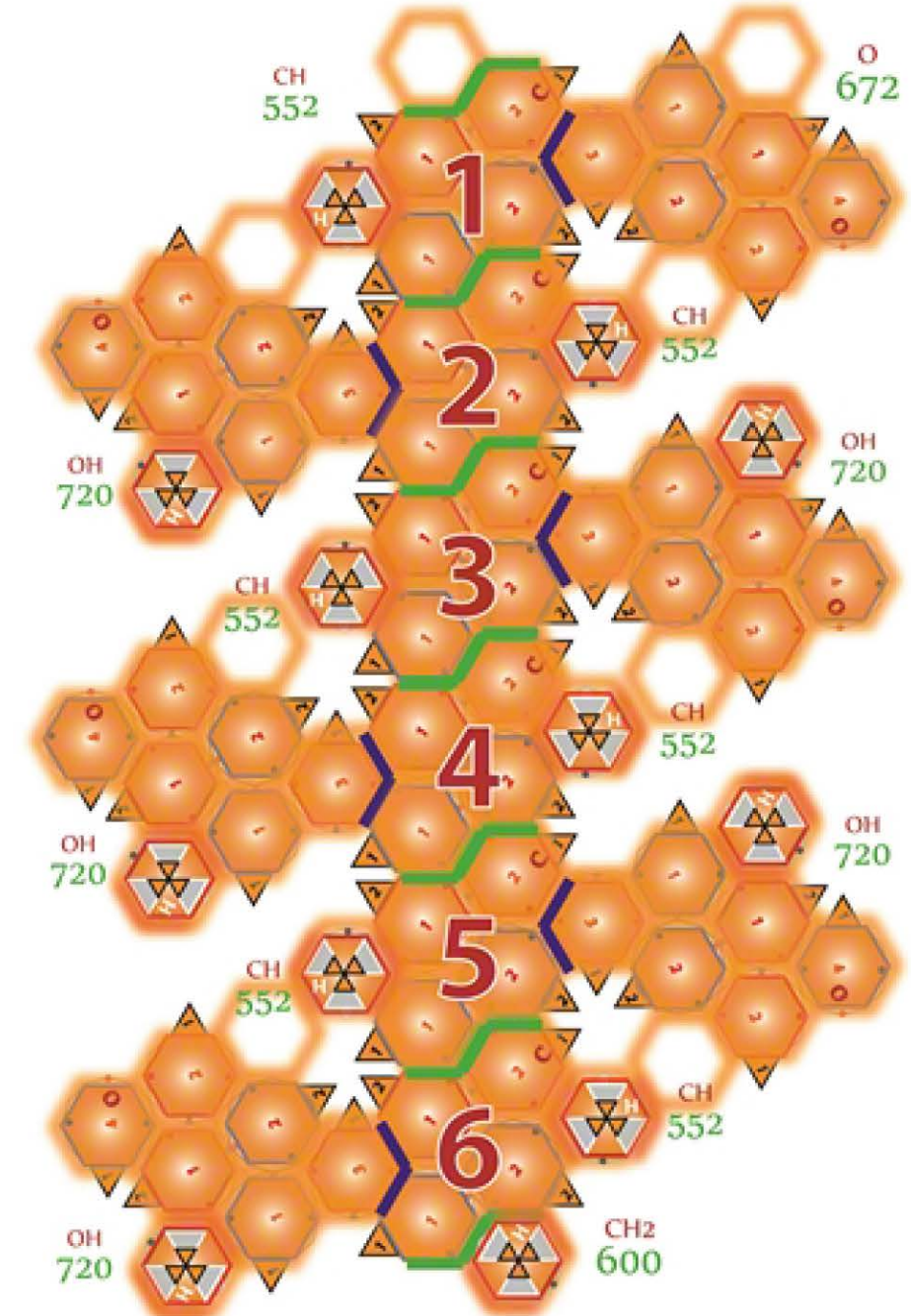
The general chemical formula of an unmodified monosaccharide is (C·H₂O)_n, literally a "carbon hydrate."

CH-OH

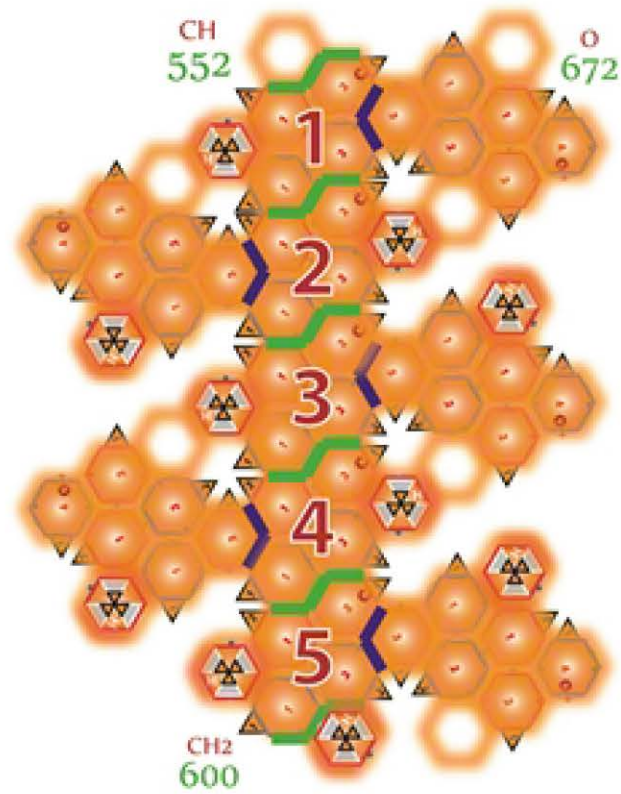


D-Glucose

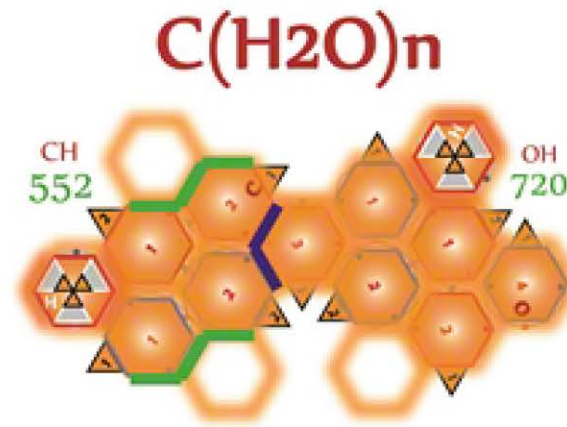
L-Glucose



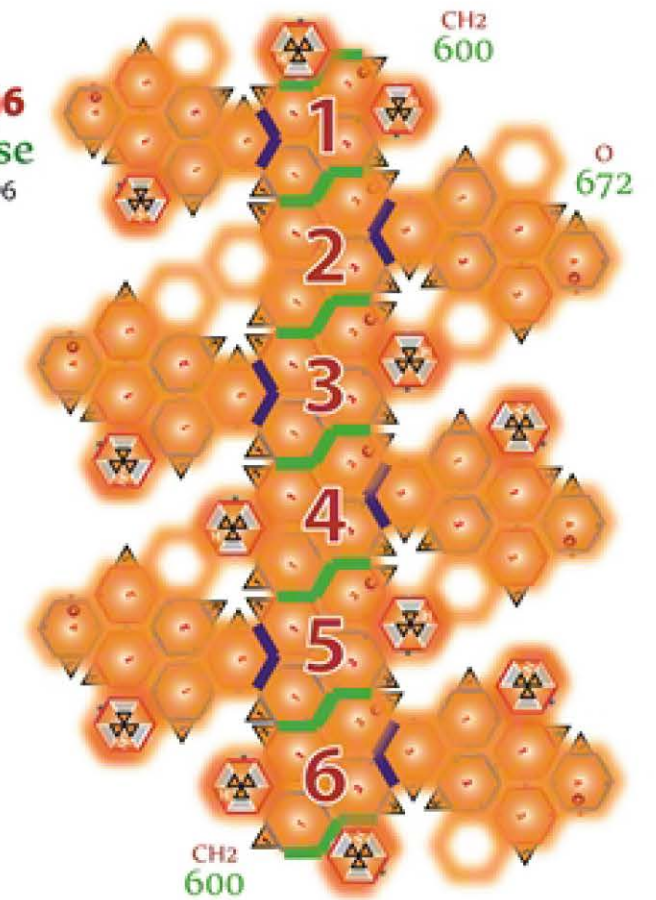
C(H₂O)₆
L-glucose
 C₆-H₁₂-O₆



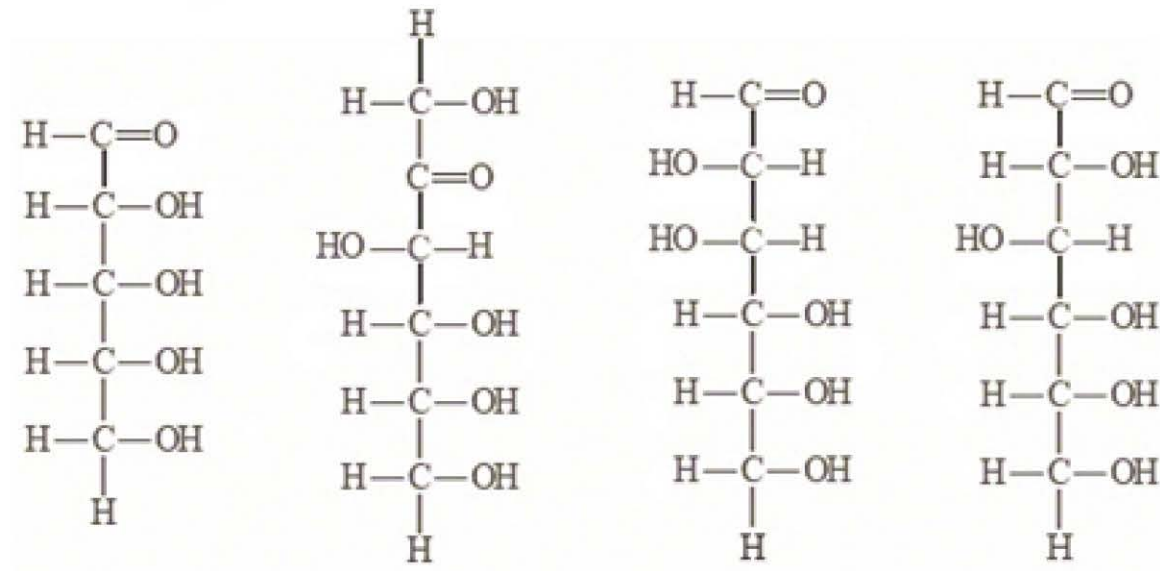
C(H₂O)₅
ribose
 C₅-H₁₀-O₅



C(H₂O)₆
fructose
 C₆-H₁₂-O₆



Major Monosaccharides



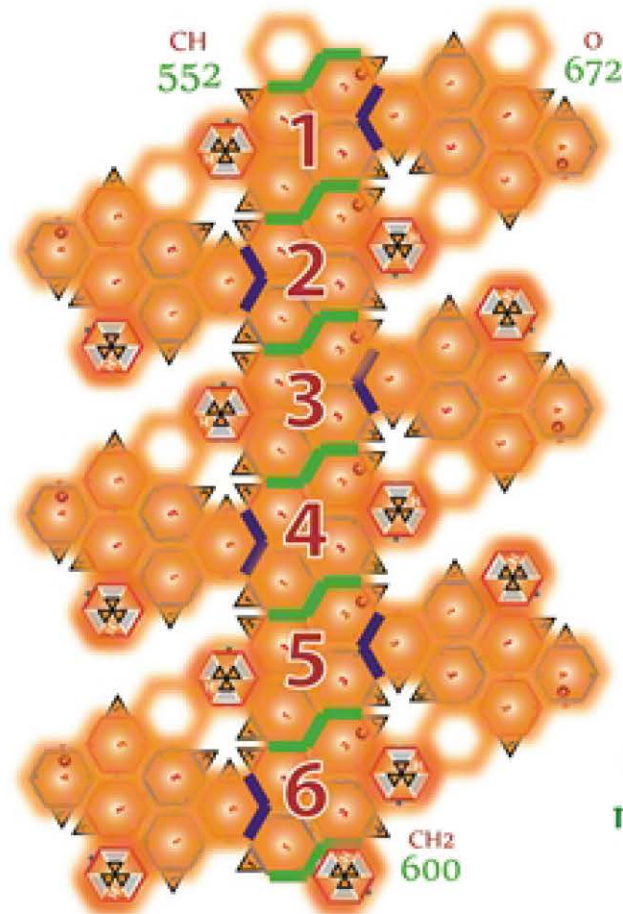
ribose

fructose

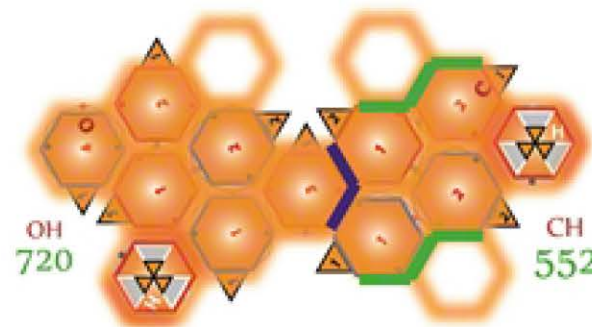
mannose

glucose

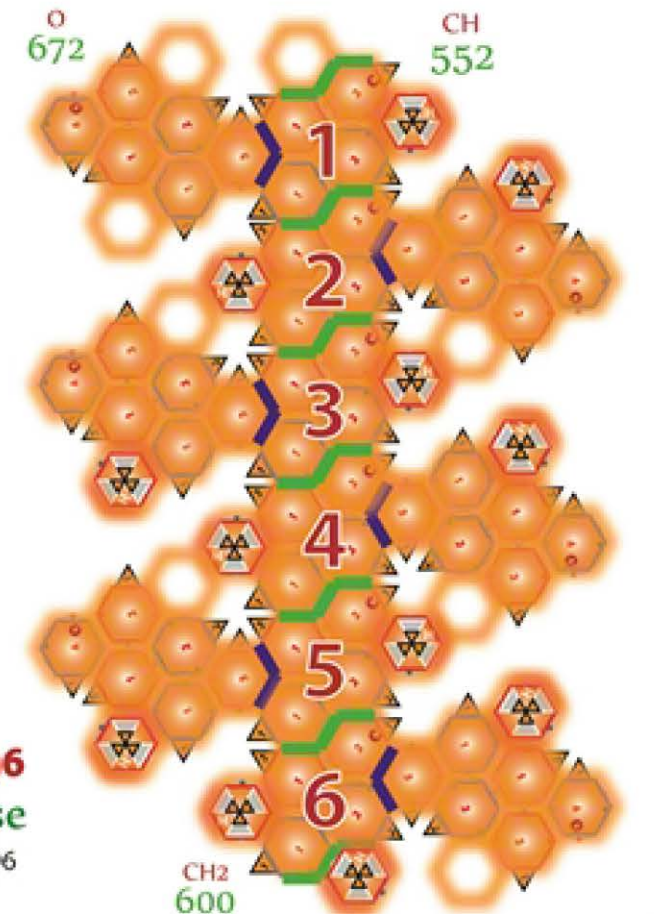
D D & L sugars are chiral, mirror images of one another and have the same name. **L**



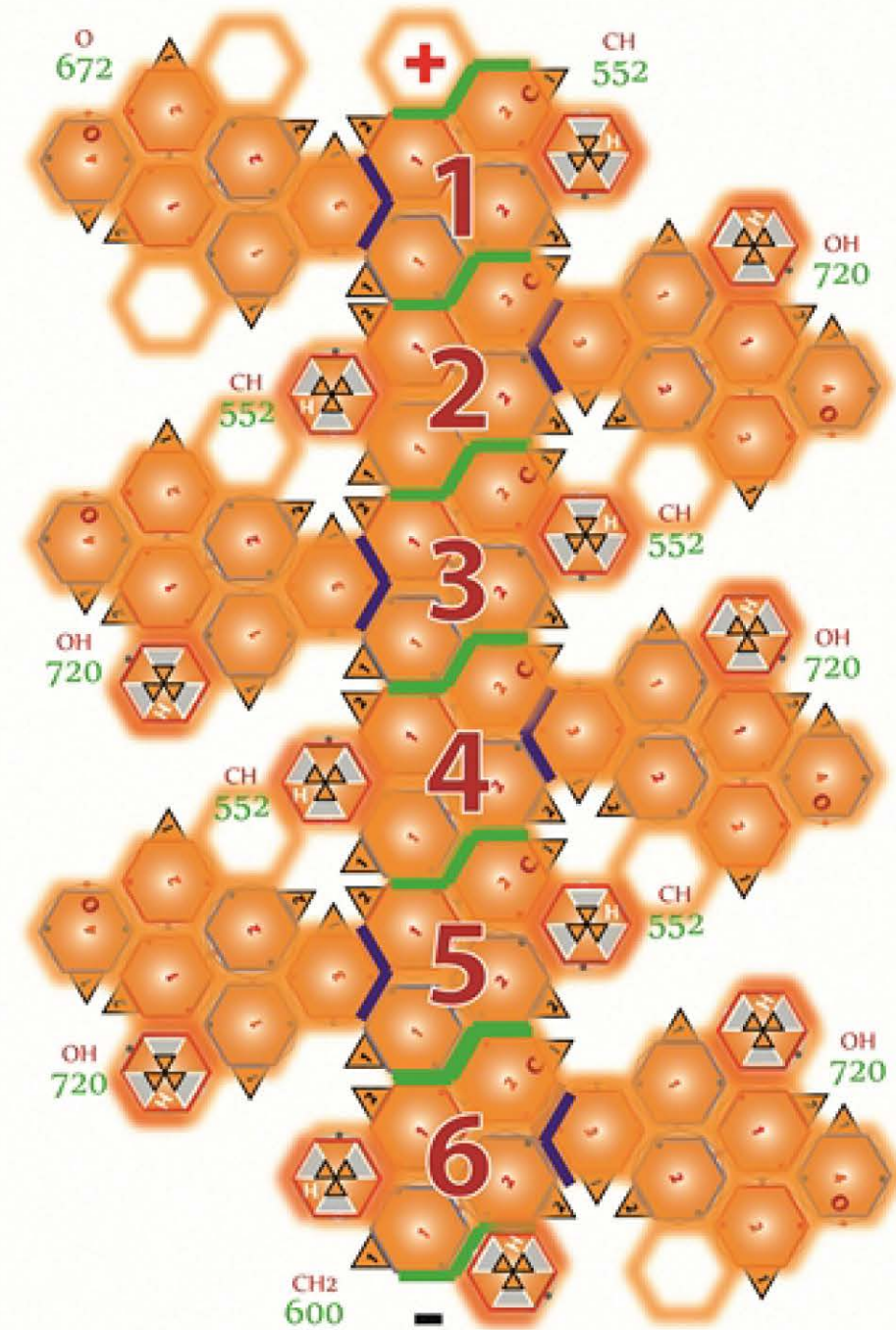
C(H₂O)₆
mannose
 C₆-H₁₂-O₆



C(H₂O)₆
glucose
 C₆-H₁₂-O₆



A monosaccharide often switches from the acyclic (open-chain) form to a cyclic form, through a nucleophilic addition reaction between the carbonyl group and one of the hydroxyls of the same molecule.

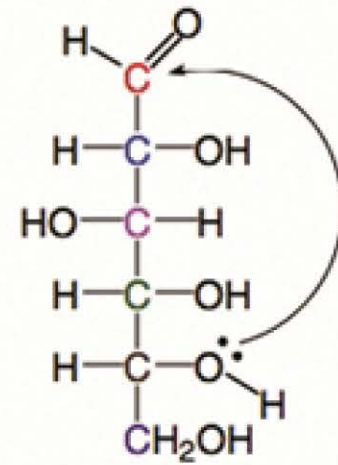


linear saccharide chain

The Carbon nuclei in Monosaccharides chains can join together to form cyclic [Carbon-Oxygen] rings or polycarbohydrates through condensation

acyclic monosaccharides

C(H₂O)₆
glucose
C₆-H₁₂-O₆

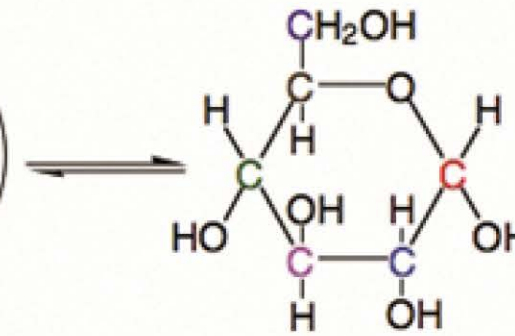


C₆-H₁₂-O₆
7,632
[3,816-3,816]

The reaction creates a ring of carbon atoms closed by one bridging oxygen atom, which in turn can be easily broken to restore the linear monosaccharide chains

cyclic monosaccharides

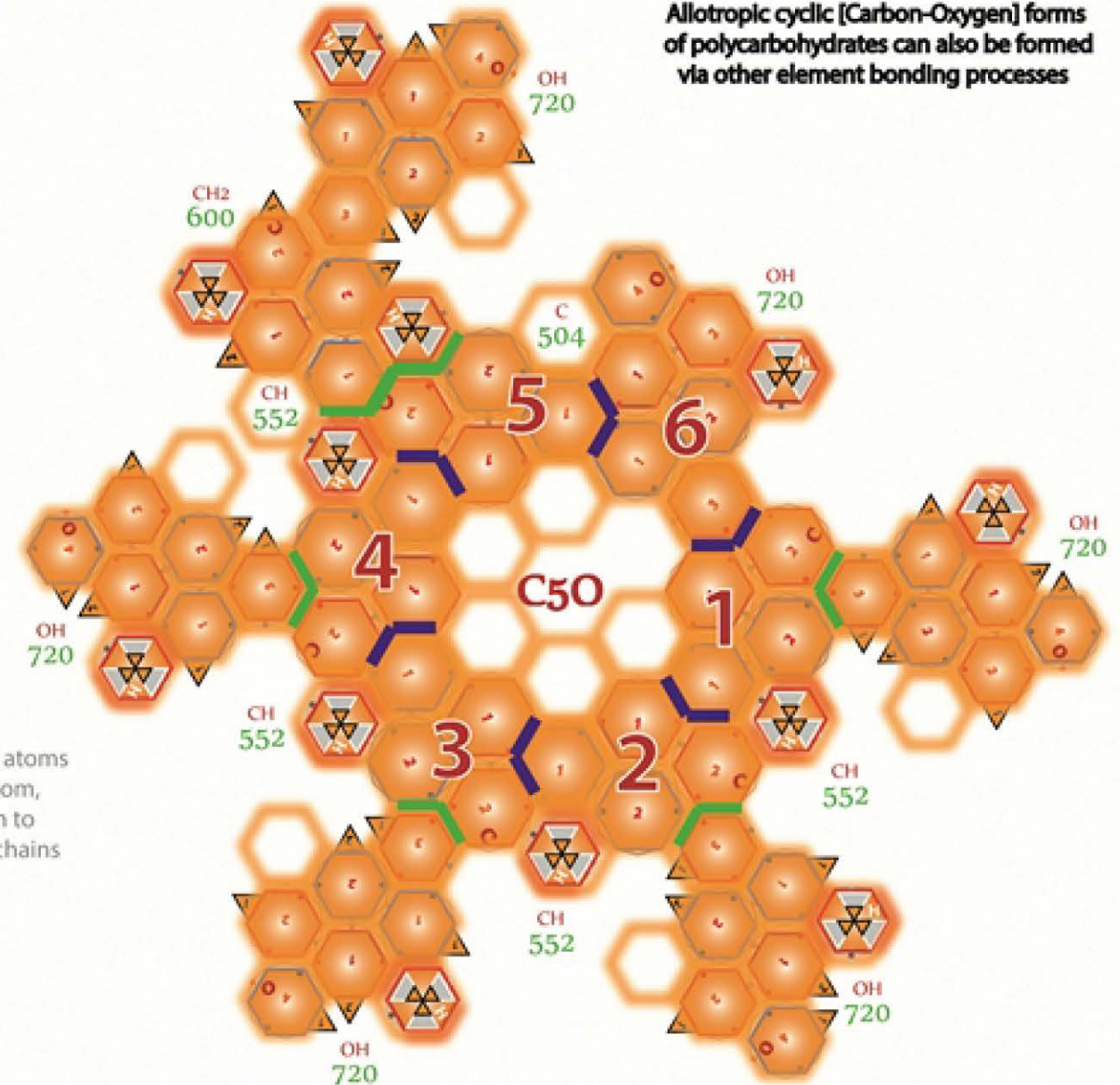
For many monosaccharides (including glucose), the cyclic forms predominate, and therefore the same name commonly is used for forms of isomers.



C(H₂O)₆
glucopyranose
C₆-H₁₂-O₆

cyclic Oxygen-Carbon ring

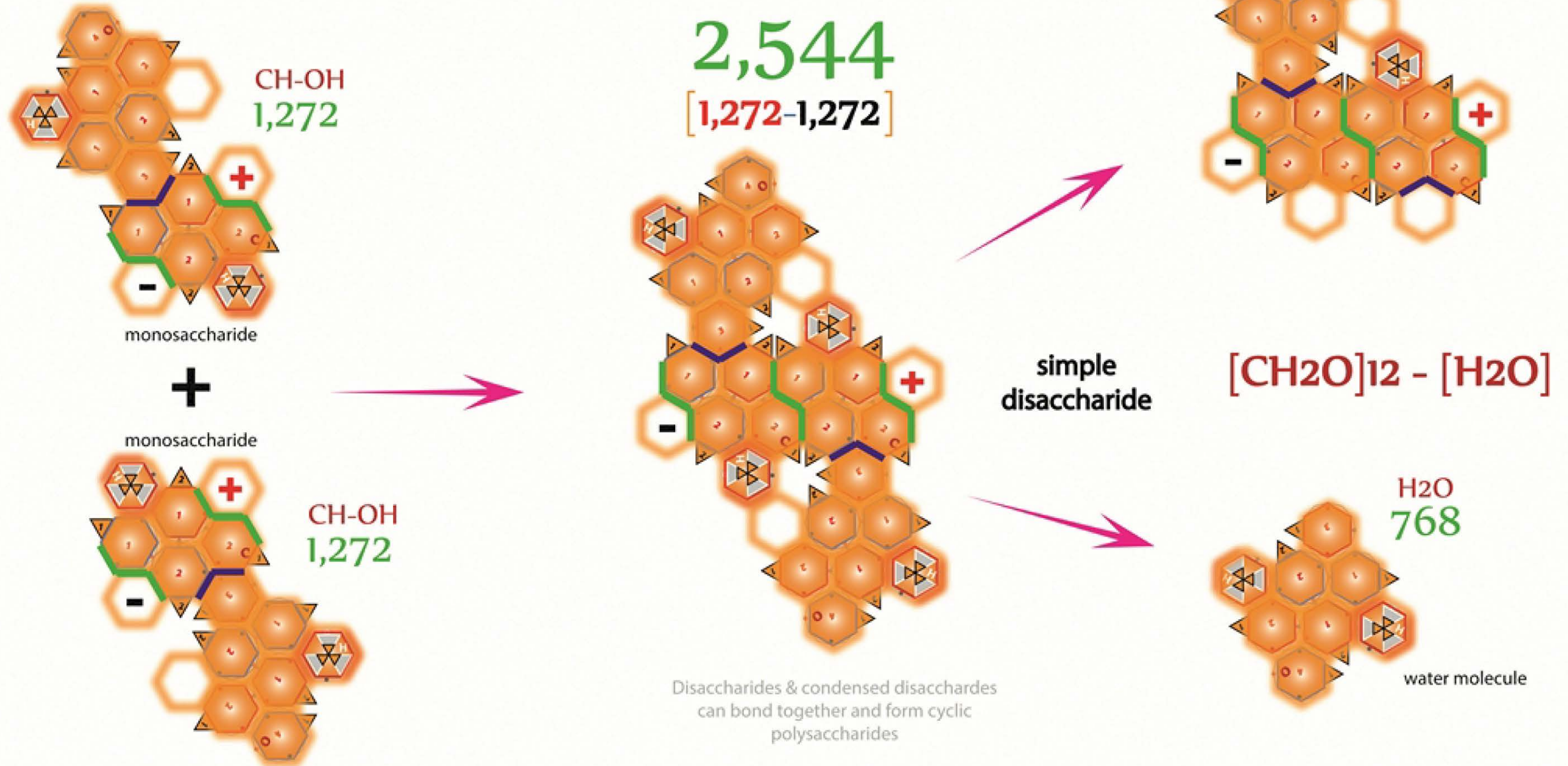
Allotropic cyclic [Carbon-Oxygen] forms of polycarbohydrates can also be formed via other element bonding processes



Condensed Disaccharides

Condensed Disaccharides are formed when two monosaccharides are joined together and a molecule of water is removed

For example, milk sugar (lactose) is made from glucose and galactose whereas cane sugar (sucrose) is made from glucose and fructose



The reverse of this reaction, the formation of two monosaccharides from one disaccharide, is called a hydrolysis reaction and requires one water molecule to supply the H and OH to the sugars formed.

Sucrose is used in many plants for transporting food reserves, often from the leaves to other parts of the plant. Lactose is the sugar found in the milk of mammals and maltose is the first product of starch digestion and is further broken down to glucose before absorption in the human gut.

14,496

[7,248-7,248]

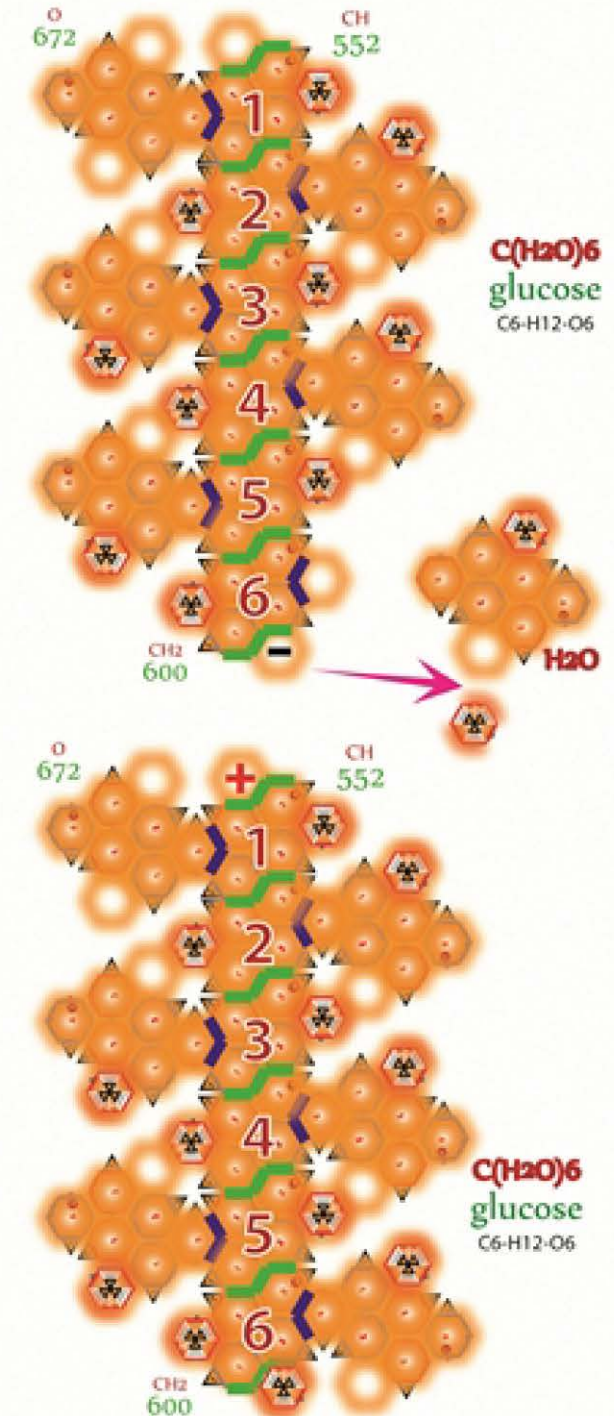
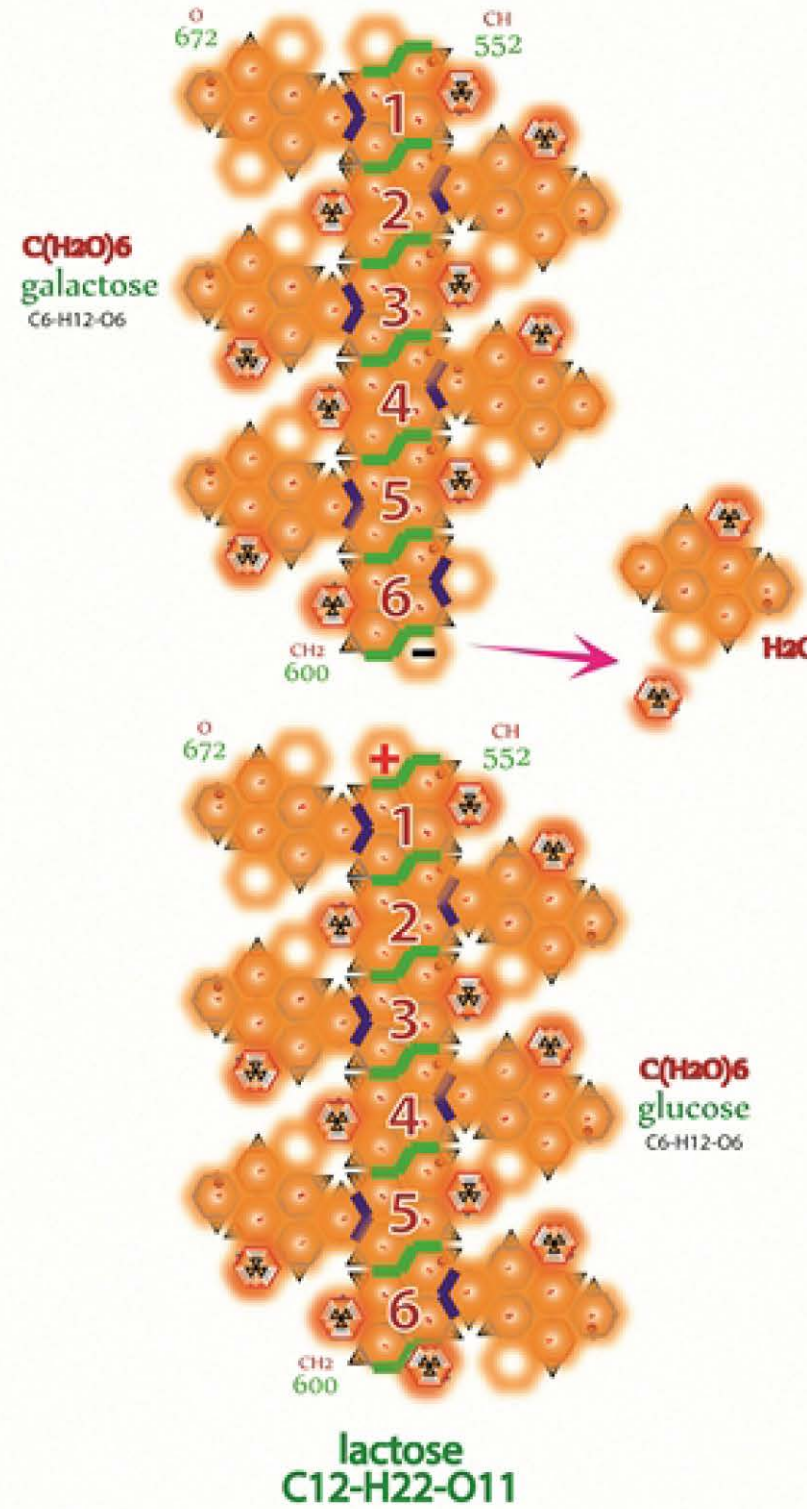
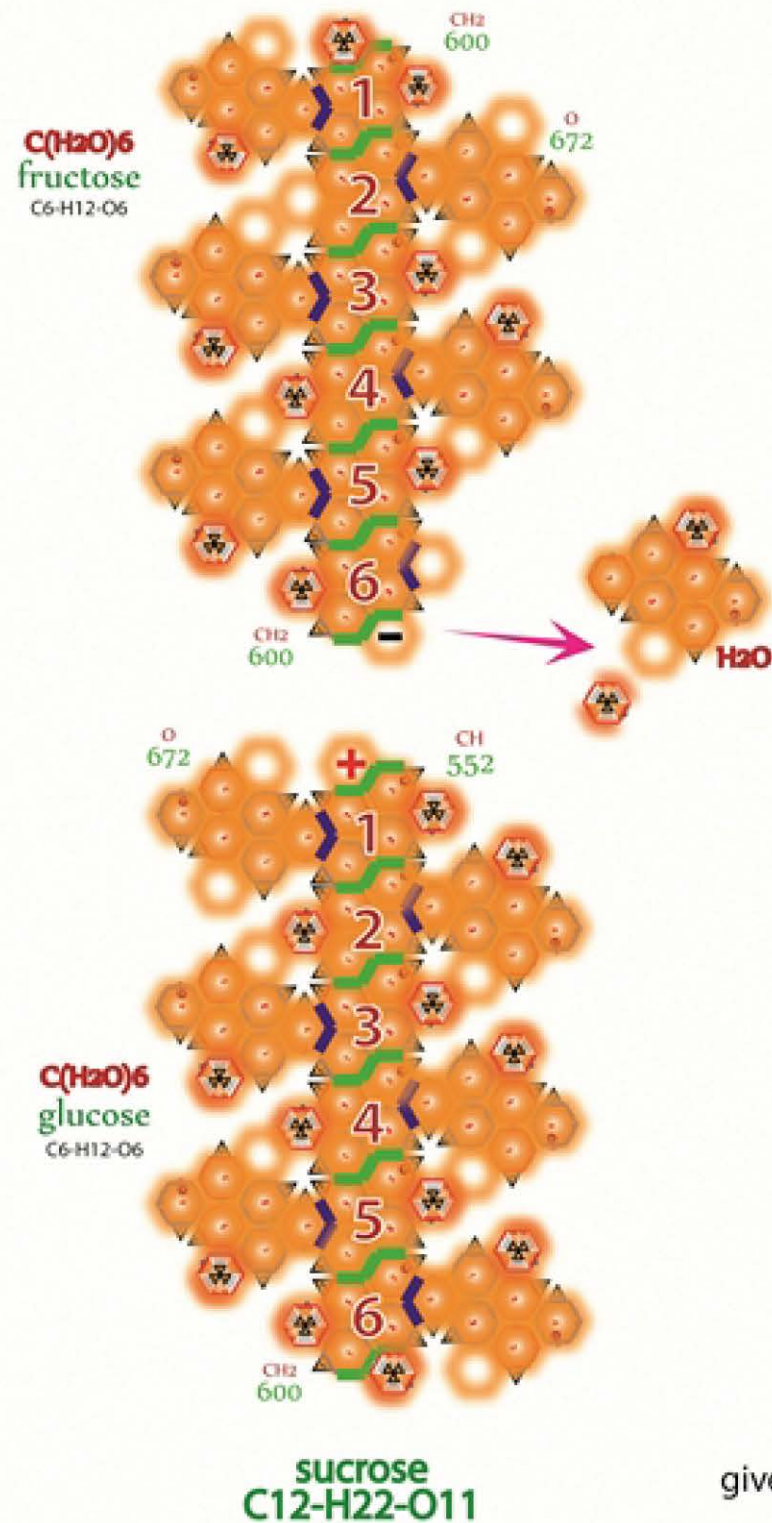
Disaccharides

Disaccharides are one of the four basic categories of carbohydrates, (the others are monosaccharides, oligosaccharides, and polysaccharides)

Monosaccharides, such as glucose, are the monomers out of which disaccharides are constructed.

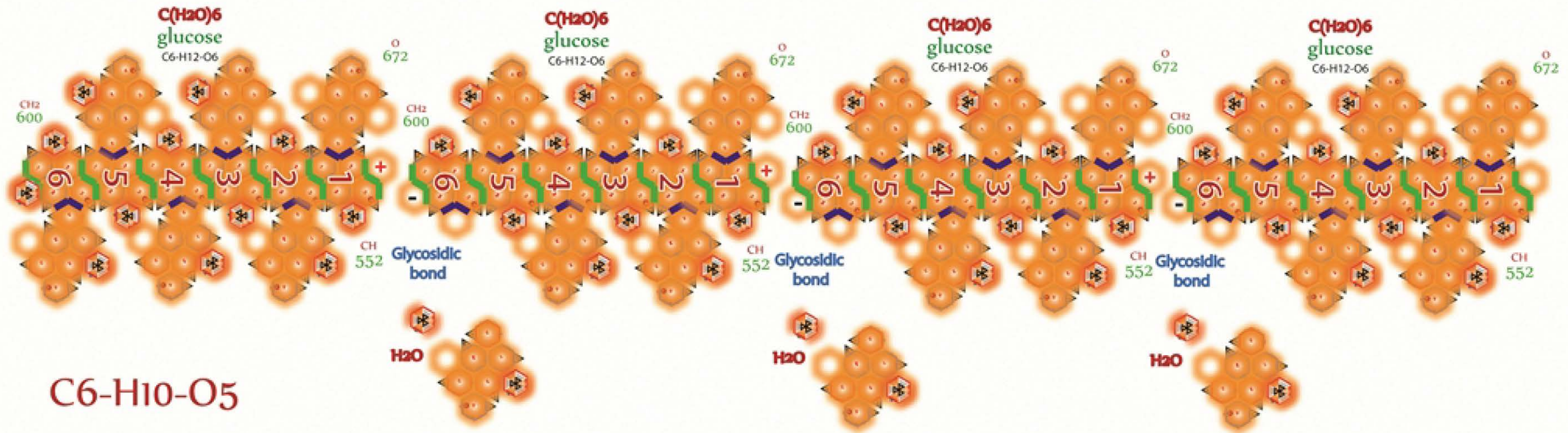
$C_{12}-(H_2O)_{11}$

Disaccharides & condensed disaccharides can bond together and form cyclic polysaccharides



The general chemical formula for carbohydrates, $C(H_2O)_n$, gives the relative proportions of carbon, hydrogen, and oxygen in a monosaccharide (the proportion of these atoms are 1:2:1)-(H₂O)

Starch or amyllum is a carbohydrate consisting of a large number of glucose units joined by glycosidic bonds. This polysaccharide is produced by most green plants as an energy store.



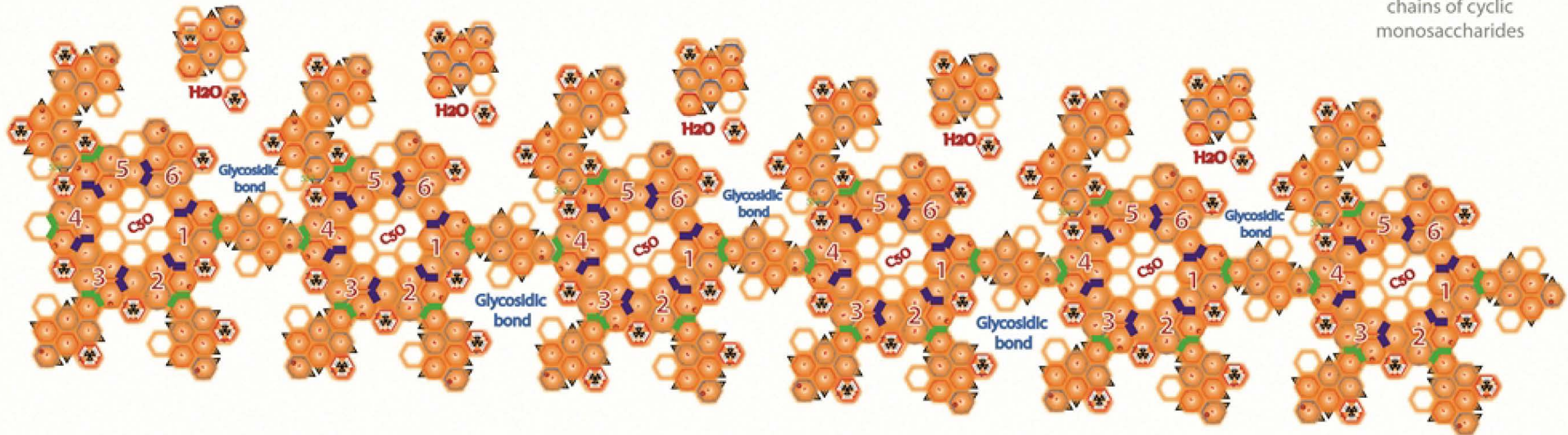
Polysaccharides

Polysaccharides have a general formula of $C_x(H_2O)_y$ where x is usually a large number between 200 and 2500.



The repeating units in a Polysaccharide polymer backbone are often six-carbon monosaccharides, their general formula can be represented as $(C_6H_{10}O_5)_n$

Polysaccharides are generally comprised of chains of cyclic monosaccharides



Cellulose is an organic compound with the formula $(C_6H_{10}O_5)_n$, a polysaccharide consisting of a linear chain of several hundred to over ten thousand linked D-glucose sugars.

Amines



Amines are organic compounds that contain Nitrogen

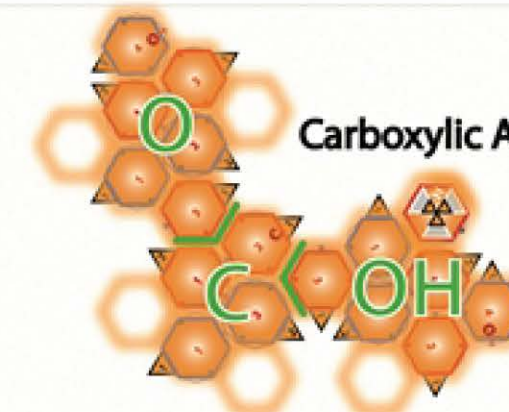


As both the amine and carboxylic acid groups of amino acids can react to form amide bonds, one amino acid molecule can react with another and become joined through an amide linkage. This polymerization of amino acids is what creates proteins.



This yields a peptide bond and a molecule of water via a condensation reaction

Carboxylic Acids

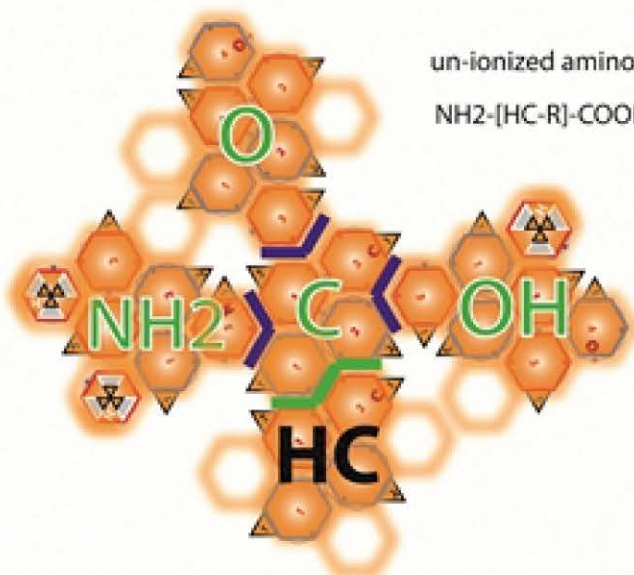


The general formula of a carboxylic acid is R-COOH

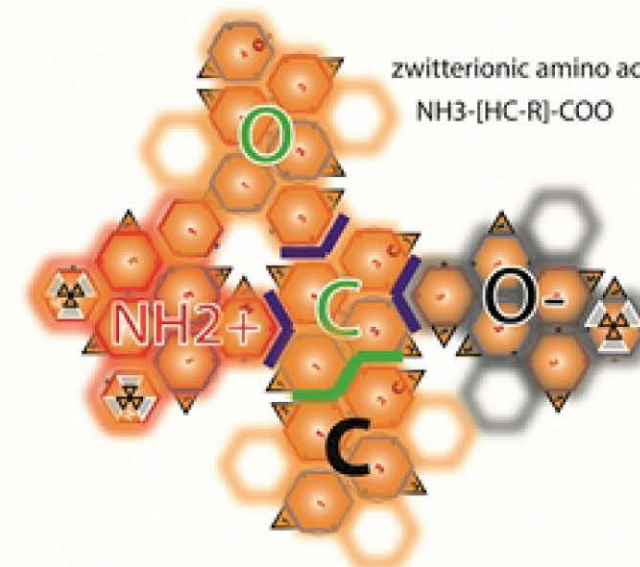
Amino Acids

Amino acids are biologically important organic compounds made from amine and carboxylic acid functional groups, along with a side-chain specific to each amino acid

un-ionized amino acid
NH₂-(HC-R)-COOH

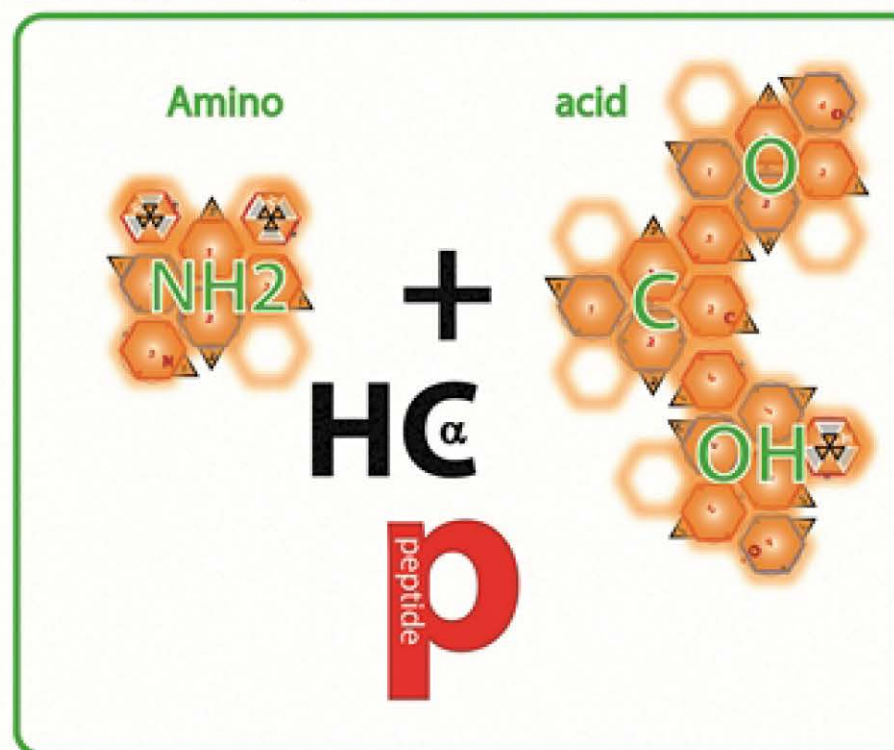


zwitterionic amino acid
NH₃⁺-(HC-R)-COO⁻

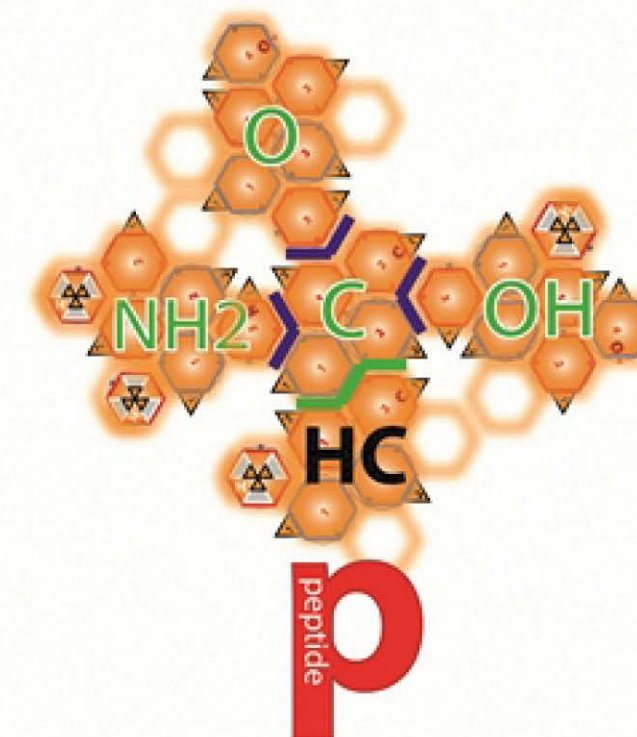


The α-carbon.

The α-amino acids in peptides and proteins consist of a carboxylic acid (-COOH) and an amino (-NH₂) functional group attached to the same tetrahedral carbon atom



The peptide group attached to the alpha carbon distinguishes one amino acid from another (Tetryonic theory defines these compound side-chains of atoms as peptides [p])



Peptide side chains

Amino acids are the structural units (monomers) that join together to form short polymer chains called peptides; or longer chains called either polypeptides or proteins



AAA
AAG
AAC
AAU
AGA
AGG
AGC
AGU
ACA
ACG
ACC
ACU
AUA
AUG
AUC
AUU

A
C5-H5-N5
Adenine

CAA
CAG
CAC
CAU
CGA
CGG
CGC
CGU
CCA
CCG
CCC
CCU
CUA
CUG
CUC
CUU

C
C4-H5-N3-O
Cytosine

GAA
GAG
GAC
GAU
GGA
GGG
GGC
GGU
GCA
GCG
GCC
GCU
GUA
GUG
GUC
GUU

G
C5-H5-N5-O
Guanine

3,180
Gly
C2H5NO2

4,452
Ser
C3H7NO3

5,052
Thr
C4H9NO3

6,192
Gln
C5H10N2O3

7,392
Arg
C6H14N4O2

8,640
Trp
C11H12N2O2

3,780
Ala
C3H7NO2

4,884
Pro
C5H9NO2

5,124
Cys
C3H7NO2S

6,216
Lys
C6H14N2O2

7,668
Tyr
C9H11NO3

4,980
Val
C5H11NO2

5,580
Lle
C6H13NO2

6,228
Glu
C5H9NO4

p
peptide side chain

current chemical theory hypothesizes that all peptides and proteins are the result of codon triplet side chains on amino acids

6,324
Met
C5H11NO2S

6,564
His
C6H9N3O2

6,996
Phe
C9H11NO2

5,580
Leu
C6H13NO2

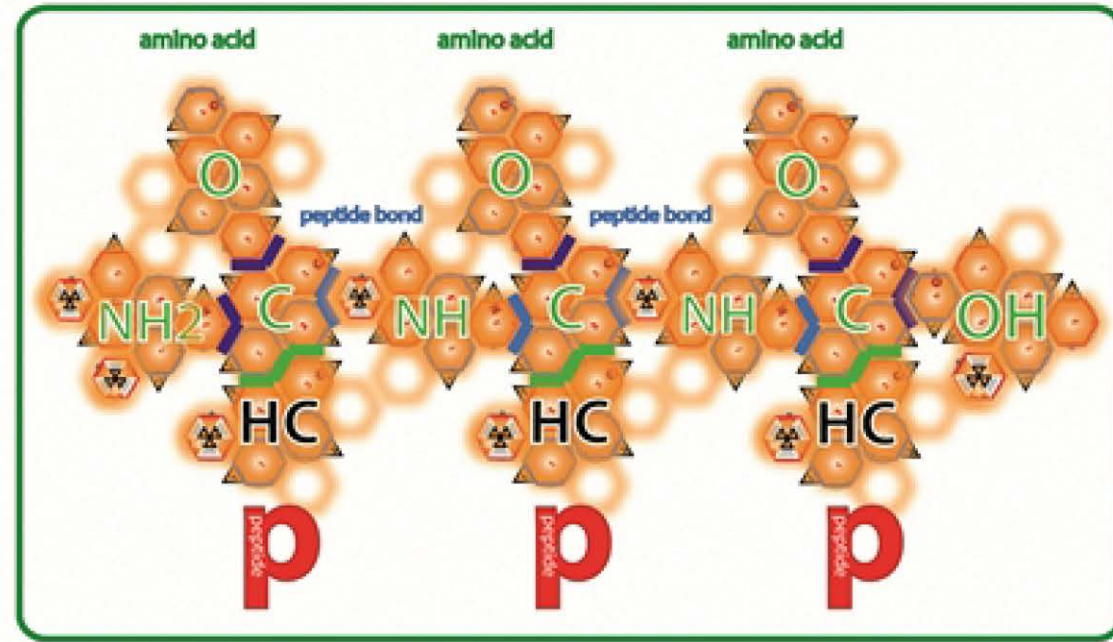
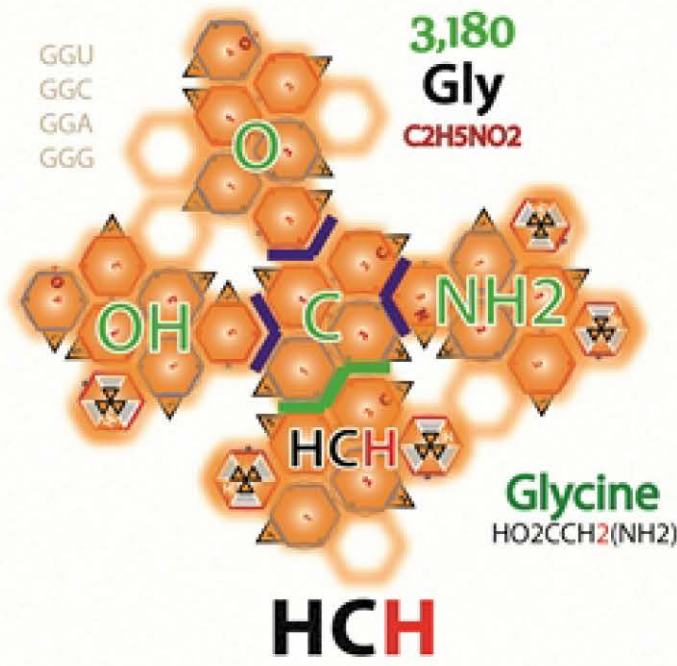
5,592
Asn
C4H8N2O3

5,628
Asp
C4H7NO4

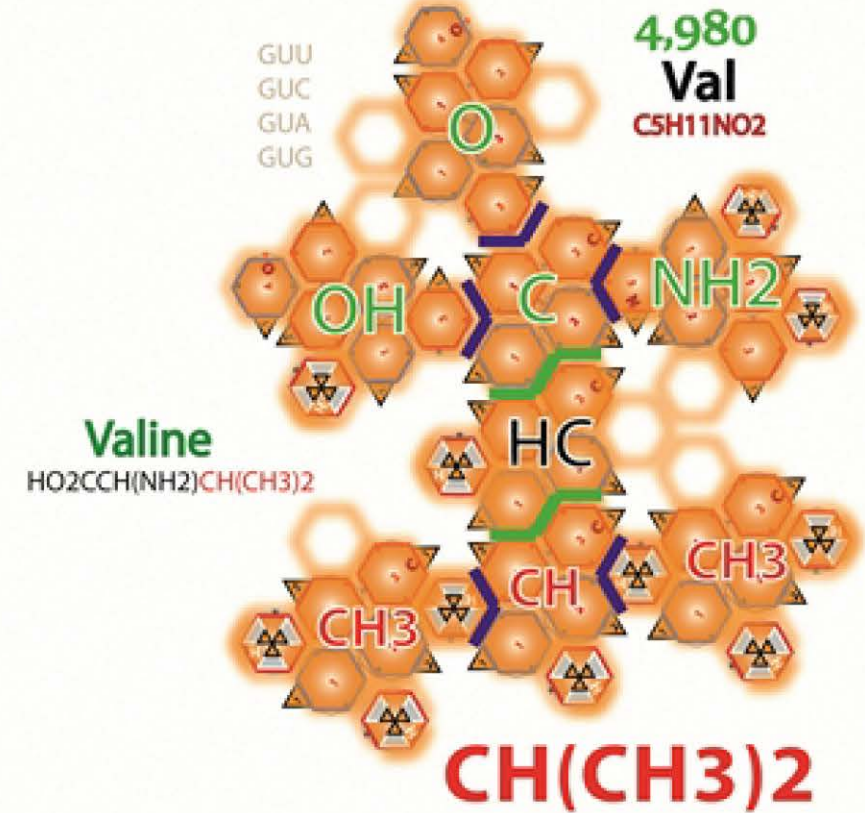
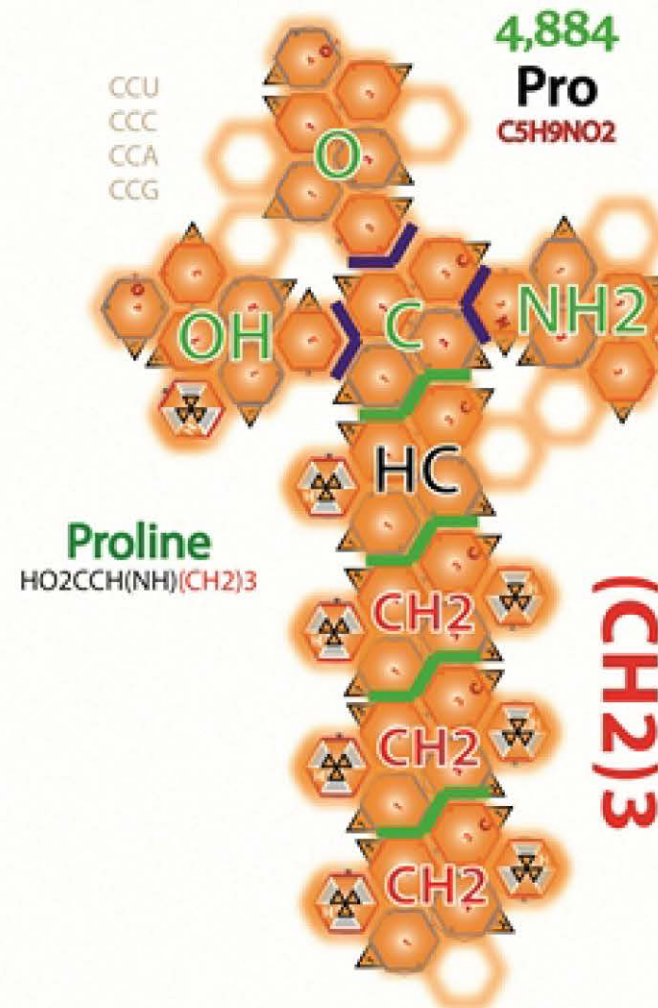
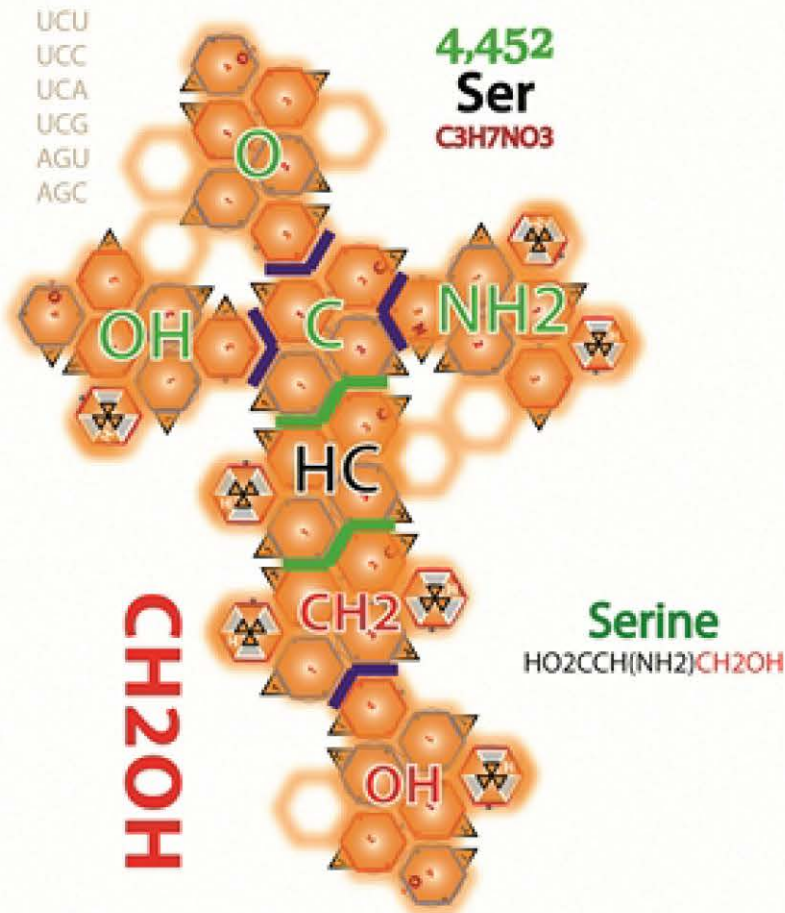
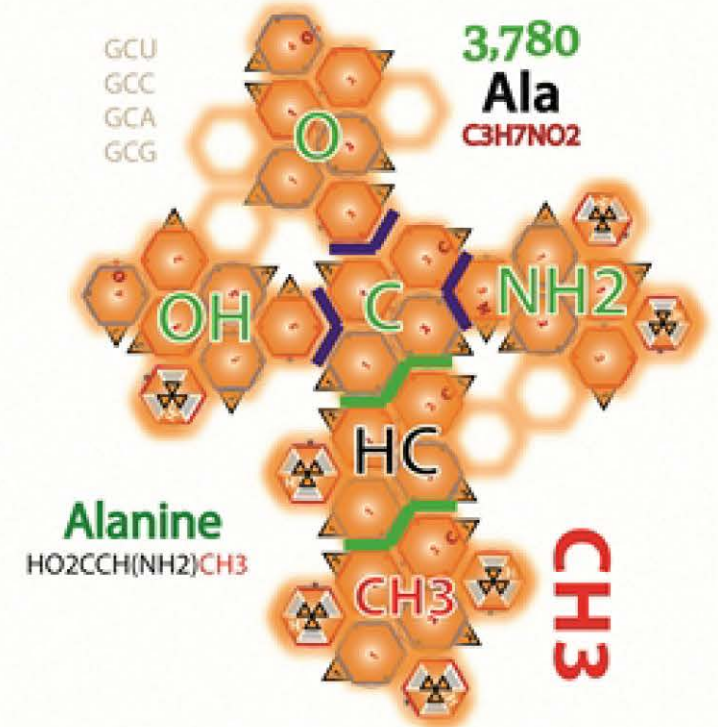
Tetryonic theory reveals serious flaws in this line of thought

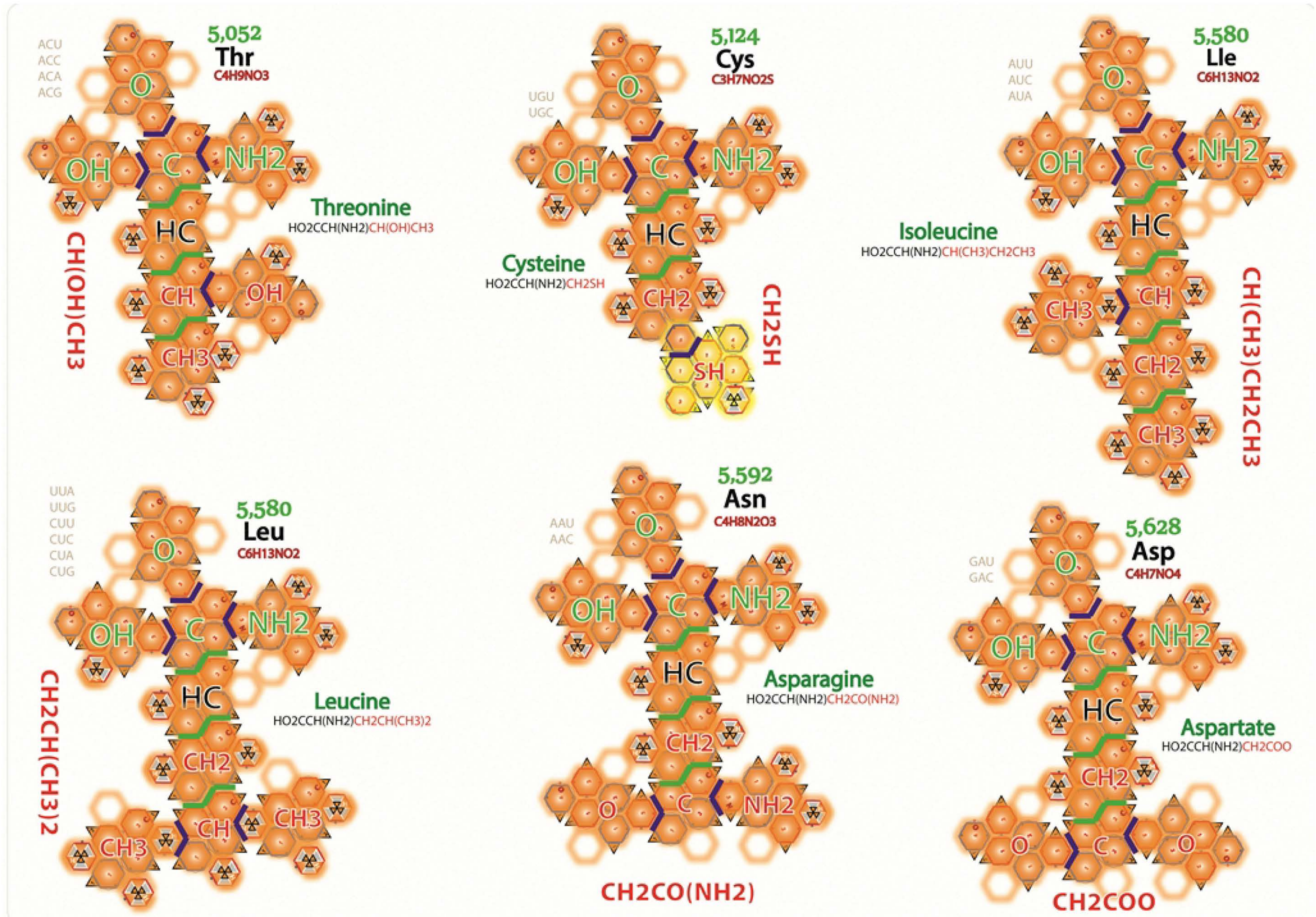
U
C4-H4-N2-O2
Uracil

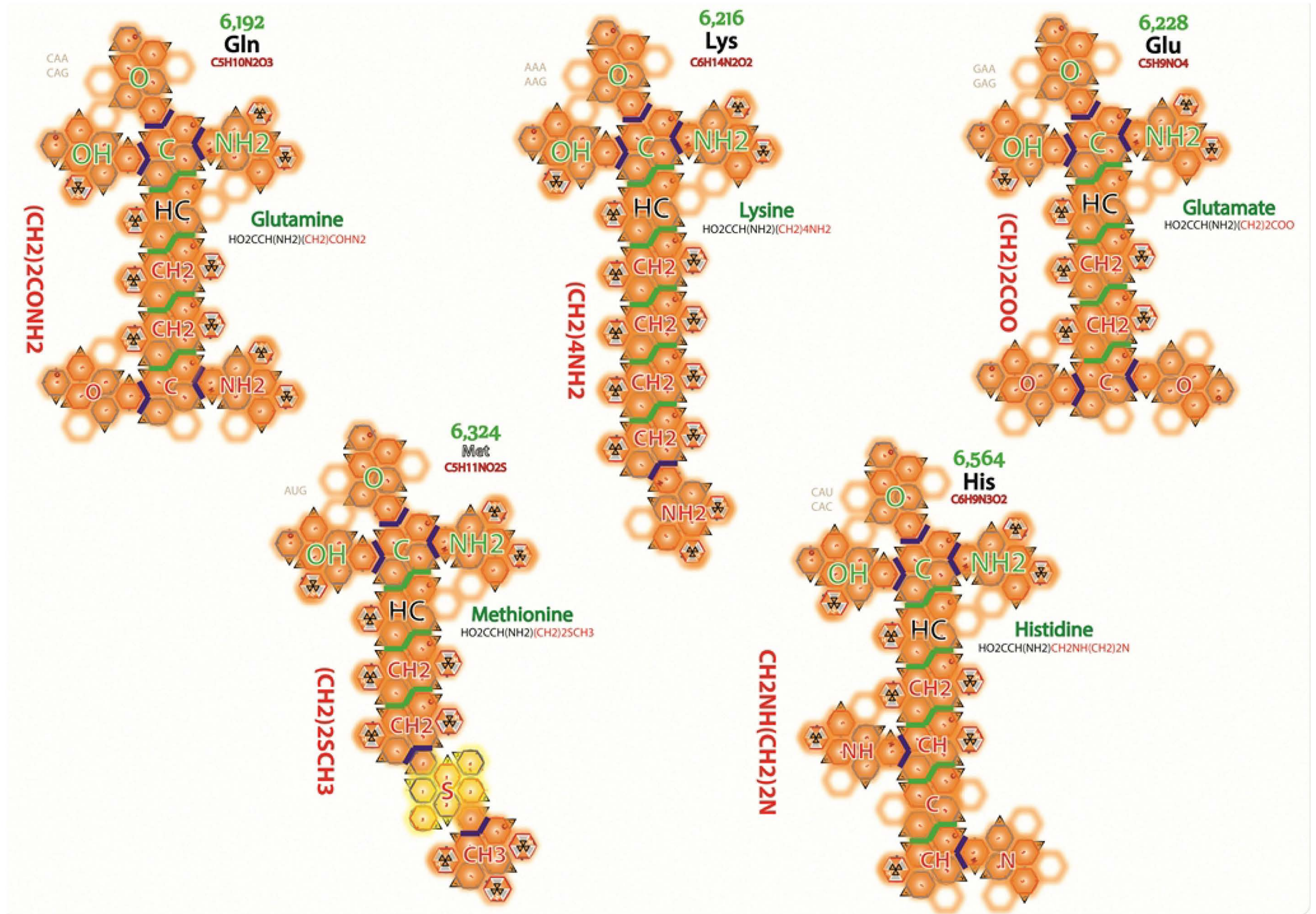
UAA
UAG
UAC
UAU
UGA
UGG
UGC
UGU
UCA
UCG
UCC
UCU
UUA
UUG
UUC
UUU

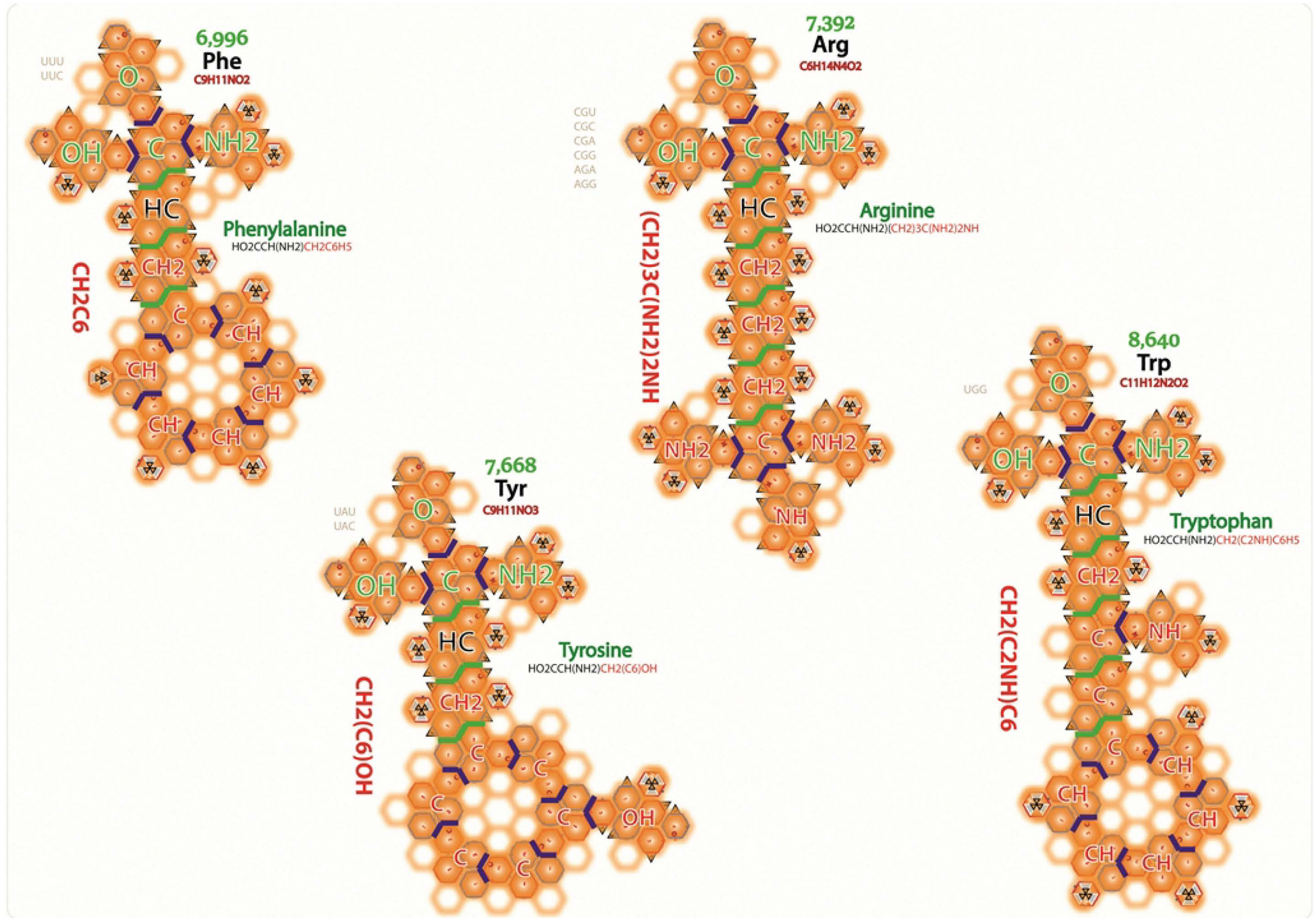


poly-peptide chains



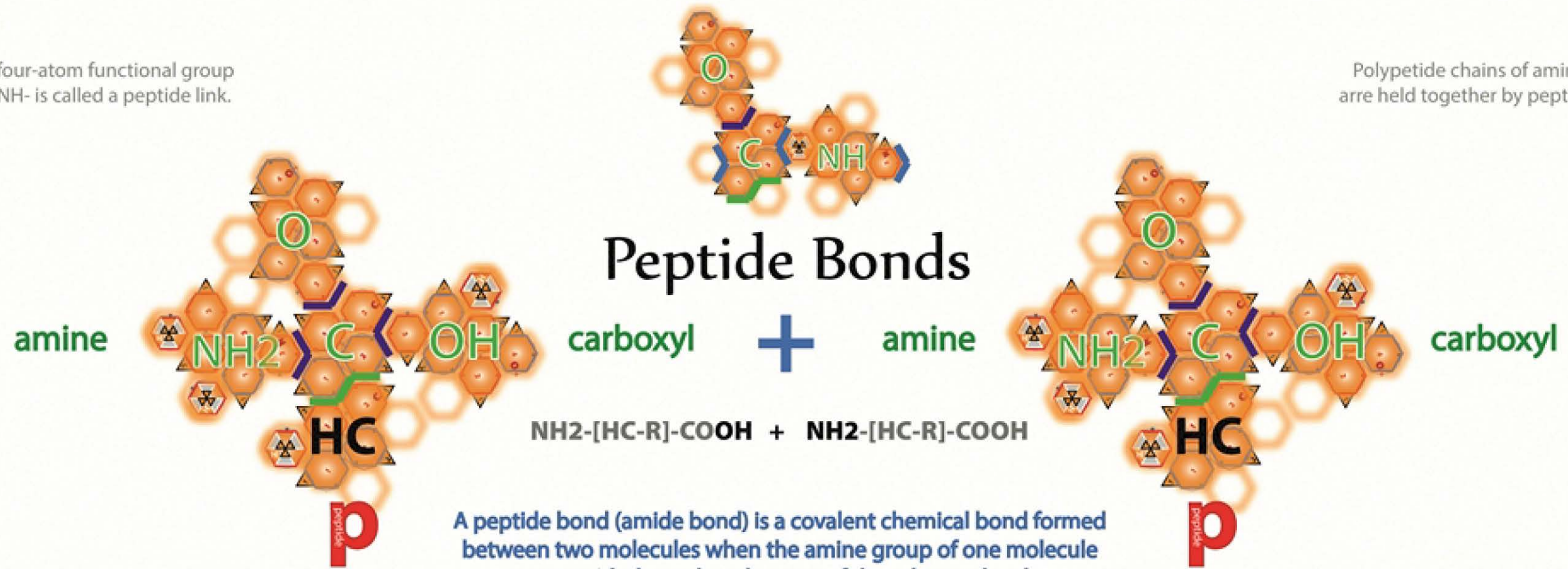




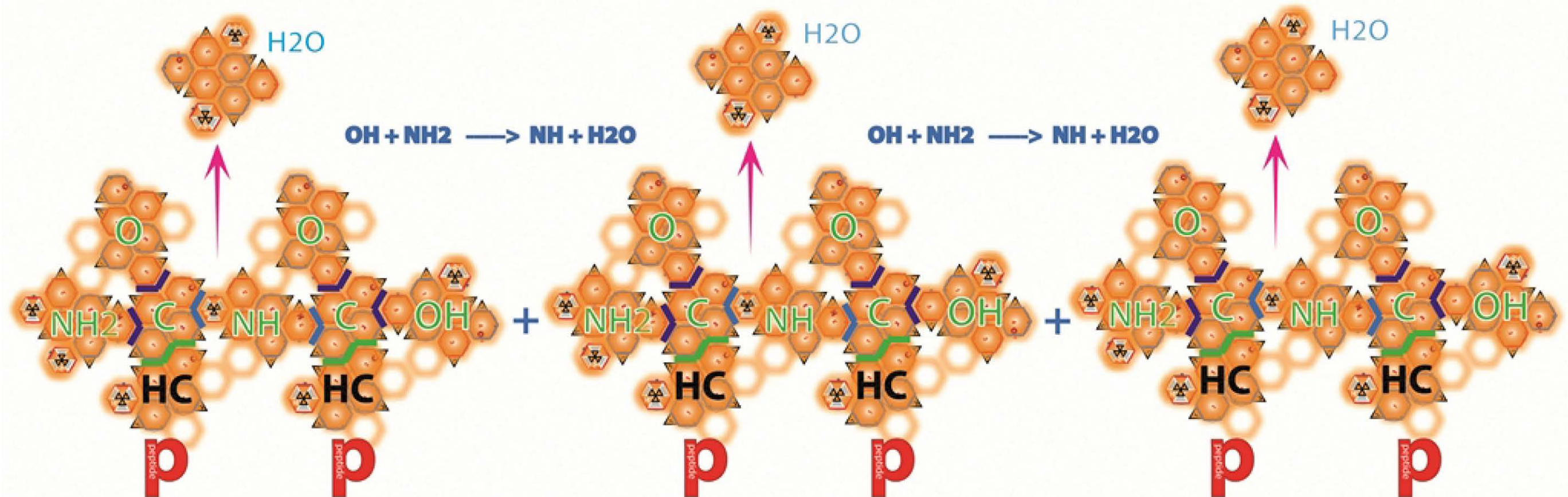


The four-atom functional group
-CONH- is called a peptide link.

Polypeptide chains of amino acids
are held together by peptide bonds

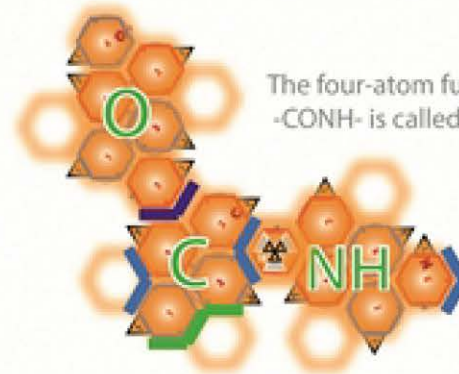
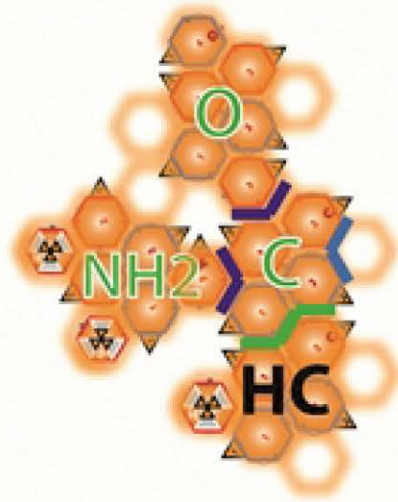


A peptide bond (amide bond) is a covalent chemical bond formed between two molecules when the amine group of one molecule reacts with the carboxyl group of the other molecule, causing the release of a molecule of water (H₂O),



amino terminus

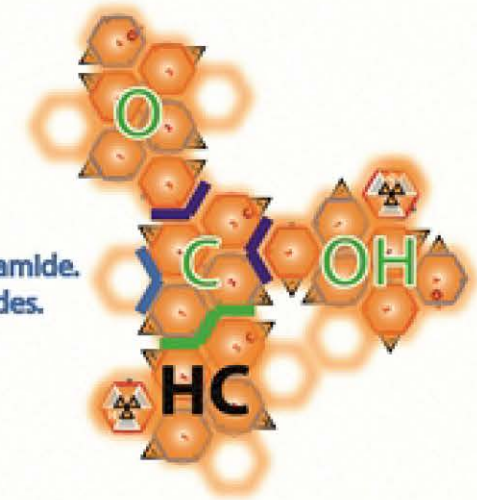
The beginning of a polypeptide protein molecule has a free amino group.



The four-atom functional group -CONH- is called a peptide link.

carboxy terminus

The end of a polypeptide protein molecule has a free carboxyl group.



Proteins [poly-peptides] are formed by joining the -CO₂H [carboxyl] end of one amino acid with the -NH₂ [amine] end of another to form an amide. The -CONH- bond between amino acids is known as a peptide bond because relatively short polymers of amino acids are known as peptides.

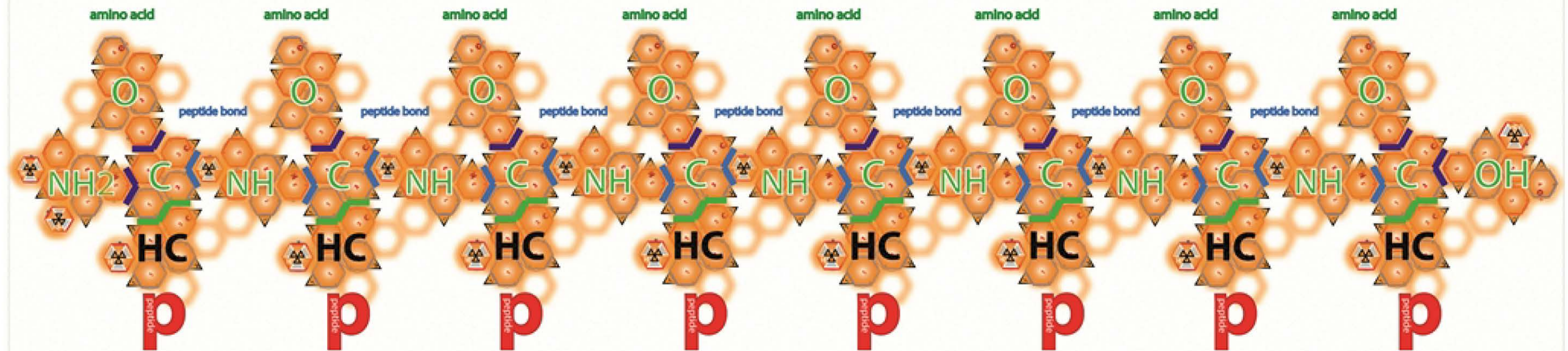
polypeptide chains

Proteins are formed when amino acids are covalently linked together.

DNA and RNA have a deoxyribose and ribose sugar backbone, respectively, whereas PNA's backbone is composed of repeating (2-aminoethyl)-glycine units linked by peptide bonds.



Proteins

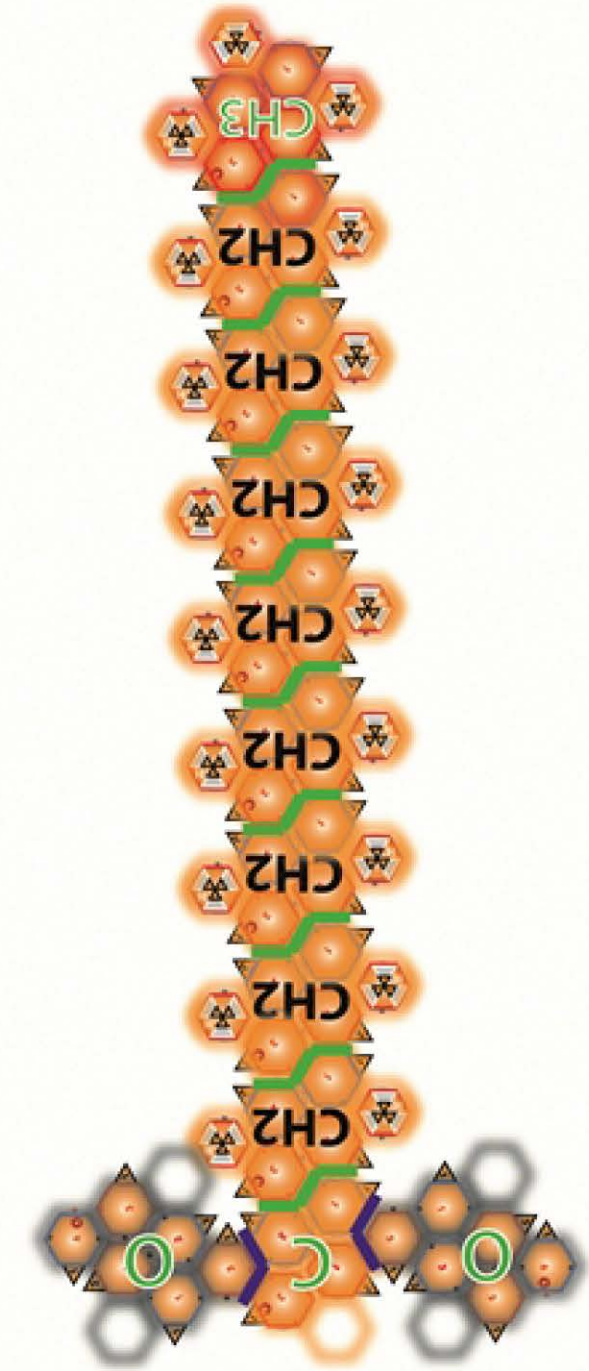
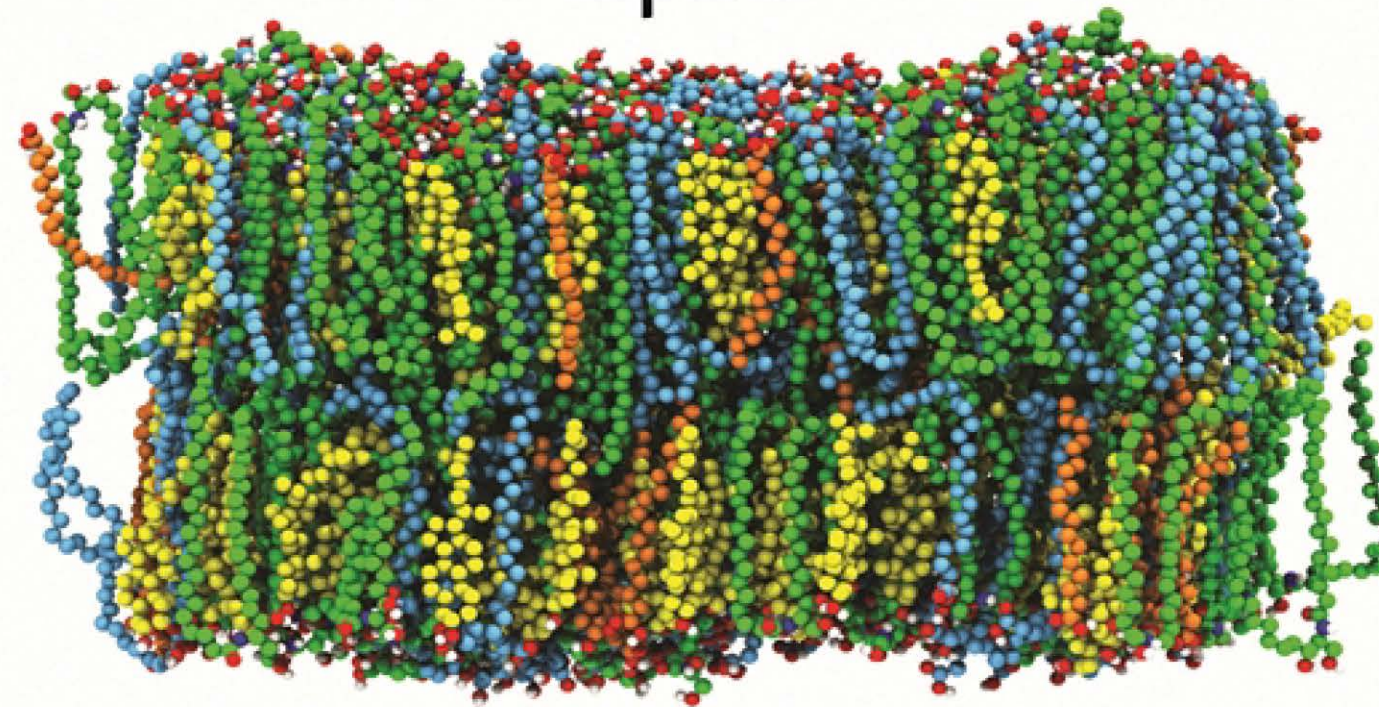
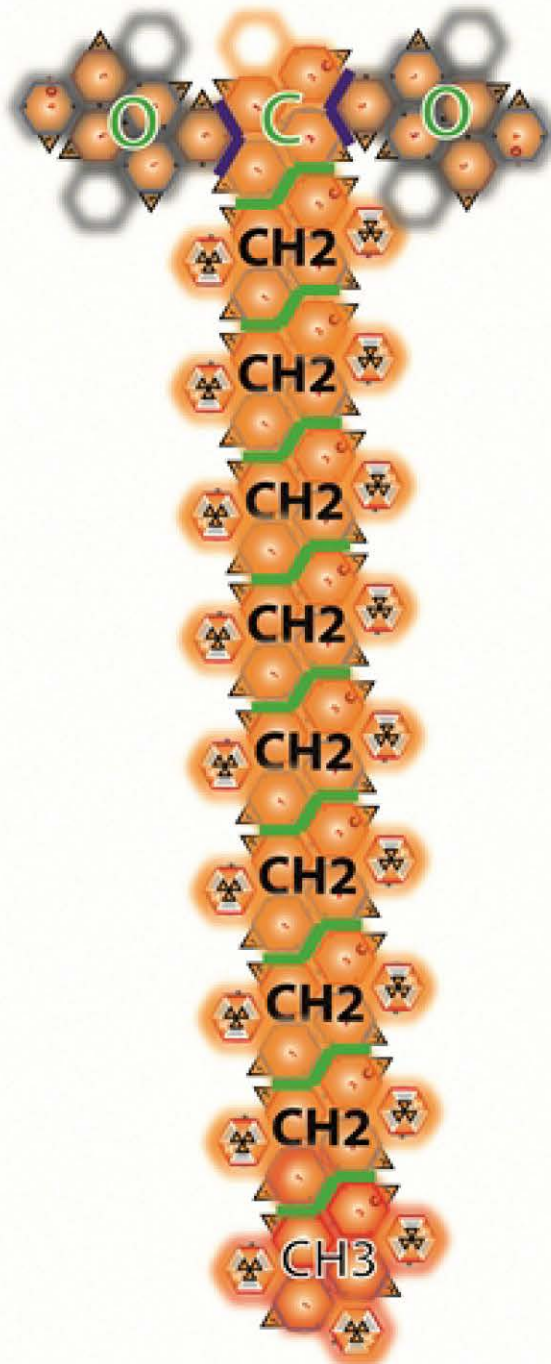


There are 20 different nucleotide side chains present in biological molecules.

Lipids

hydrophilic

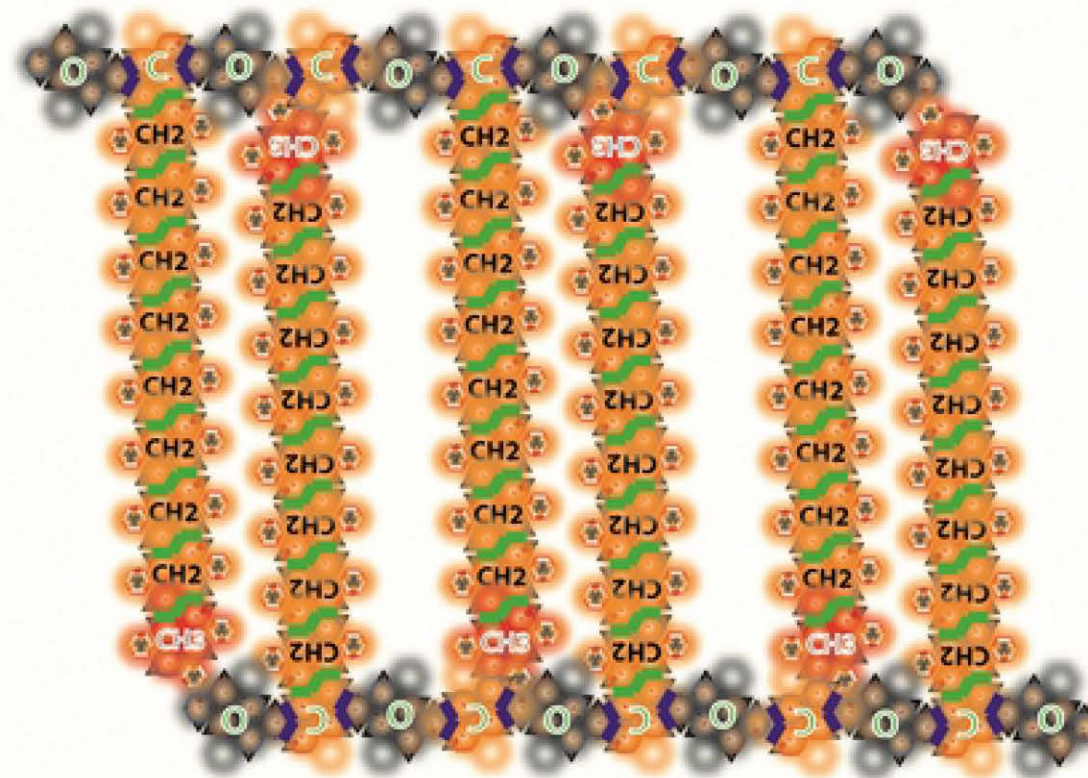
hydrophobic



hydrophobic

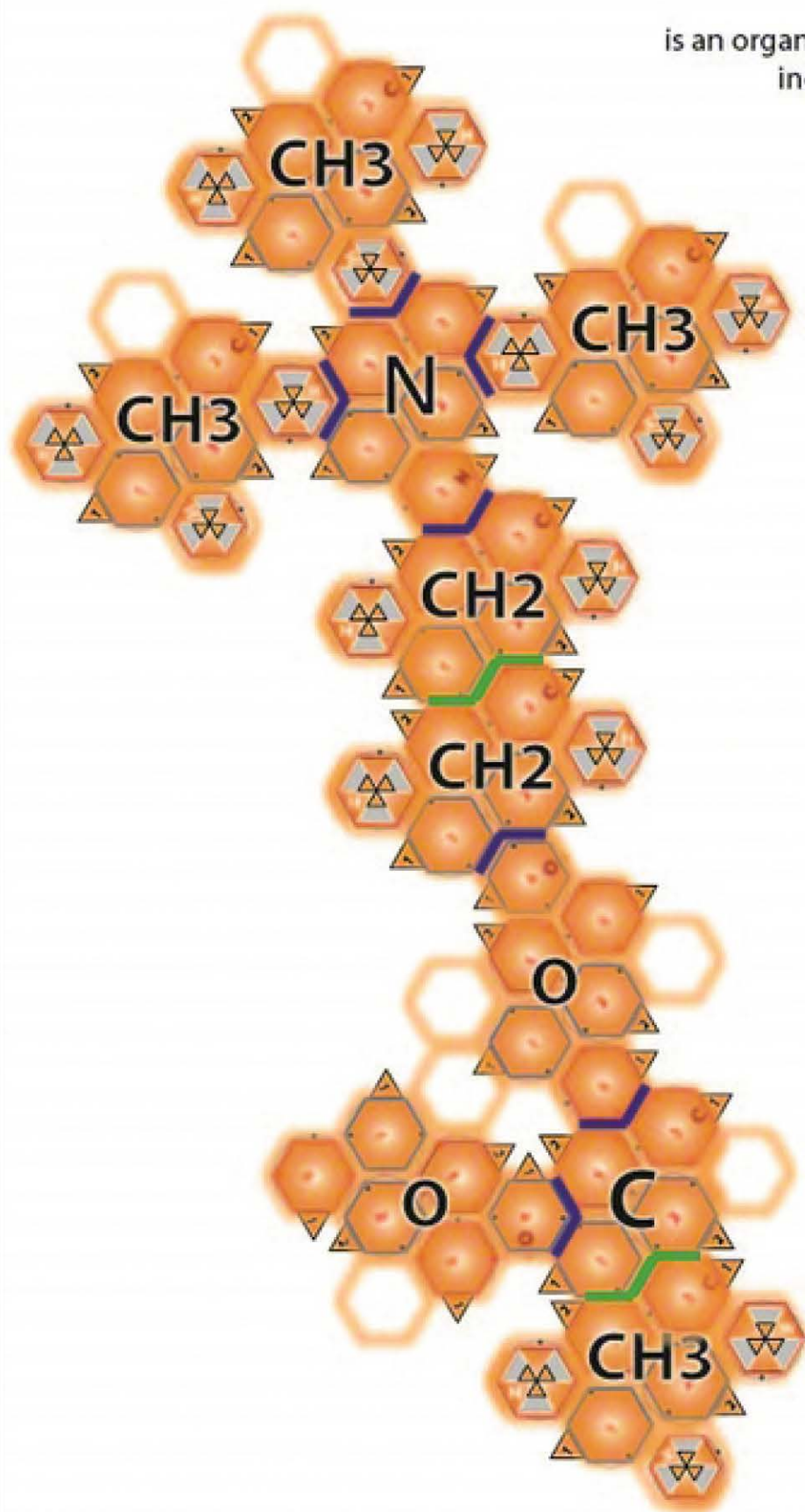
hydrophilic

Lipids are a group of naturally occurring molecules that include fats, waxes, sterols, fat-soluble vitamins (such as vitamins A, D, E, and K), mono-glycerides, di-glycerides, tri-glycerides, phospho-lipids, and others.



Lipids are molecules that contain hydrocarbons and make up the building blocks of membranes, providing a semi-permeable barrier between a living cell's internal & external environments.

Lewis chemical structure



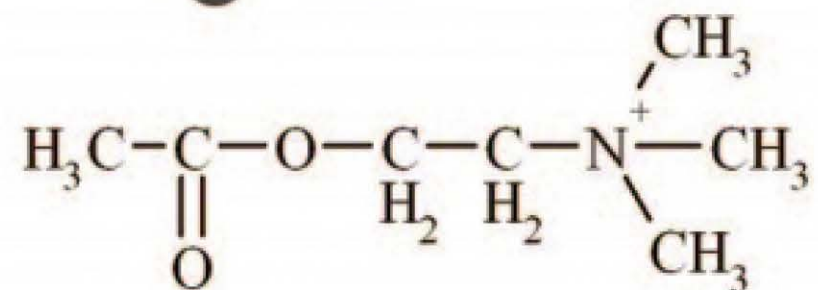
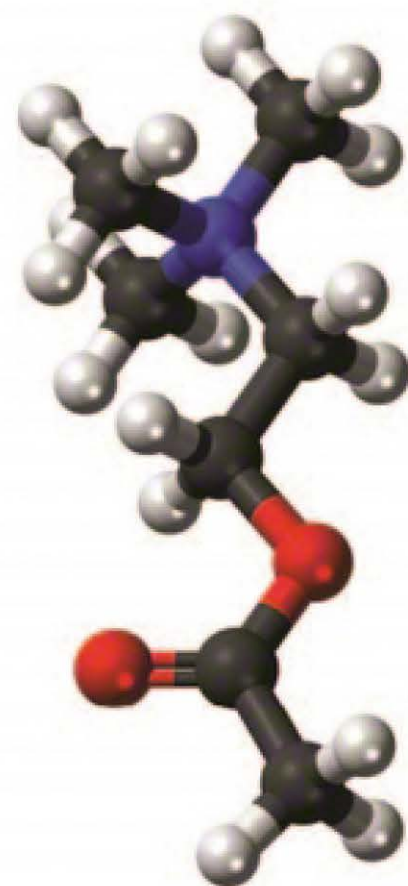
Acetylcholine

is an organic molecule that acts as a neurotransmitter in many organisms, including humans. It is an ester of acetic acid and choline

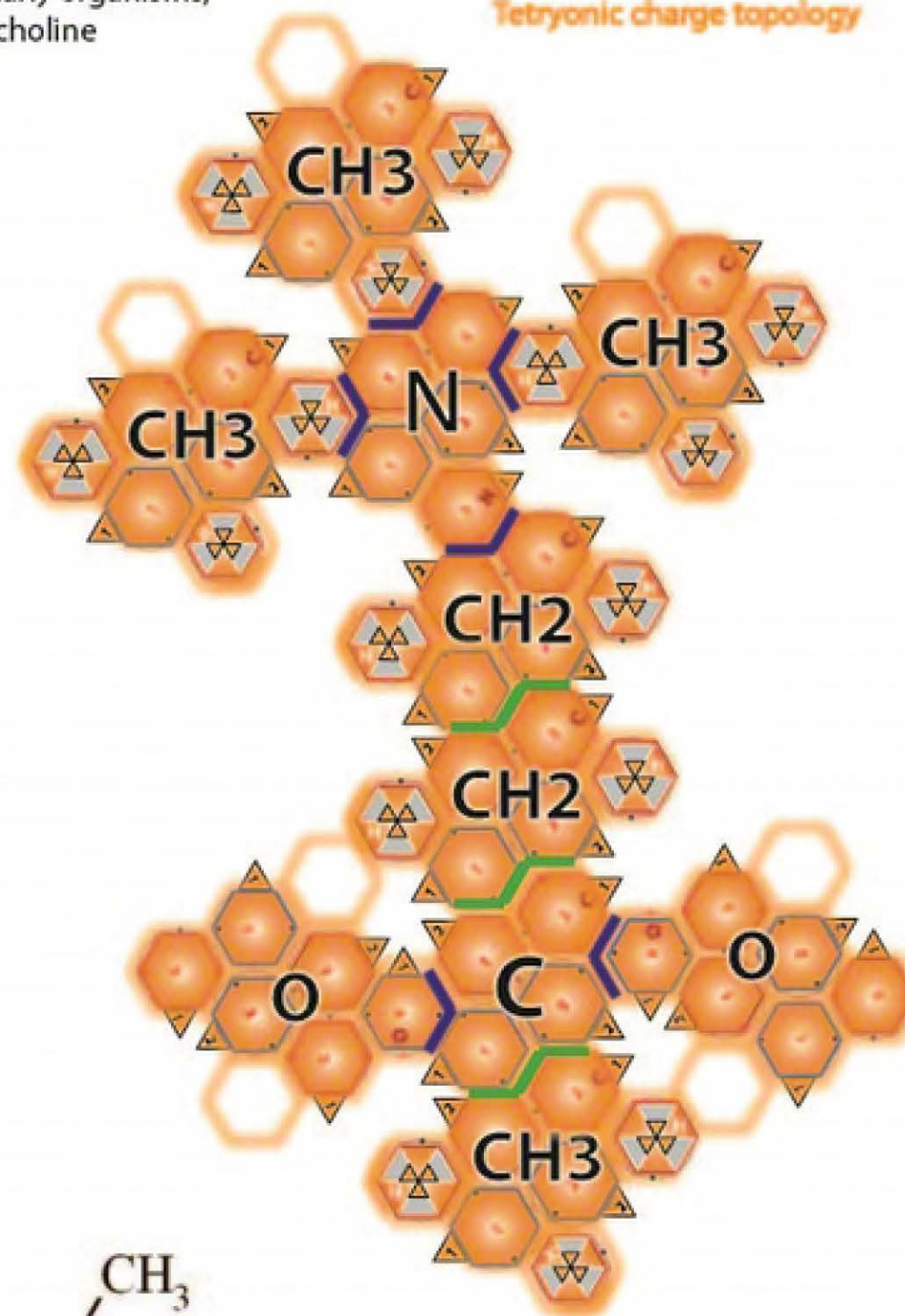
Ach

C7H16NO2

CH3COO(CH2)2N+(CH3)3



Tetryonic charge topology



6,228

Ribose

6,360

C₅-H₁₀-O₅

[3,180-3,180]

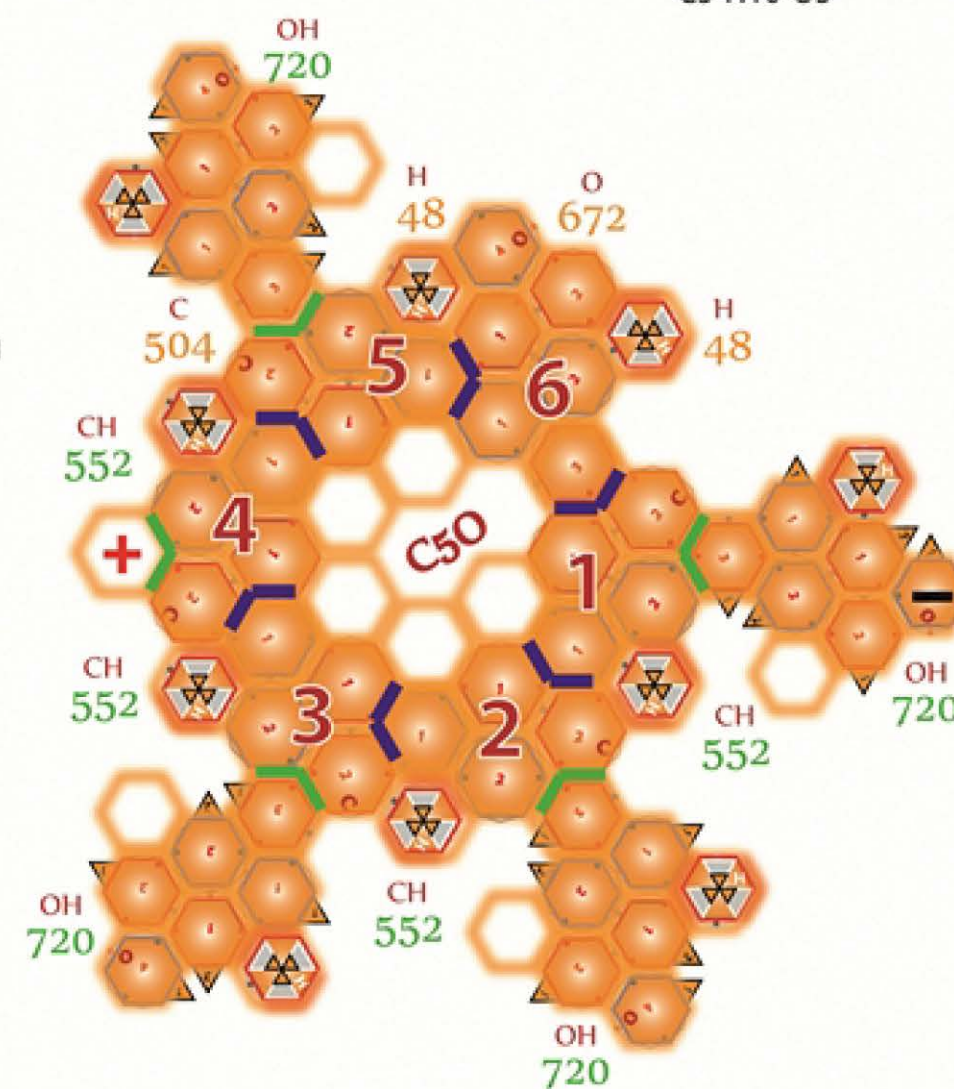
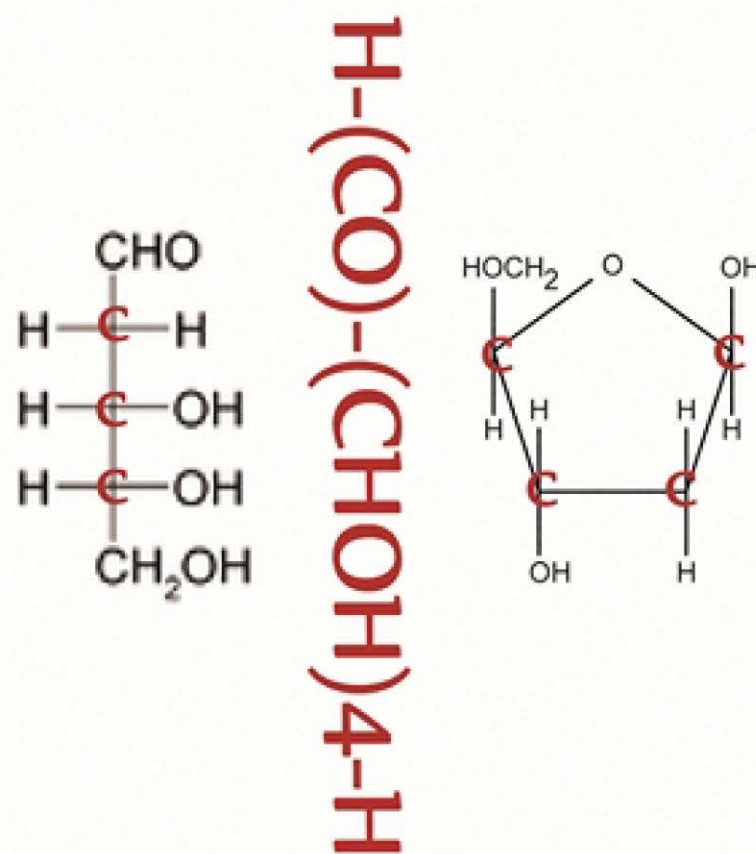
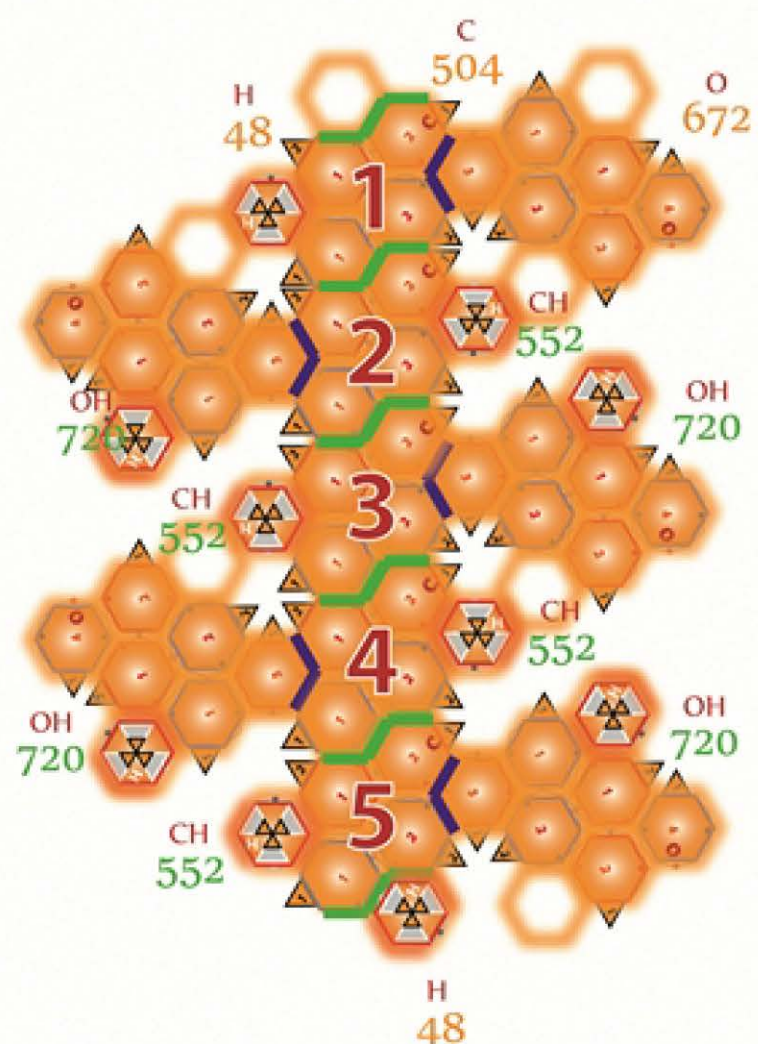
Carbohydrate compounds
can form acyclic sugars

Carbohydrate compounds
can also form cyclic sugars

Ribose is an organic compound with the formula C₅H₁₀O₅; specifically, a monosaccharide (simple sugar) with linear form H-(C=O)-(CHOH)₄-H

C(H₂O)₅
ribose
C₅-H₁₀-O₅

C(H₂O)₅
ribose
C₅-H₁₀-O₅



Ribose forms part of the backbone of RNA.
It is related to deoxyribose, which is found in DNA.

Ribose is present within every living cell of the body and is used to manufacture ATP (the energy currency of the cell) from scratch. Whilst the body can manufacture its own ribose from glucose, this requires energy and is a very slow process.

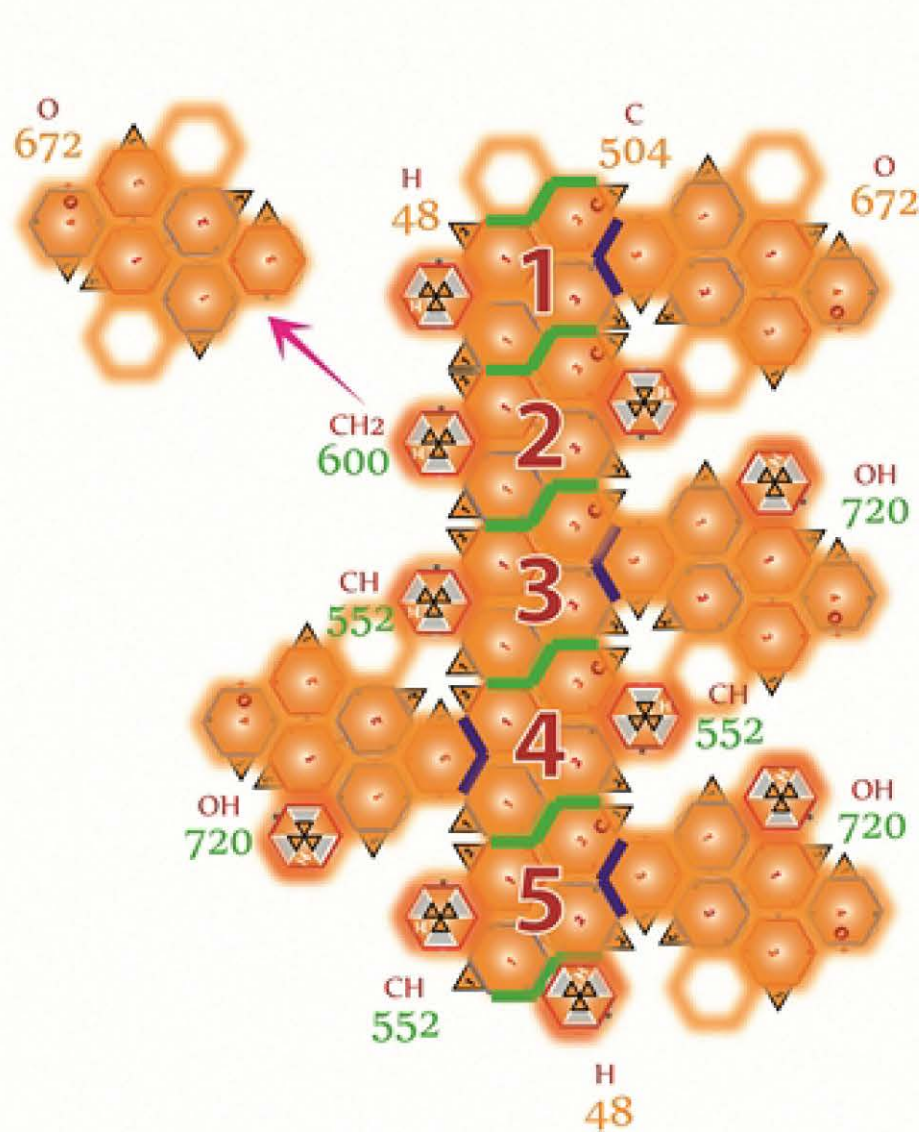
As its name indicates it is a deoxygenated sugar, meaning that it is derived from the sugar ribose by loss of an oxygen atom

Deoxyribose

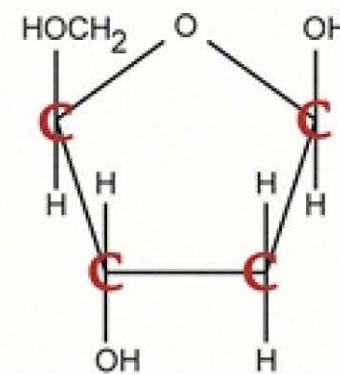
5,688
[2,844-2,844]

As a component of DNA, 2-deoxyribose derivatives have an important role in biology

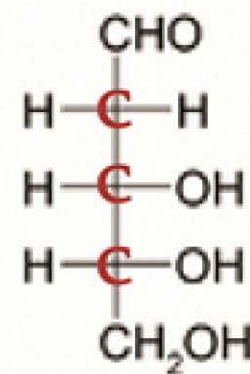
The DNA (deoxyribonucleic acid) molecule, which is the main repository of genetic information in life, consists of a long chain of deoxyribose-containing units called nucleotides, linked via phosphate groups



C₅-H₁₀-O₄
deoxyribose

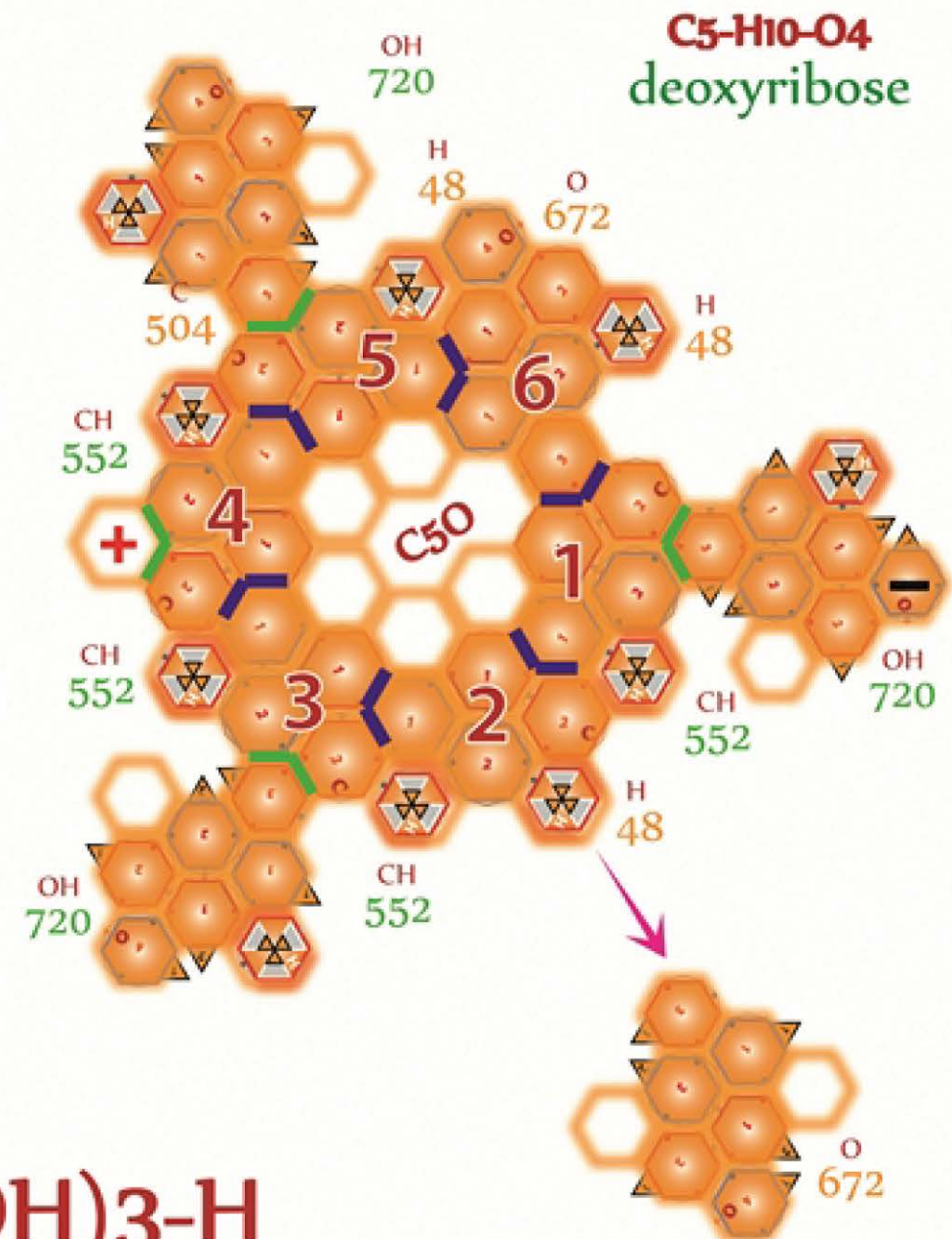


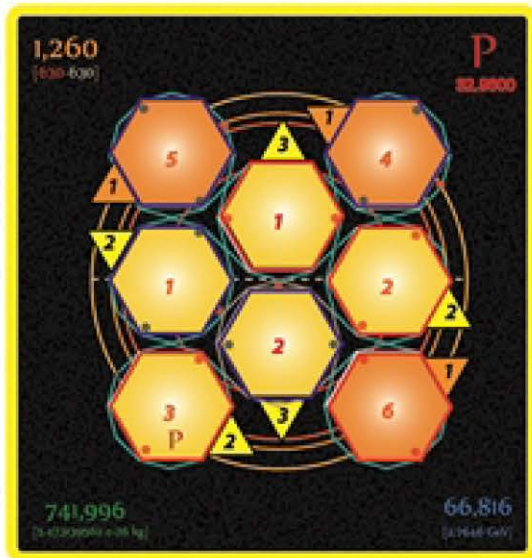
Deoxyribose, more, precisely 2-deoxyribose, is a monosaccharide



Hermann Emil Fischer won the Nobel Prize in Chemistry (1902) for his work in determining the structure of the D-aldohexoses.

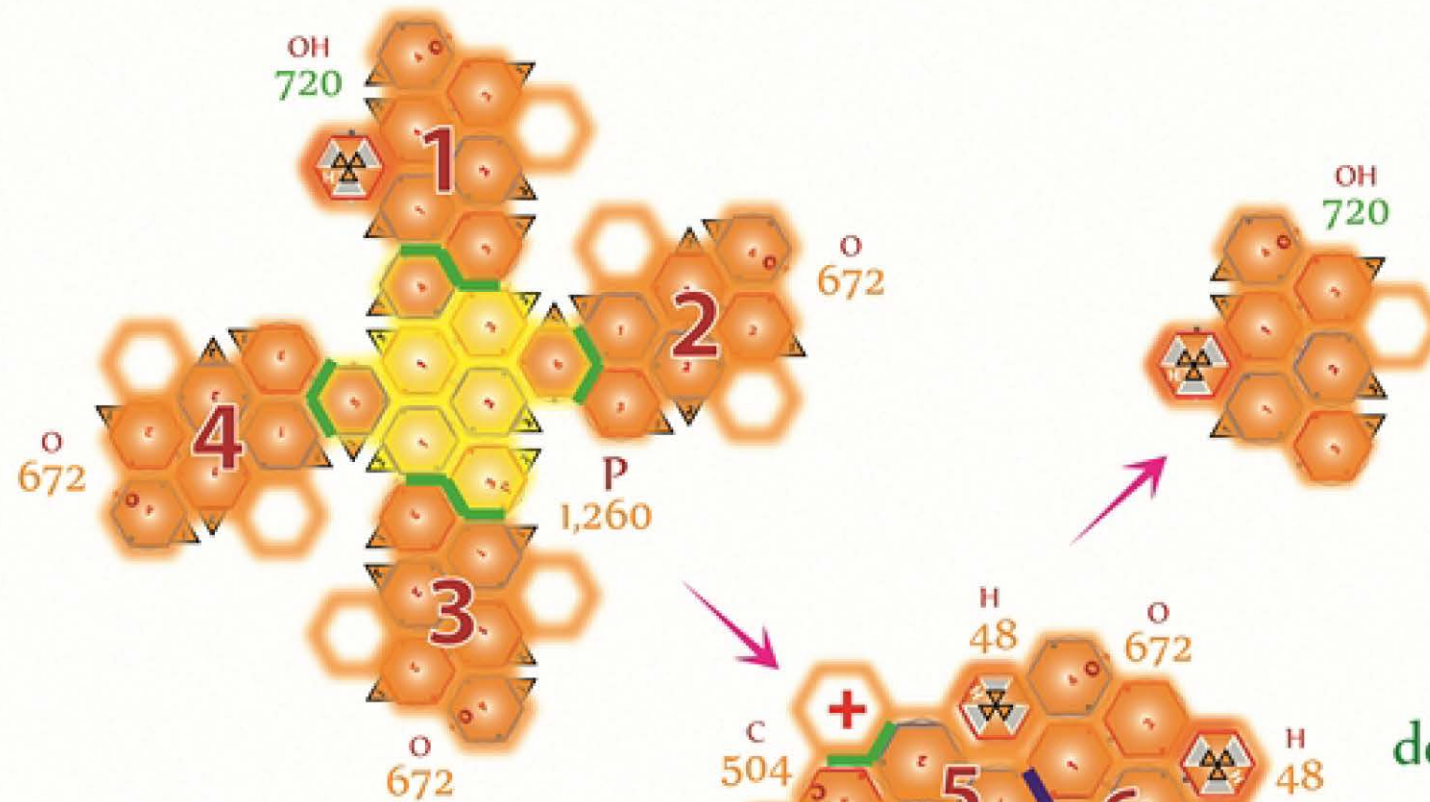
However, the linear, free-aldehyde structures that Fischer proposed represent a very minor percentage of the forms that hexose sugars adopt in solution. It was Edmund Hirst and Clifford Purves, in the research group of Walter Haworth, who conclusively determined that the hexose sugars preferentially form a pyranose, or six-membered, ring. Haworth drew the ring as a flat hexagon with groups above and below the plane of the ring – the Haworth projection



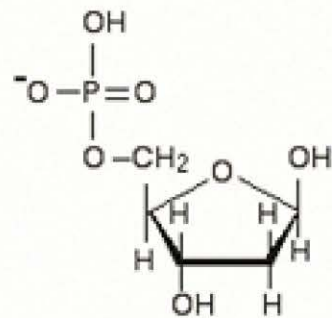


Phosphorus

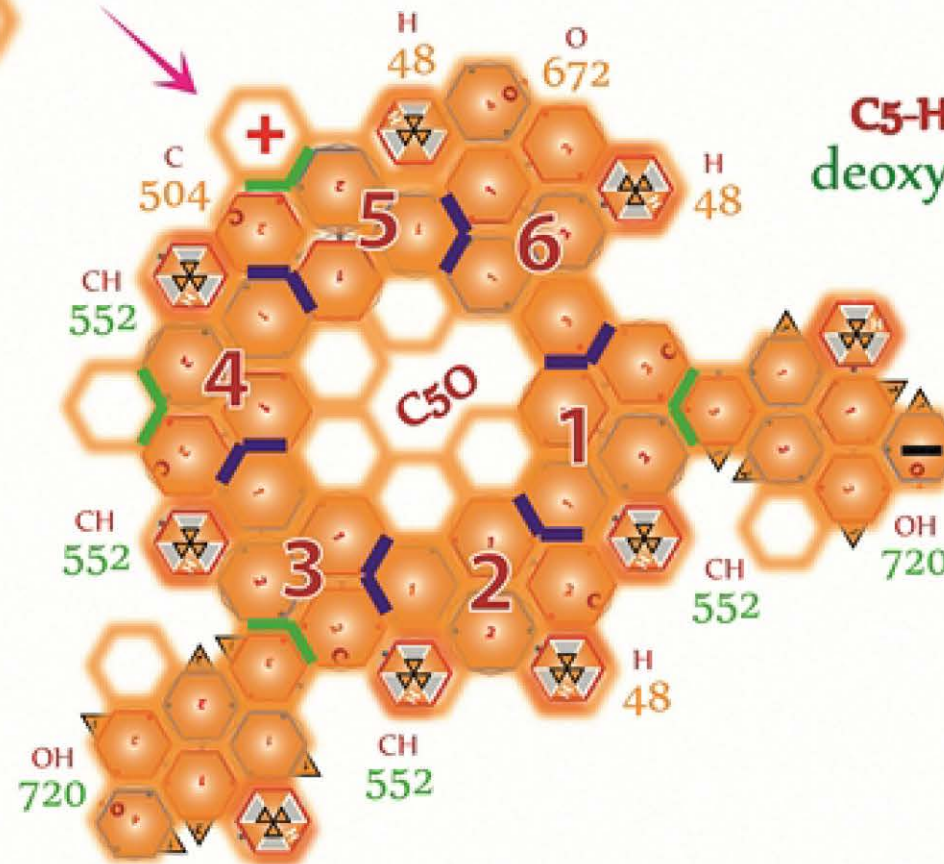
3,996
[1,998-1,998]



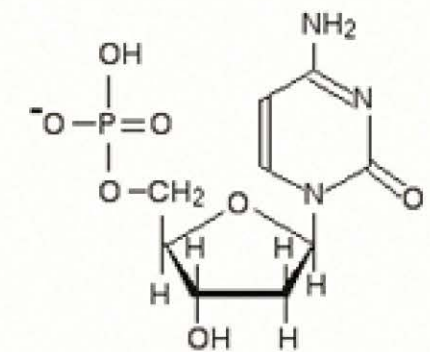
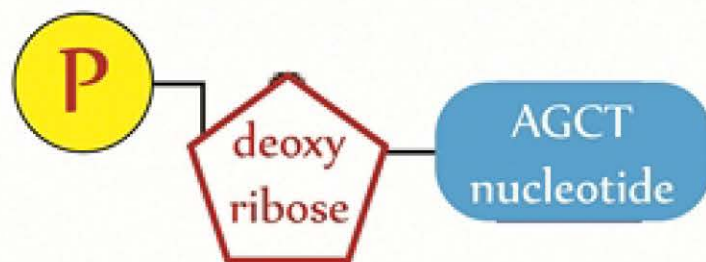
HPO₄
phosphate
group



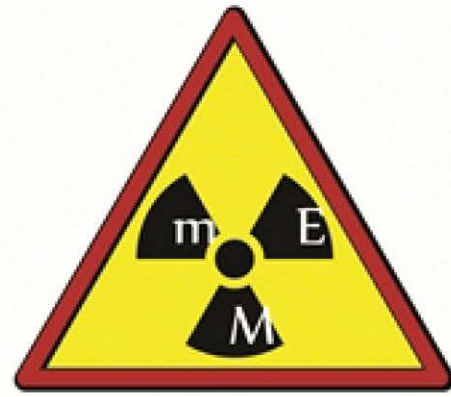
C₅H₁₀O₄
deoxyribose



The other repeating part of the DNA backbone is a phosphate group. A phosphate group is attached to the sugar molecule in place of the -OH group on the 5' carbon.



5,688
[2,844-2,844]

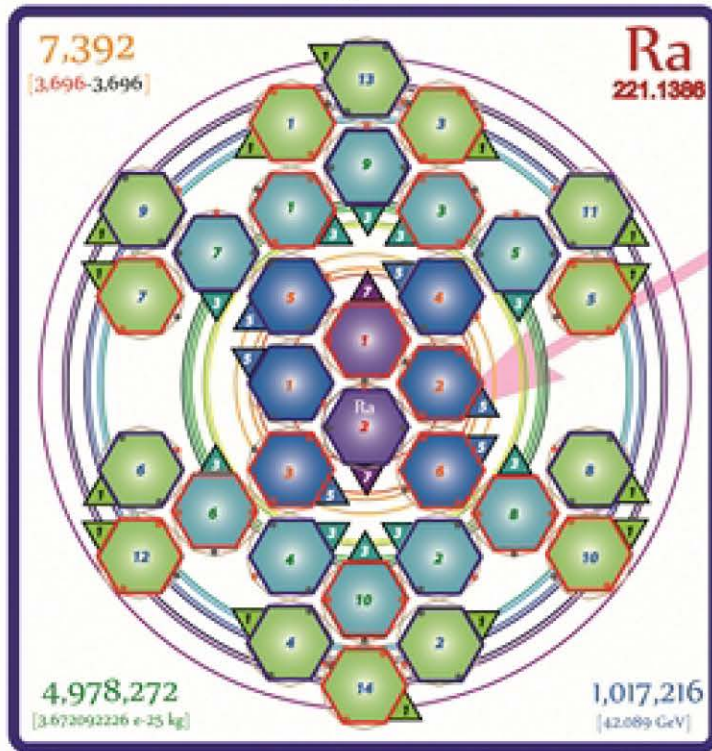


Radioactive Decay

The Atom releases excess energies in various forms as it seeks a lower energy, state of equilibria with its surrounding EM energy environment

Energy in all its forms seeks equilibrium

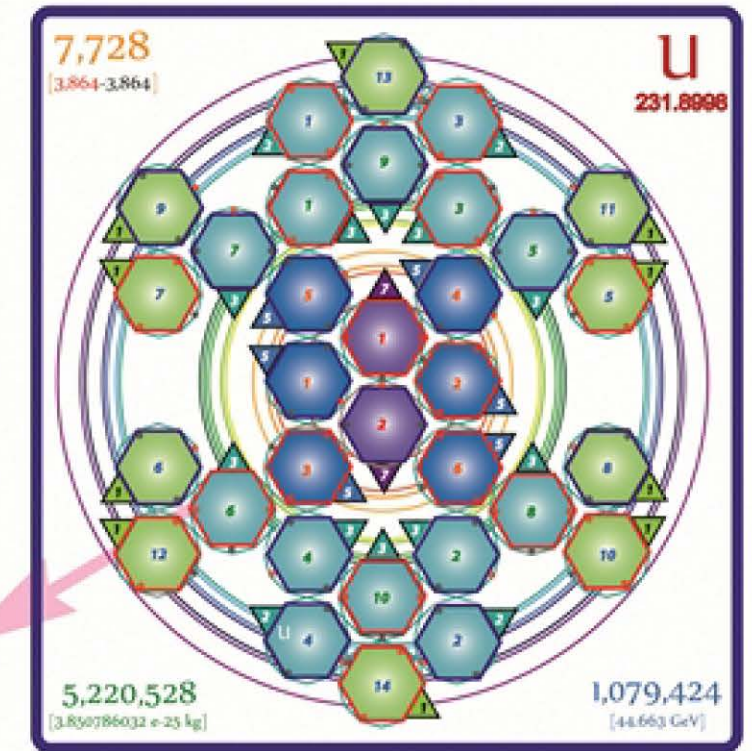
Photons, Heat, Vibration & Kinetics can all raise the energy levels of atomic nuclei



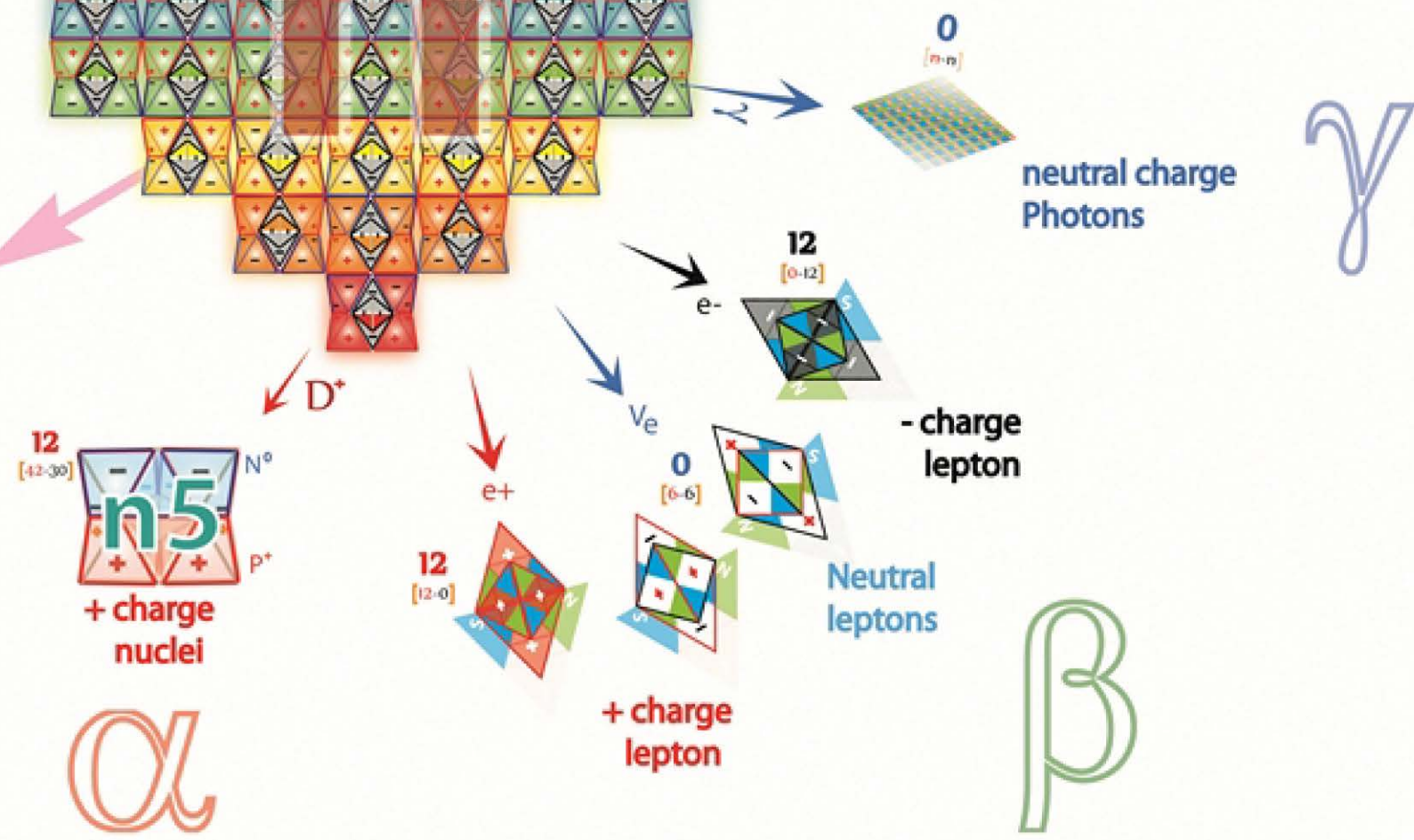
stable core electron configurations

The spectral line emissions of photons from bound electrons in addition to Alpha, Beta and Gamma Particle emissions from nuclei can release KEM energies over long time spans

E
scalar equilateral
mass-ENERGY-Matter
geometries topologies
 mc^2 Mc^4

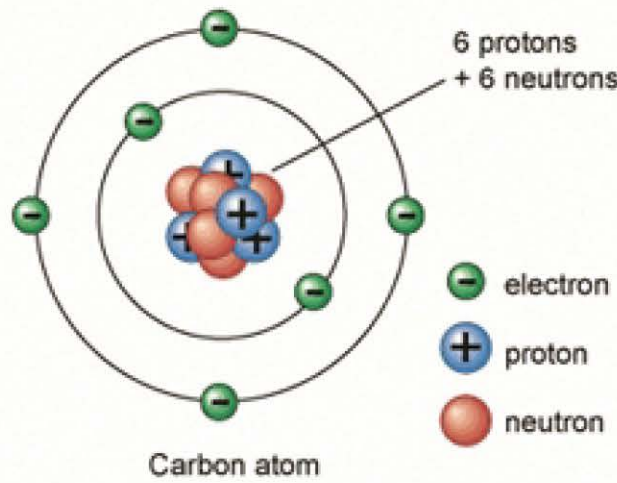


unstable high energy nuclei



Radio-Carbon isotope dating

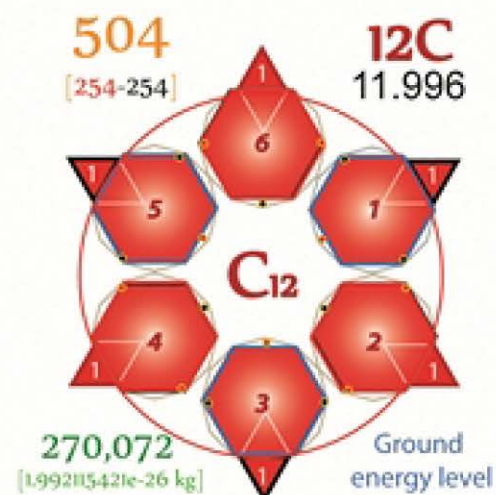
Radiocarbon dating (sometimes simply known as carbon dating) is a radiometric dating method that uses the naturally occurring radioisotope carbon-14 (^{14}C) to estimate the age of carbon-bearing materials up to about 58,000 to 62,000 years



[6 Deuterium nuclei]

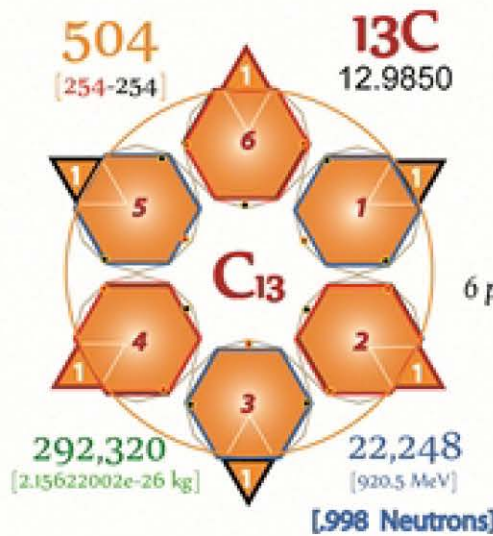
ALL elemental Carbon atoms have an atomic configuration of 6 protons, 6 neutrons and 6 electrons

Radio-Carbon dating can be used to determine the age of carbonaceous materials up to about 60,000 years old

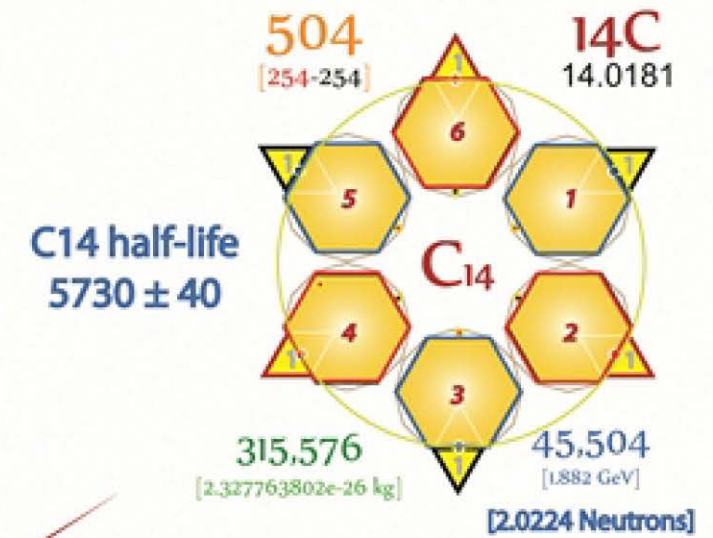
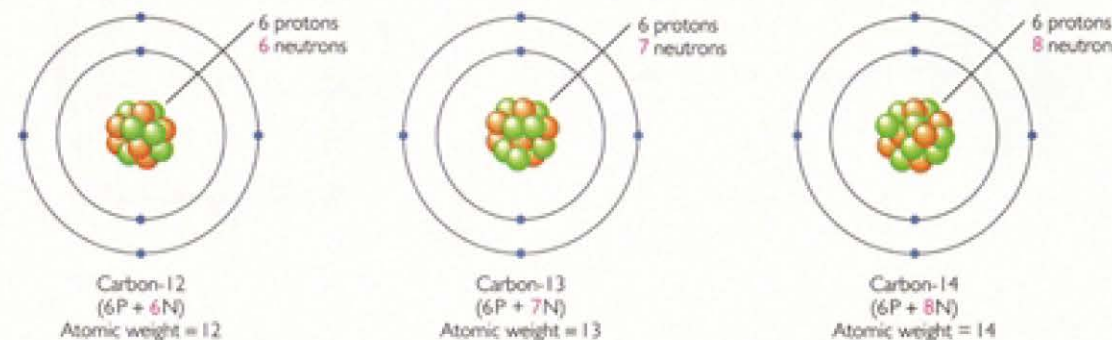


Standing-wave KE not 'excess' Neutrons

It is the stored Kinetic Energies [KE] that increase the mass of Carbon 12 to create its isotopes, historically these mass-energies have been mistakenly thought to be extra Neutrons in the nuclei



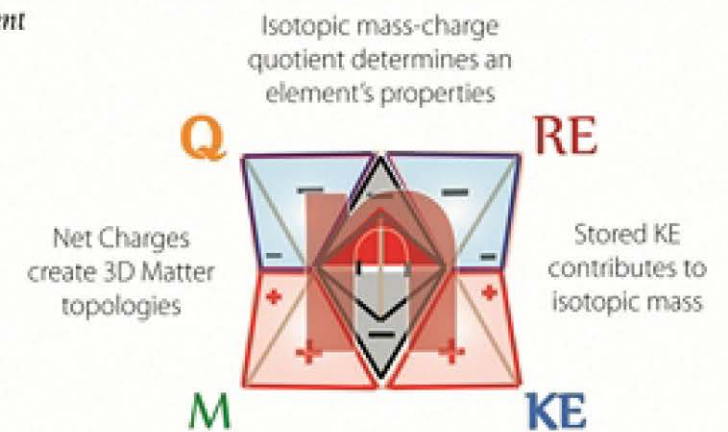
Tetryonic theory corrects historical errors of atomic geometries and nuclear energies



C14 half-life 5730 ± 40

Carbon-14, ^{14}C , or radiocarbon, is a radioactive isotope of carbon with a nucleus containing 6 protons, 6 neutrons and 6 electrons with an excess energy content of 1.88 GeV

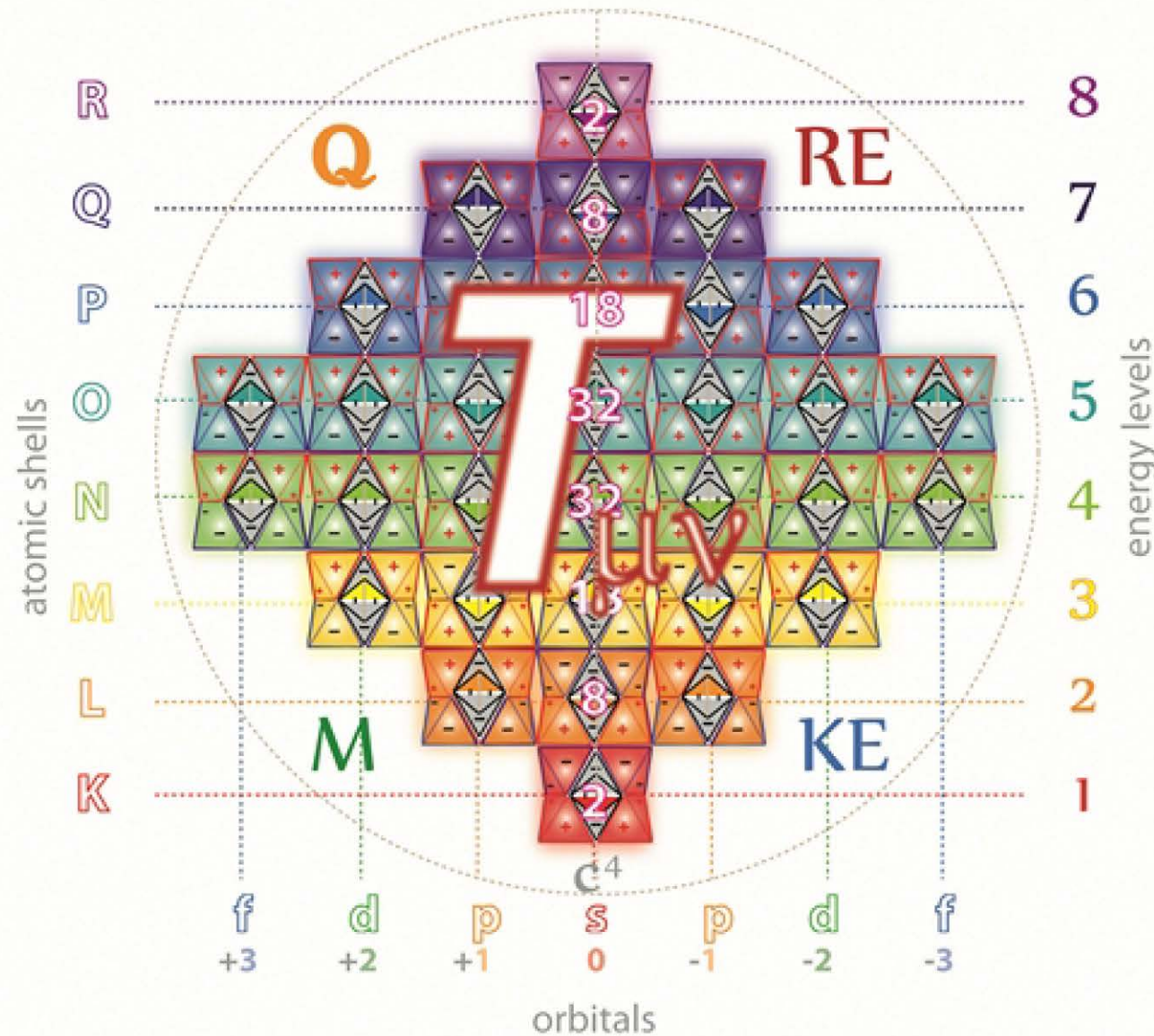
Carbon-13, ^{13}C , is a weakly radioactive isotope of carbon with a nucleus containing 6 protons, 6 neutrons and 6 electrons with an excess energy content of 920 MeV



The stored KE [chemical] mass-energies of the Carbon 12+ Isotopes comes from various radiological [and biological] processes and its steady, predictable release through the quantum mechanics of the synchronous convertors that make up Carbon nuclei make it useful in dating objects based on their decay rates

Radioactive Isotopes

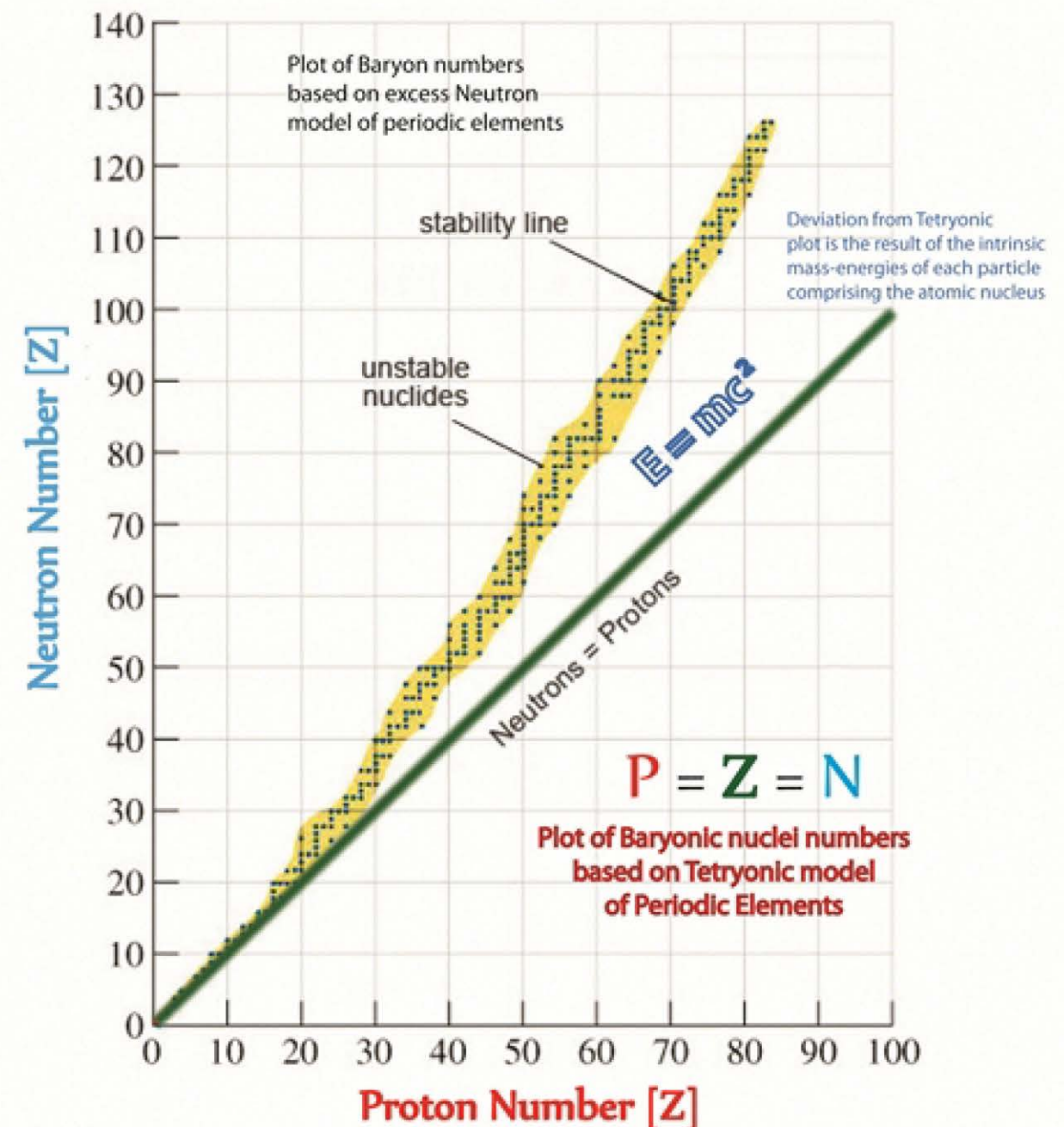
Where the elementary nuclei's Deuteron energy levels are raised from their ground levels radioactive isotopes are created



Each periodic element is comprised of an EQUAL number of Protons, Neutrons & electrons that form each element's unique 2D mass-energy geometries & 3D Matter topology and contribute to its observed properties

The $\frac{\text{mass}}{c^2} \sim \frac{\text{energy}}{c^4}$ content of Matter

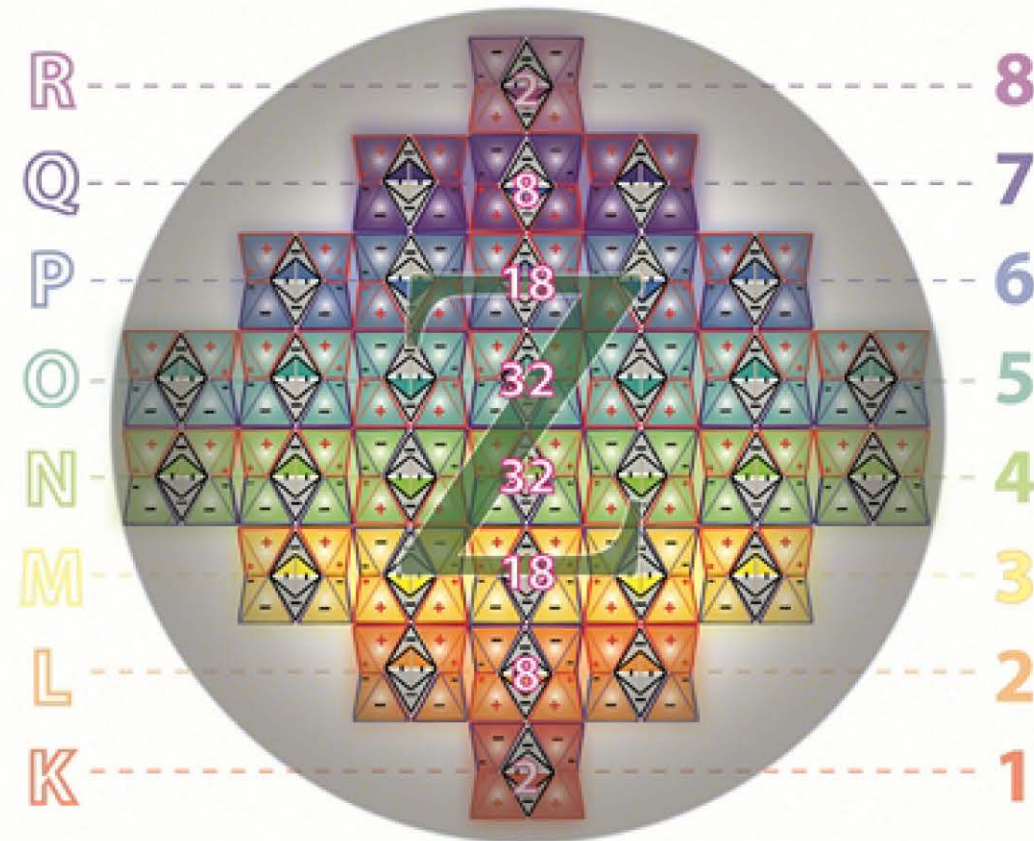
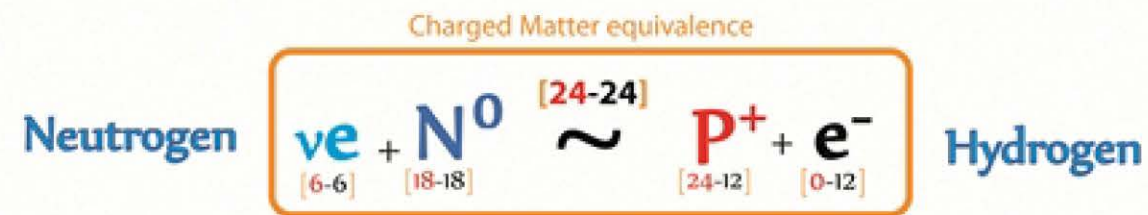
Einstein's relativistic stress energy tensor models mass-energy-Matter as a nebulous energy-momenta density-pressure gradient



Tetryonic theory redefines the relativistic stress energy tensor $[T_{\mu\nu}]$ into a geometric measure of the charged 2D electromagnetic mass-energies & 3D Matter topologies within any spatial co-ordinate system

Nuclear Decay processes

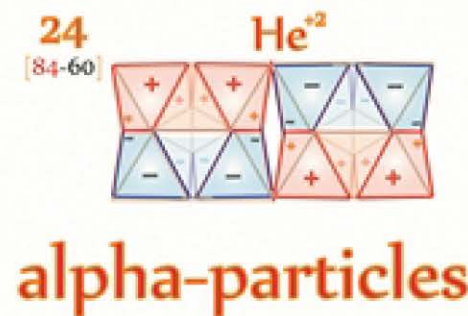
is the set of processes by which an unstable atomic nucleus emits subatomic particles



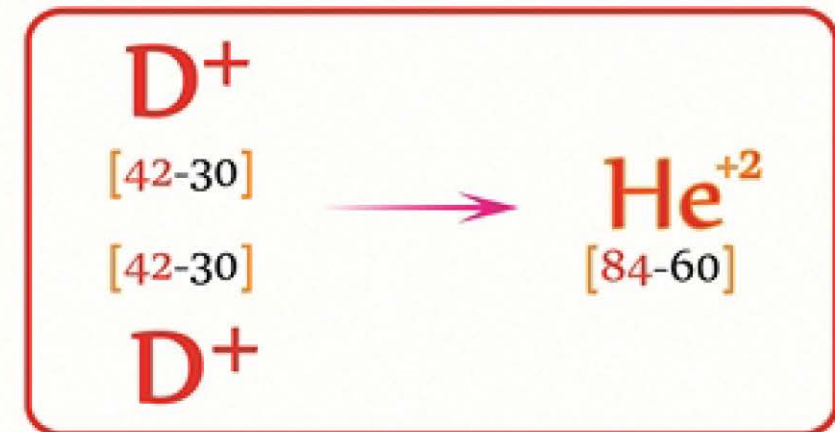
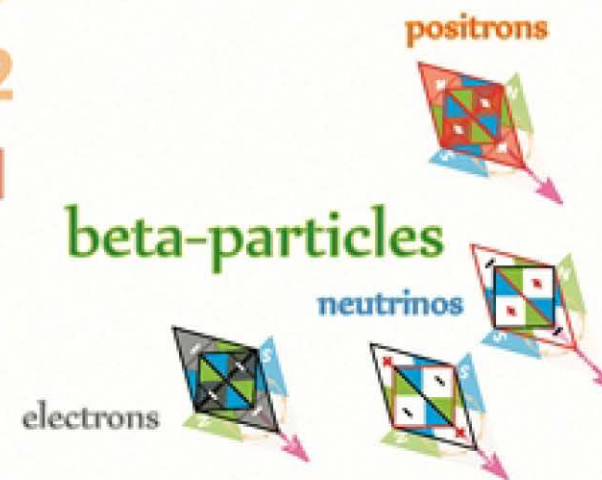
m All nuclear decay particles are determined by **M** Tetryonic charge topologies

Charge & mass-energy momenta are conservative physical properties

Radioactivity was discovered in 1896 by the French scientist Henri Becquerel, while working on phosphorescent materials. These materials glow in the dark after exposure to light, and he suspected that the glow produced in cathode ray tubes by X-rays might be associated with phosphorescence



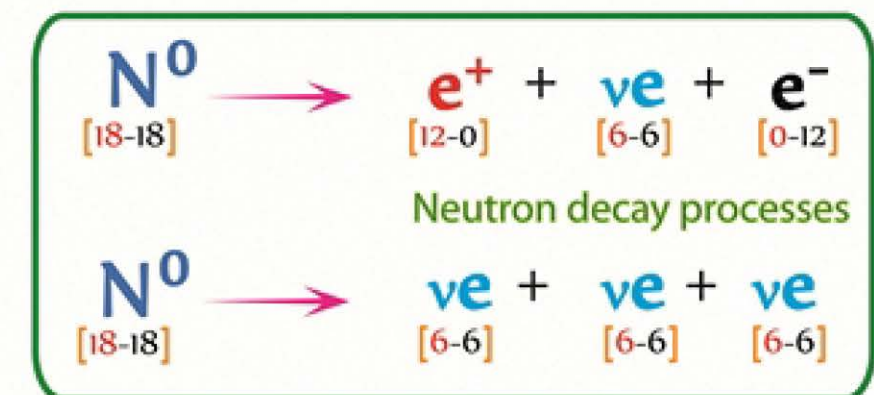
E



Energy can be released from atomic nuclei through various processes

alpha-particles
beta-particles
gamma rays
spectral lines
heat & motion

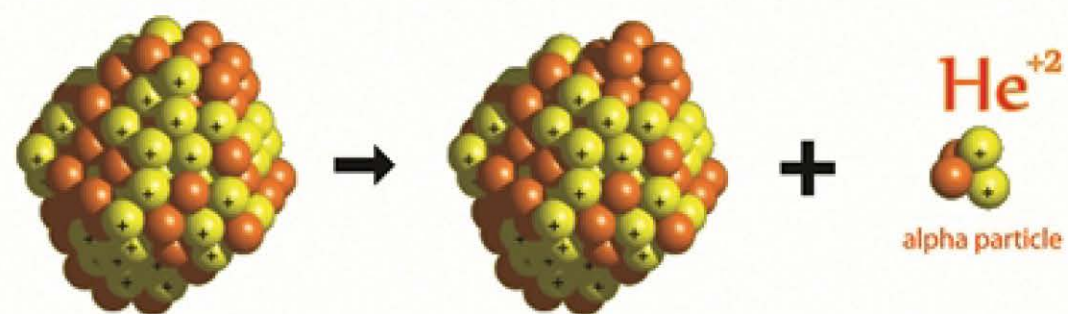
Charge Matter particle creation follows chemical equilibrium formulae



3D Matter topologies are not conservative

Alpha radiation

(Deuteron emissions)

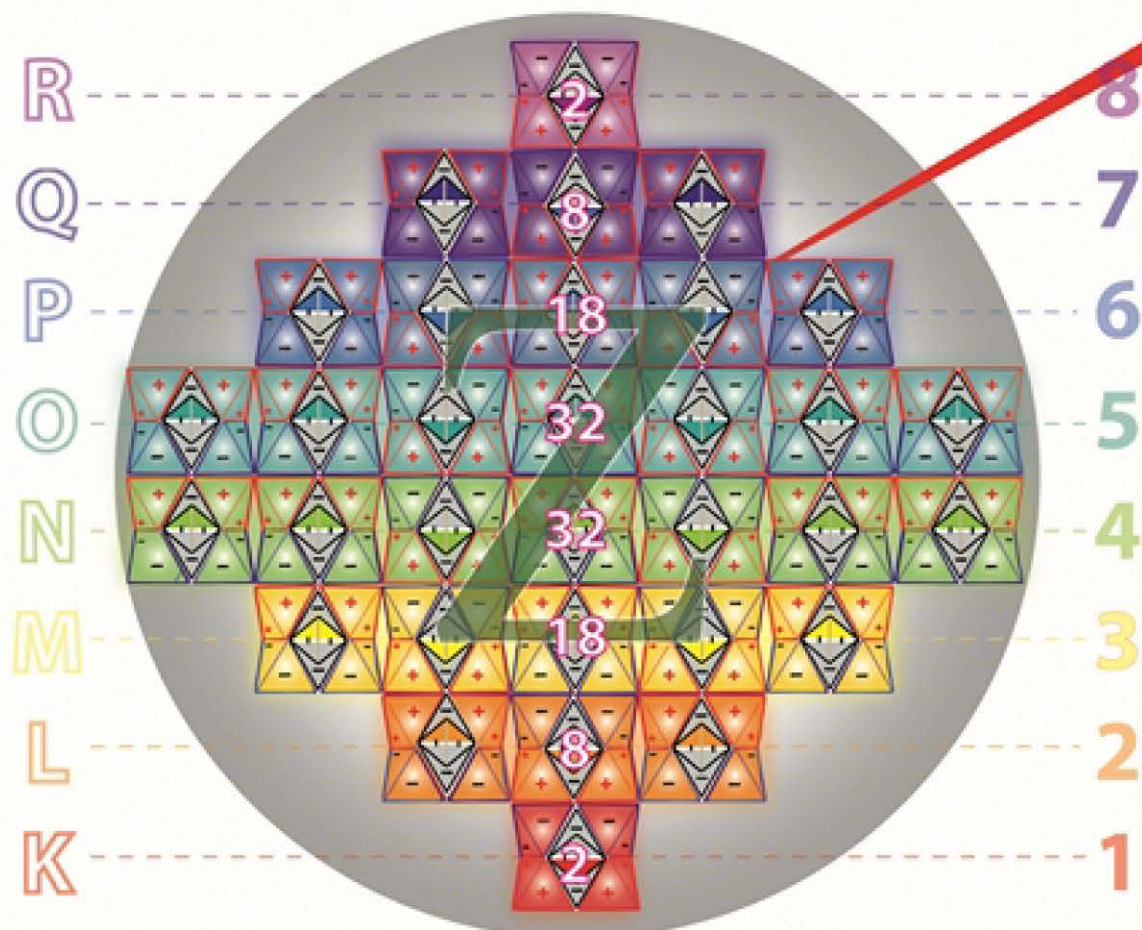


large, unstable energetic nuclei

large stable nuclei

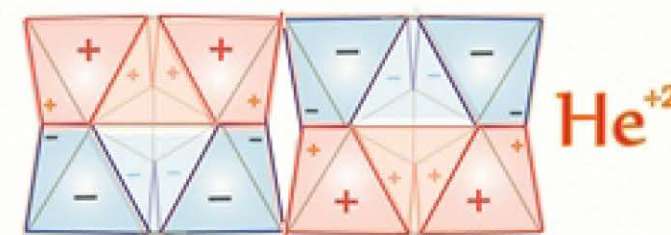
alpha particle

Alpha particles are released during alpha decay processes in ultra-heavy nuclei like uranium, thorium, actinium, and radium



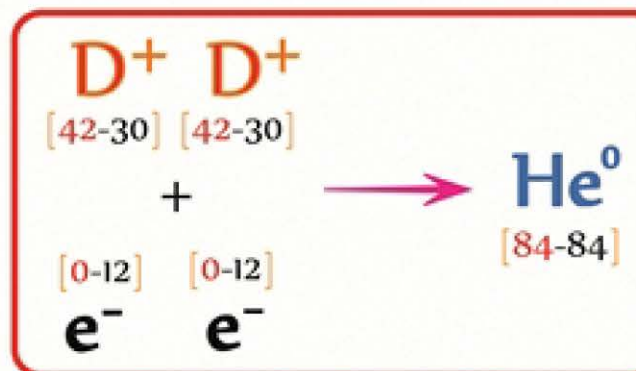
Beta radiation - Negative charge sets (Nuclei)
Gamma radiation - Neutral Charge sets (Photons)

24
[84-60]



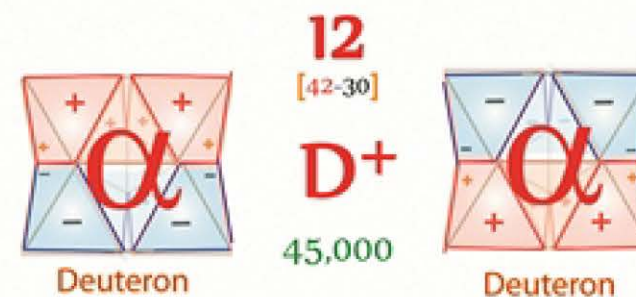
90,000

Helium nuclei creation

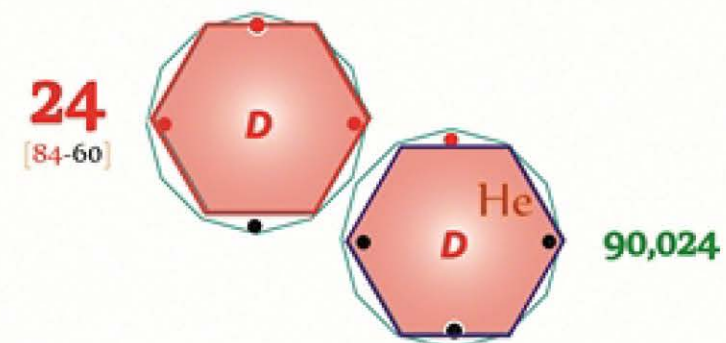


charged alpha nuclei bond & capture electrons to form neutral Helium

alpha particles

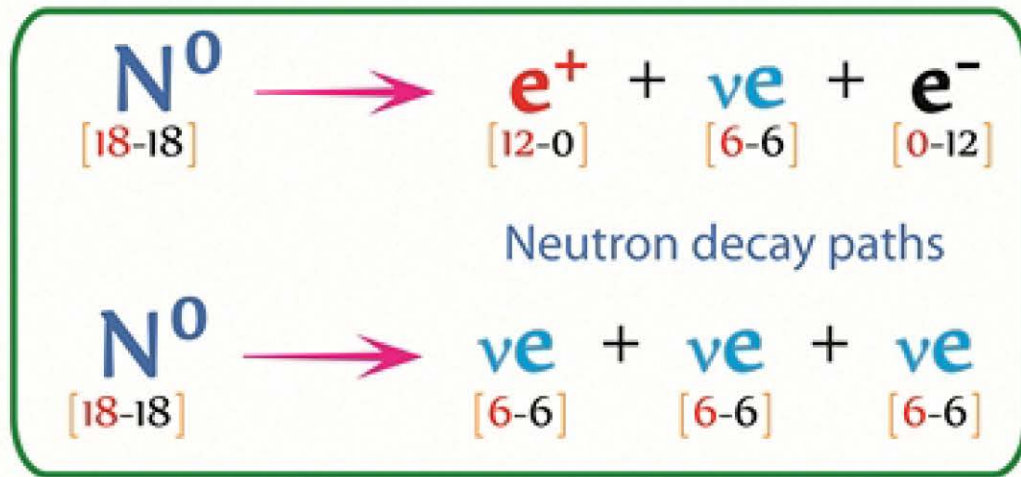


The radioactive isotope Americium 241 emits alpha particles which are used in smoke detectors.

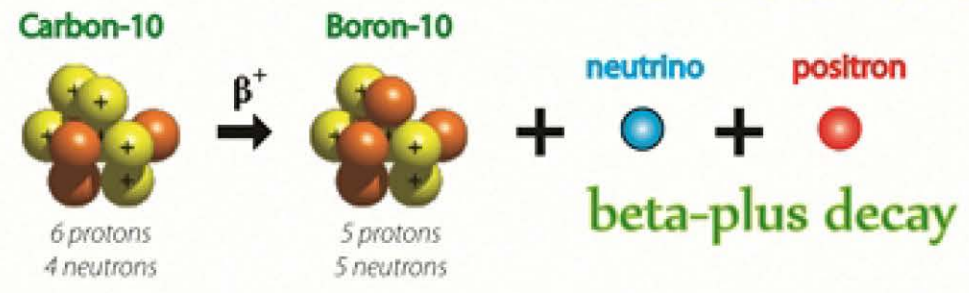
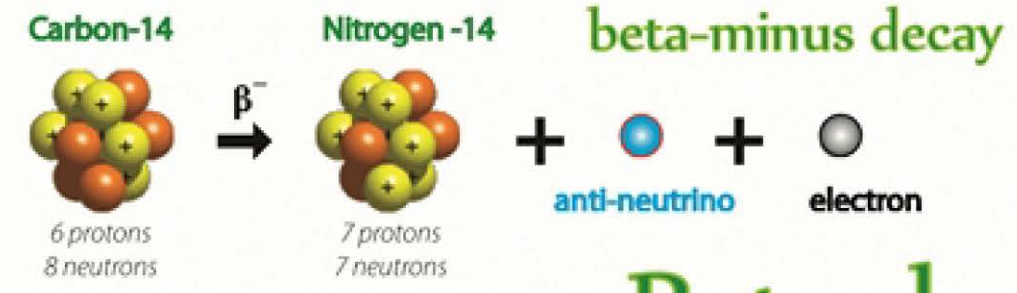


Due to their larger masses compared to beta and gamma particles, alpha particles can be easily stopped by a piece of paper or human skin.

Beta particle decay

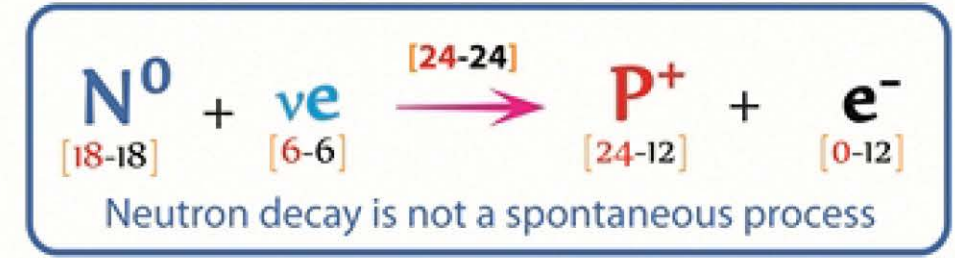


(the emission of leptons from atomic nuclei)

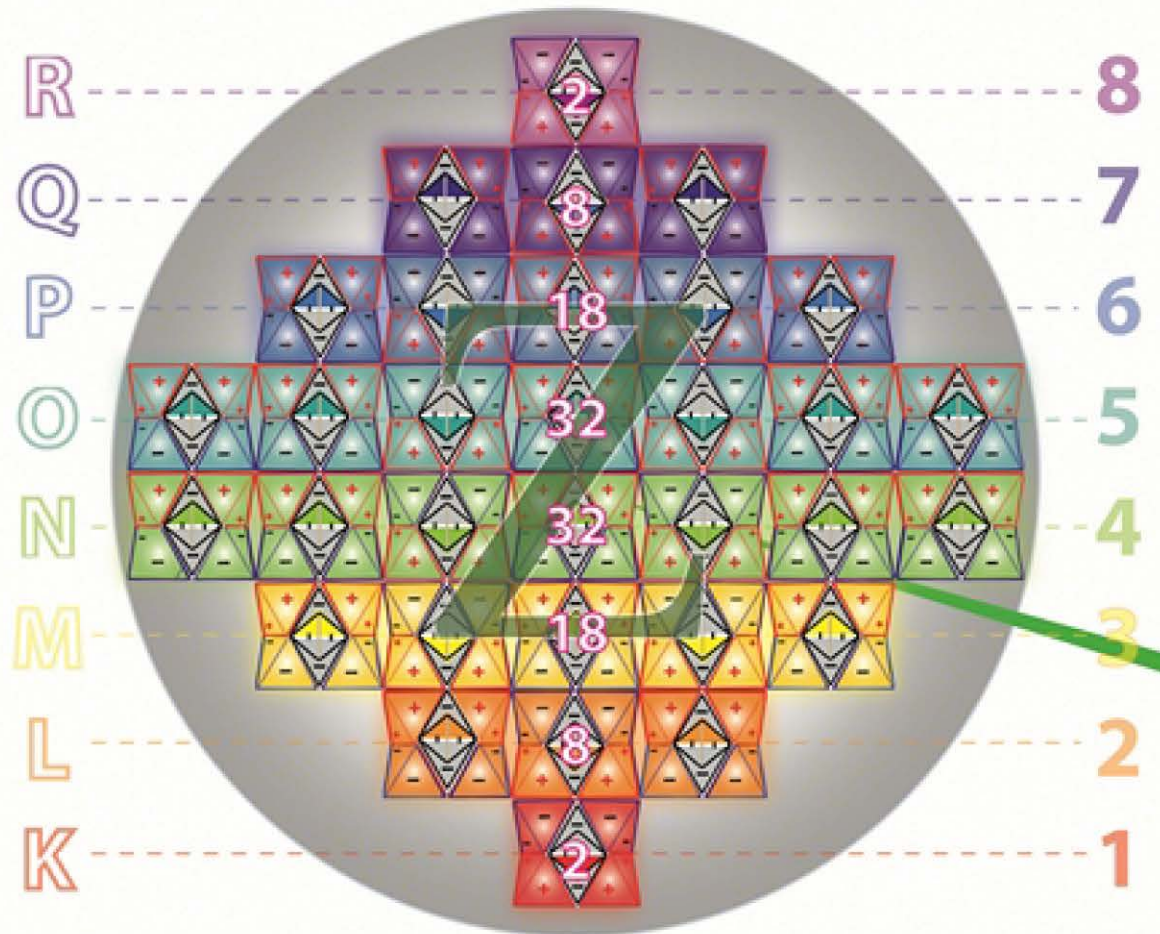


Beta decay

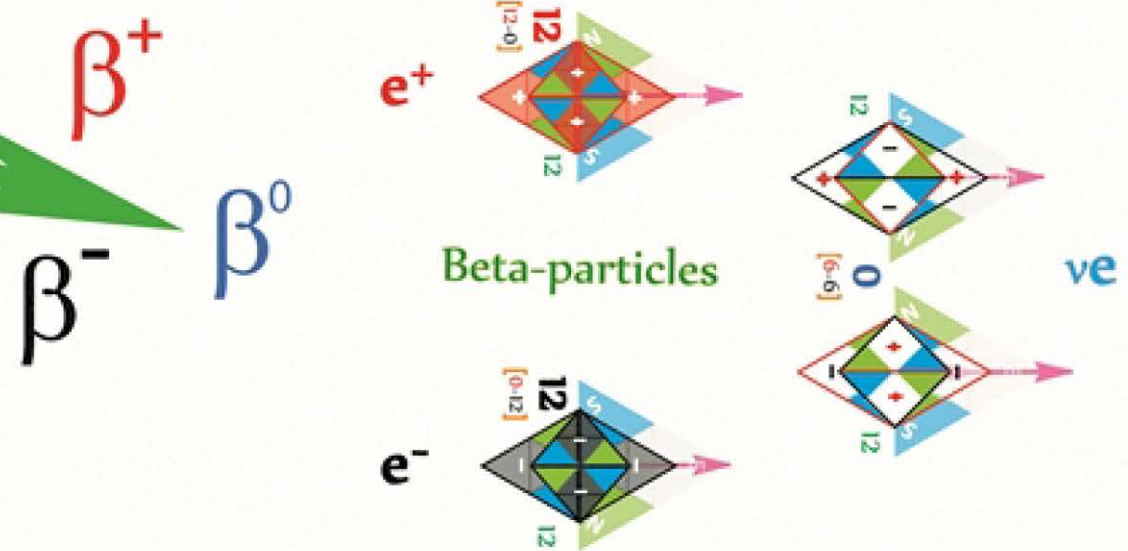
Charge is a conserved physical property of all material objects



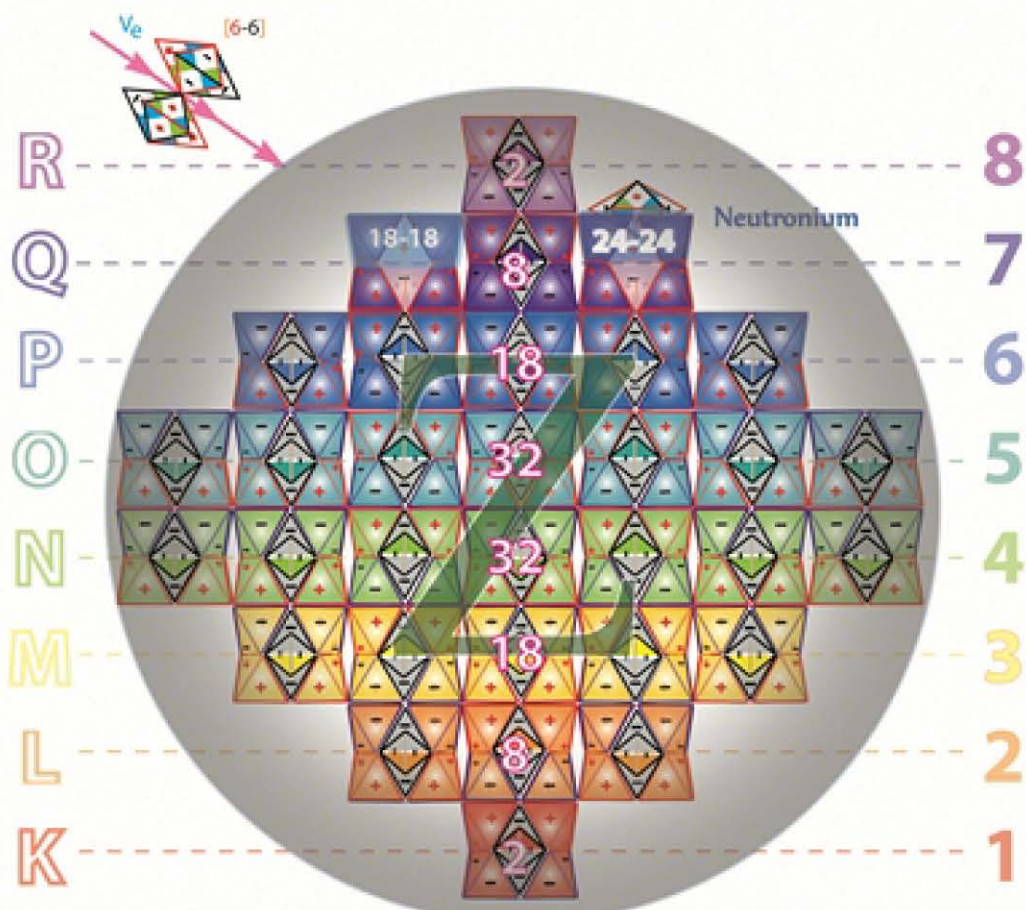
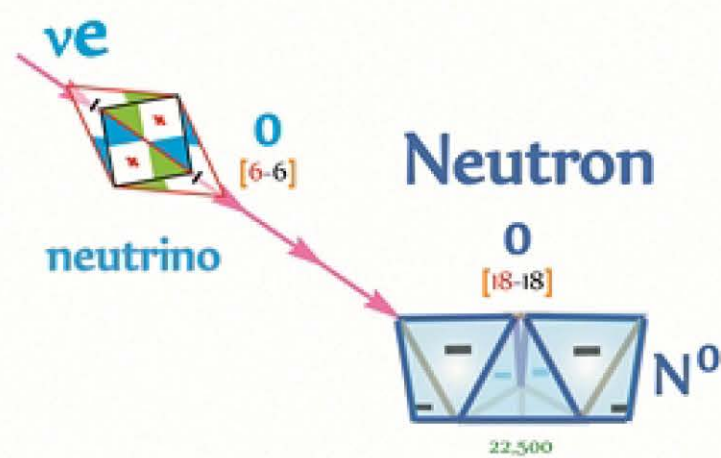
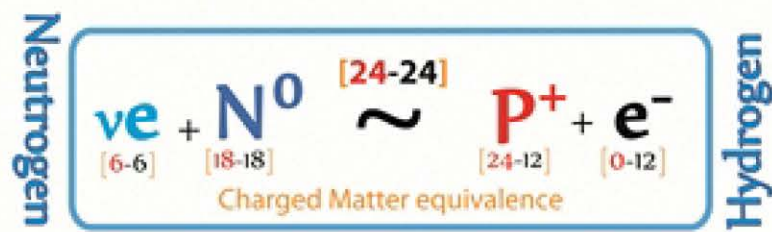
All beta decay processes are the result of neutrino interaction with Neutrons



Alpha radiation - Positive charge particles (Nuclei)
Gamma radiation - Neutral charge quanta (Photons)



neutrino-Neutron Interactions



neutrino capture

Neutron decay is not the spontaneous process hypothesized by modern nuclear physicists

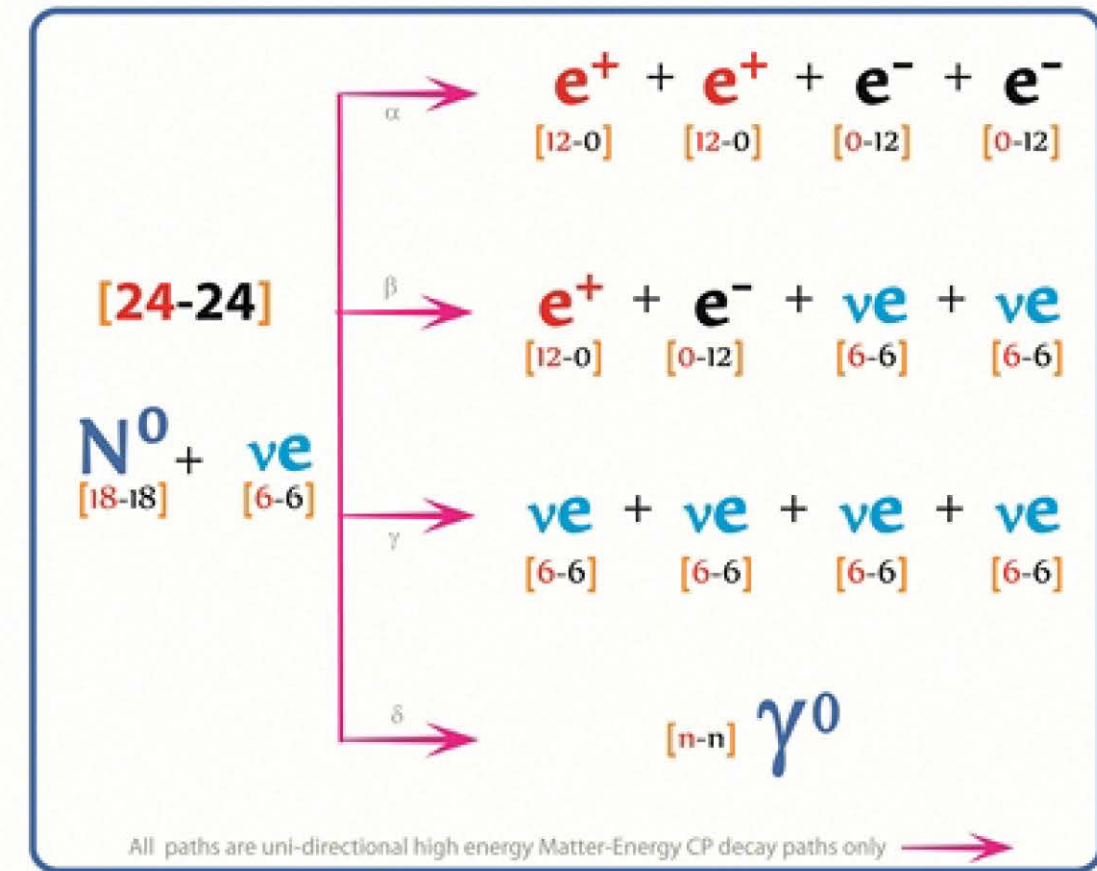
The observed decay products are the result of solar neutrinos interacting with Neutrons (both within nuclei and free)

the neutrinos also have an equally likely probability of interacting with Protons in the nuclei

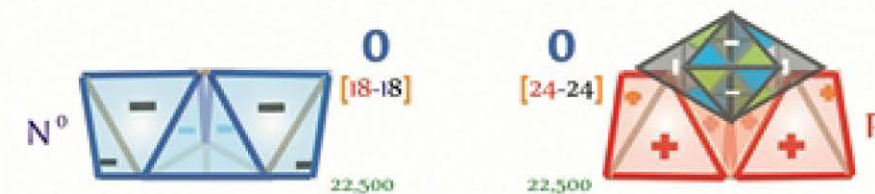
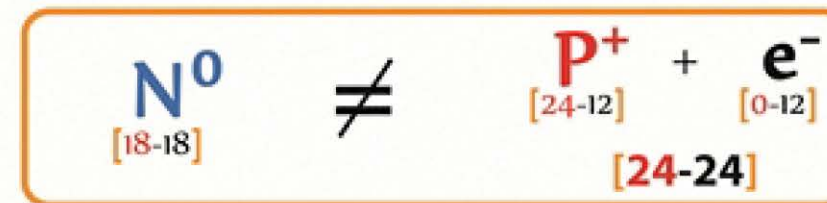
[24-24]
A Neutronium atom has an identical mass-charge quotient to that of Hydrogen **[24-24]**

Neutronium decay processes

A Neutron/neutrino interaction can decay into 4 differing particle sets



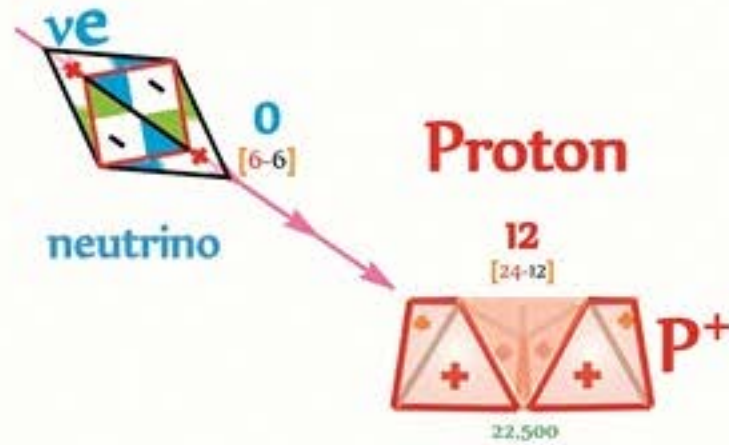
Excluding their nett Charge, Neutrons have neutral particle geometries [18-18] identical to that of a Proton [24-12]



Spontaneous Neutron decay into Proton-electron-neutrinos is not possible without the interaction of Muonic neutrinos (see Tetryonic Charge numbers)

A Neutron is NOT a Proton that has absorbed an electron

neutrino-Proton Interactions



Although very weakly interacting, neutrinos can still be attracted to and bind to Protons via their negative charge fascia

neutrino capture

Neutron decay is not the spontaneous process hypothesized by modern nuclear physicists

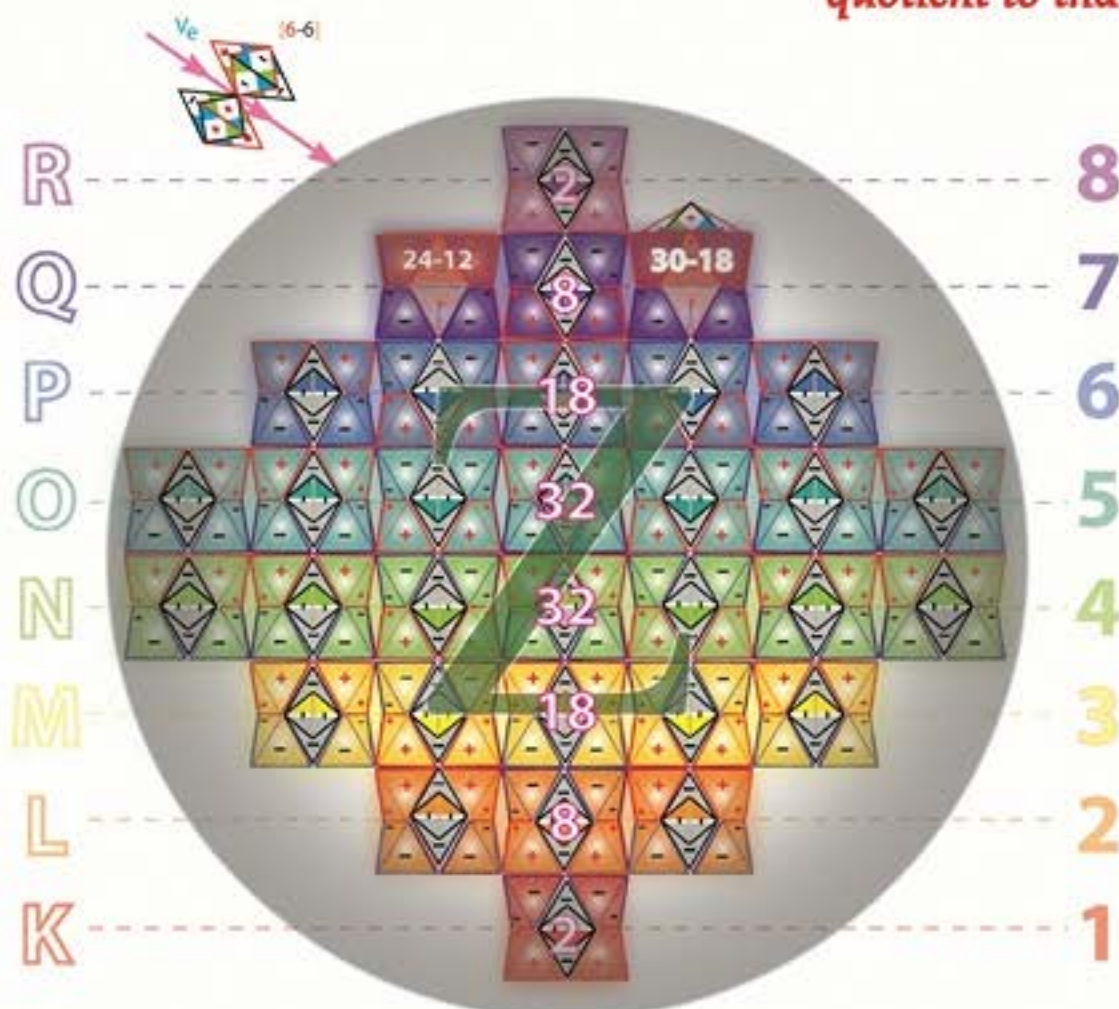
The observed decay products are the result of solar neutrinos interacting with Neutrons (both within nuclei and free)

the neutrinos also have an equally likely probability of interacting with Neutrons in the nuclei

[30-18]

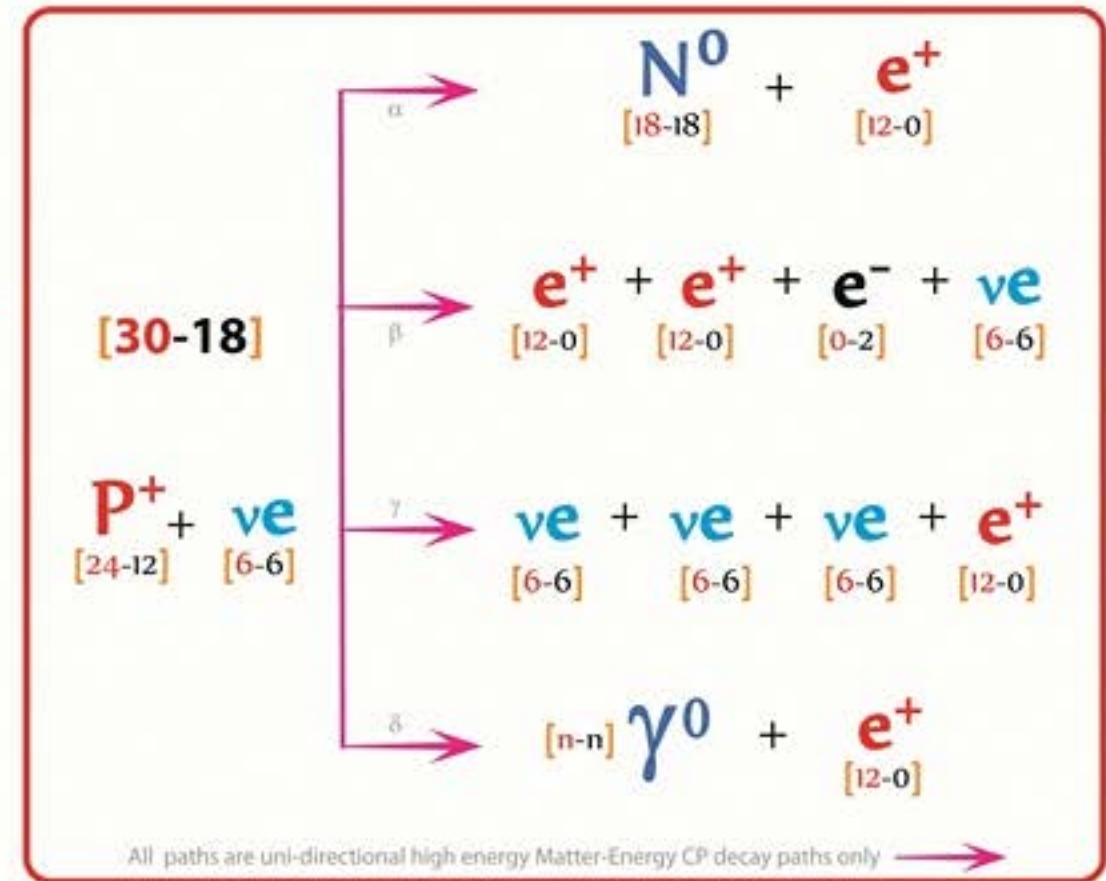
A Proton-neutrino atom would have an identical charge quotient to that of a Proton

[24-12]



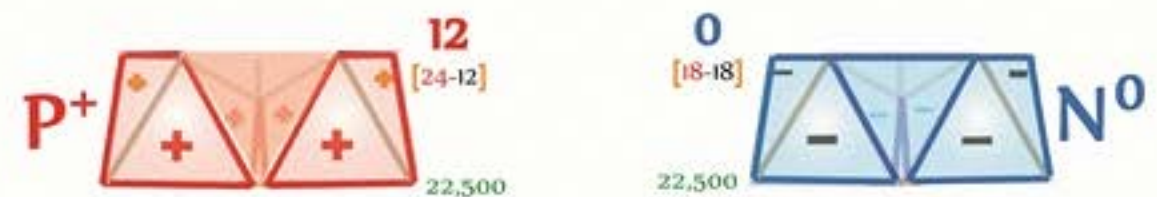
Proton decay paths

A Proton/Neutrino interaction can decay into 4 differing particle sets



If they exist, Proton-neutrino particle couplings would function in a manner identical to that of Proton-electron couplings and could be detected by the anomalous spin measurements that would result

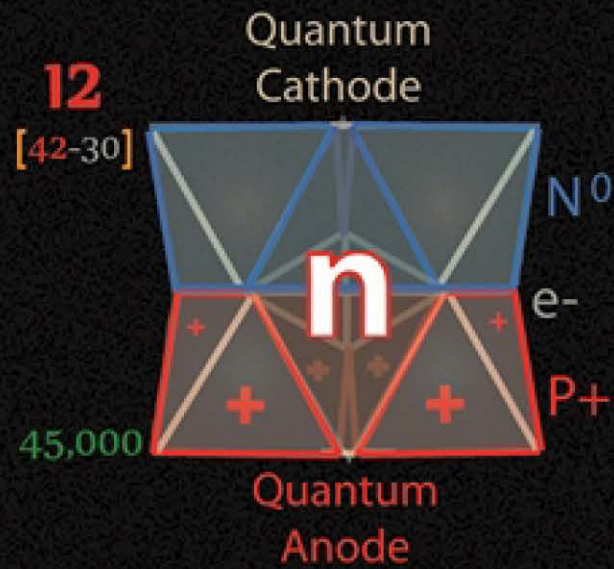
A Proton has a Positive charge geometry [24-12] equivalent to that of a Neutral Neutron [18-18]



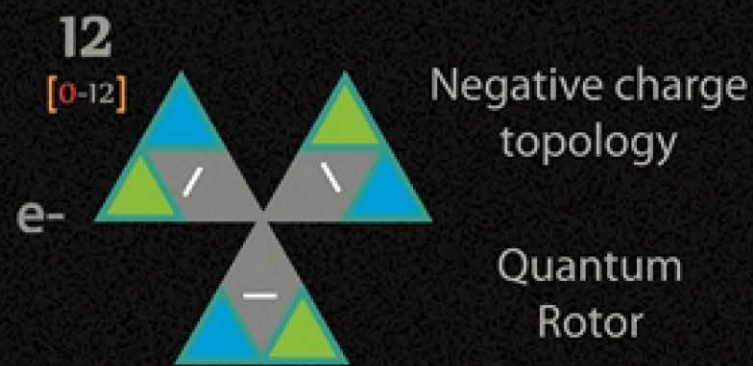
A Proton is topologically identical to a Neutron (differing only in the net charge created)

Quantum Batteries

Atomic nuclei can be easily scaled to non-quantum sizes to offer clean, safe and portable long term Energy storage devices that can store energy indefinitely and release it on demand anywhere in the World

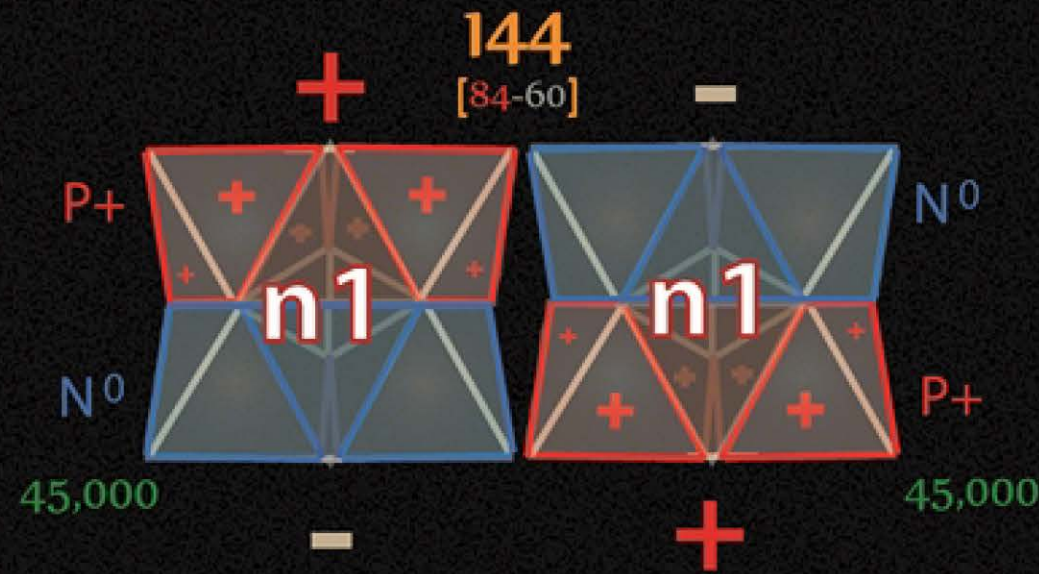


The quantum battery is unique in that in addition to storing energy indefinitely, when an electron binds to the Deuteron nuclei it has the ability to release specific energies [photons] by way of its quantum-scale synchronous converter topologies



12 loop quantum inductive rotor

(Atomic Nuclei)

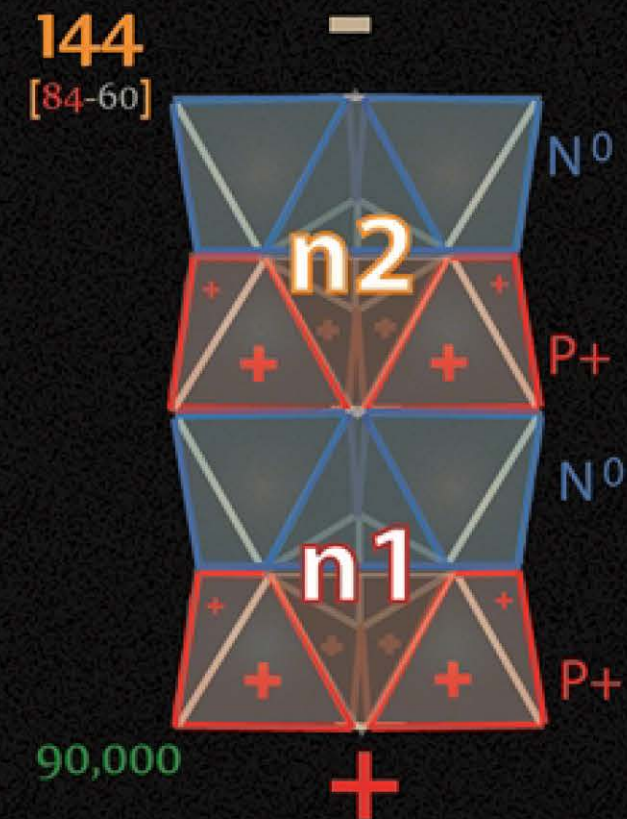


anti-Parallel Configuration



Synchronous quantum converter topologies can be connected in parallel or series to meet varying power requirements anywhere in the World and provides for the safe storage of nuclear energy as mass

Series Configuration

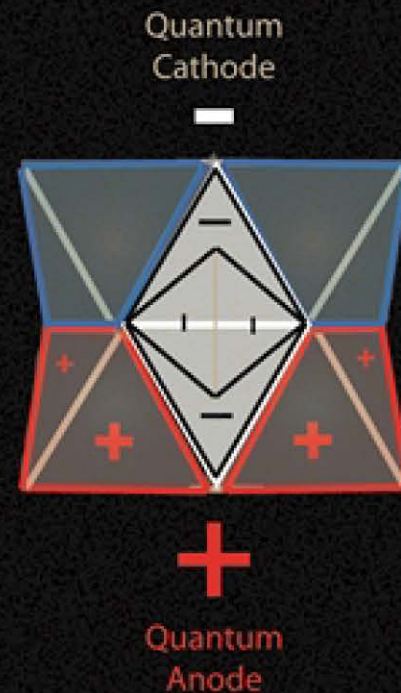


Quantum synchronous Converters

Energy can be stored in macro-scaled quantum converters as mass

The electron has a charged Tetryonic Matter topology that is electrically equivalent to a 6 loop inductive rotor

$$\frac{12\pi}{c^4} \left[\begin{array}{c} \text{Energy} \\ \text{Planck quanta} \\ \text{mass} \quad \text{velocity} \\ \text{momenta} \end{array} \right] \begin{array}{l} n8 \\ n1 \end{array}$$



Matter is radiant EM energy in a standing-waveform

$$\frac{72\pi}{c^4} \left[\begin{array}{c} \text{Energy} \\ \text{Planck quanta} \\ \text{mass} \quad \text{velocity} \\ \text{momenta} \end{array} \right] \begin{array}{l} n32 \\ n25 \end{array}$$



Building on the charged topology of Deuterium nuclei, scaled electromechanical quantum converters can be manufactured to provide efficient electrical mass-energy storage & distribution devices

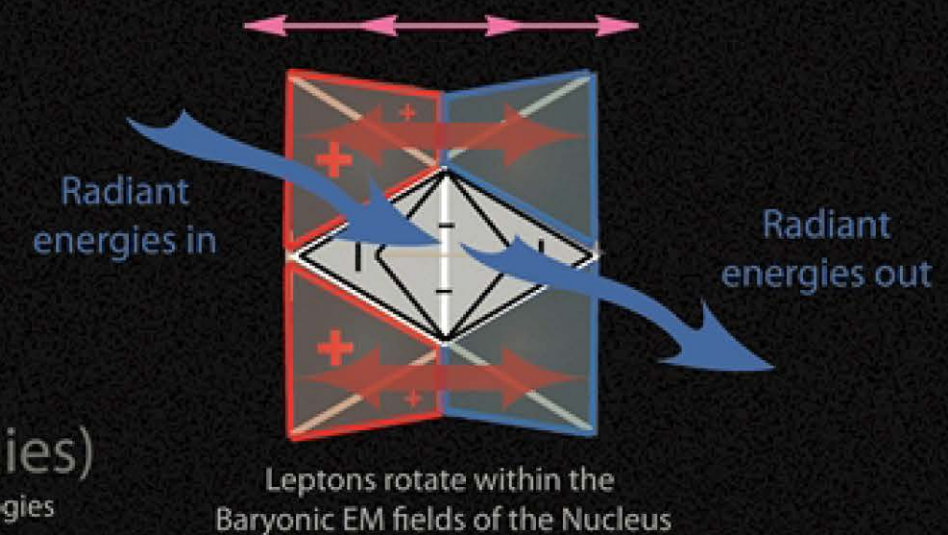
$$\frac{84\pi}{c^4} \left[\begin{array}{c} \text{Energy} \\ \text{Planck quanta} \\ \text{mass} \quad \text{velocity} \\ \text{momenta} \end{array} \right] \begin{array}{l} n32 \\ n25 \end{array}$$

These devices can be transported any where demand requires them worldwide with their energies stored in the form of mass

Negating the need for centralised power stations and distribution lines extending vast distances to provide power to remote communities

A quantum synchronous converter can store and release 3 forms of energy

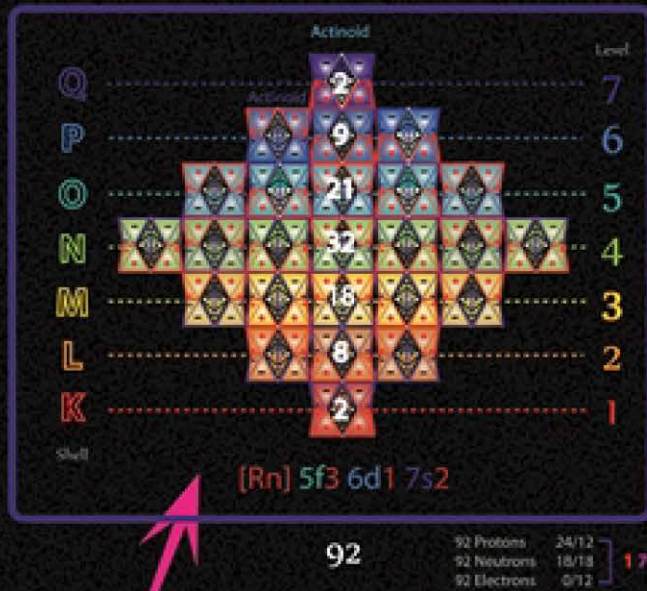
- Angular Momentum** (motional energy)
square root linear momentum
- Radiant Energy** (emission/absorption)
of photon/boson mass-energy geometries
- EM mass-Matter** (stored masses in Matter topologies)
radiant EM mass-energies stored in standing wave Matter topologies



Nuclear Fission

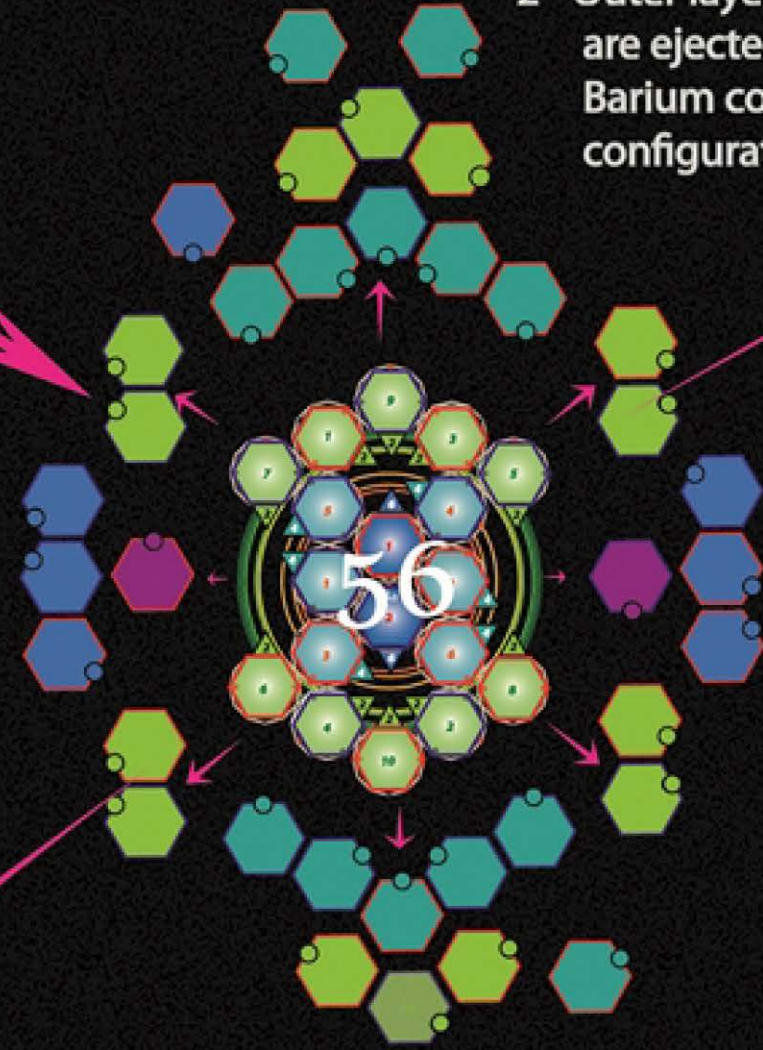
Fission is a currently known source of nuclear energy for human consumption with an efficiency of less than 1%

Its energy output can be easily exceeded with cold fission & EM pinch technologies without any of the harmful nuclear by-products

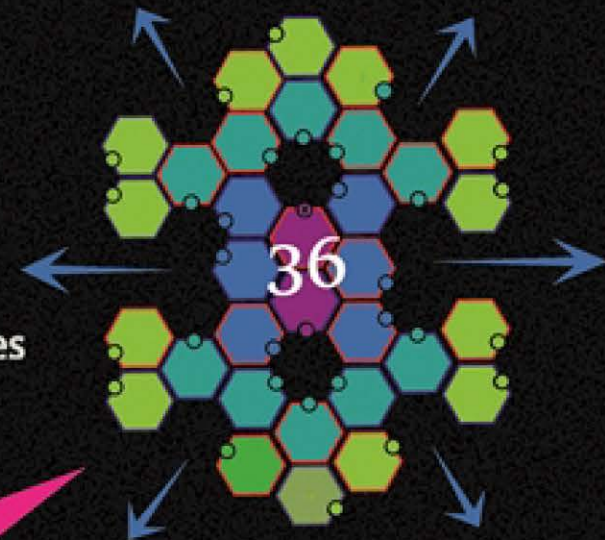


Uranium

1 - A Slow Neutron with $>0.4\text{eV}$ of [K]EM energy interacts with a unstable Uranium nuclei raising its quantum levels

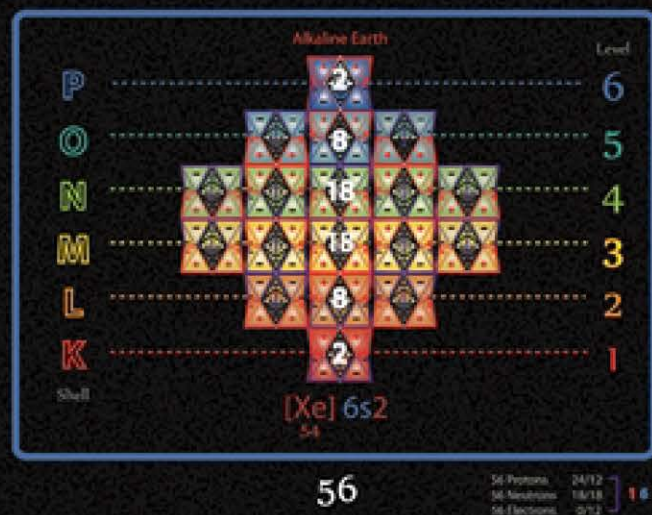


2 - Outer layer of alpha particles are ejected from inner Barium core electron configuration



3 - Remaining Bayonic cloud releases excess energy and recombines to form Nuclei

4 - Barium cores and recombined Krypton cores form Decay products



Barium

Energy Released

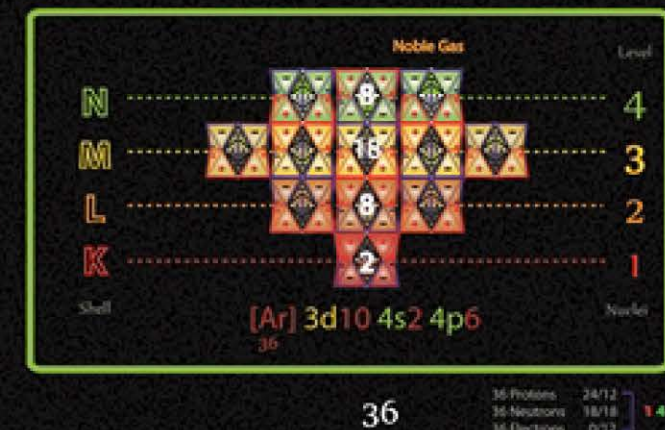
U Ba Kr

[1,079,424] - [534,240 + 255,744]

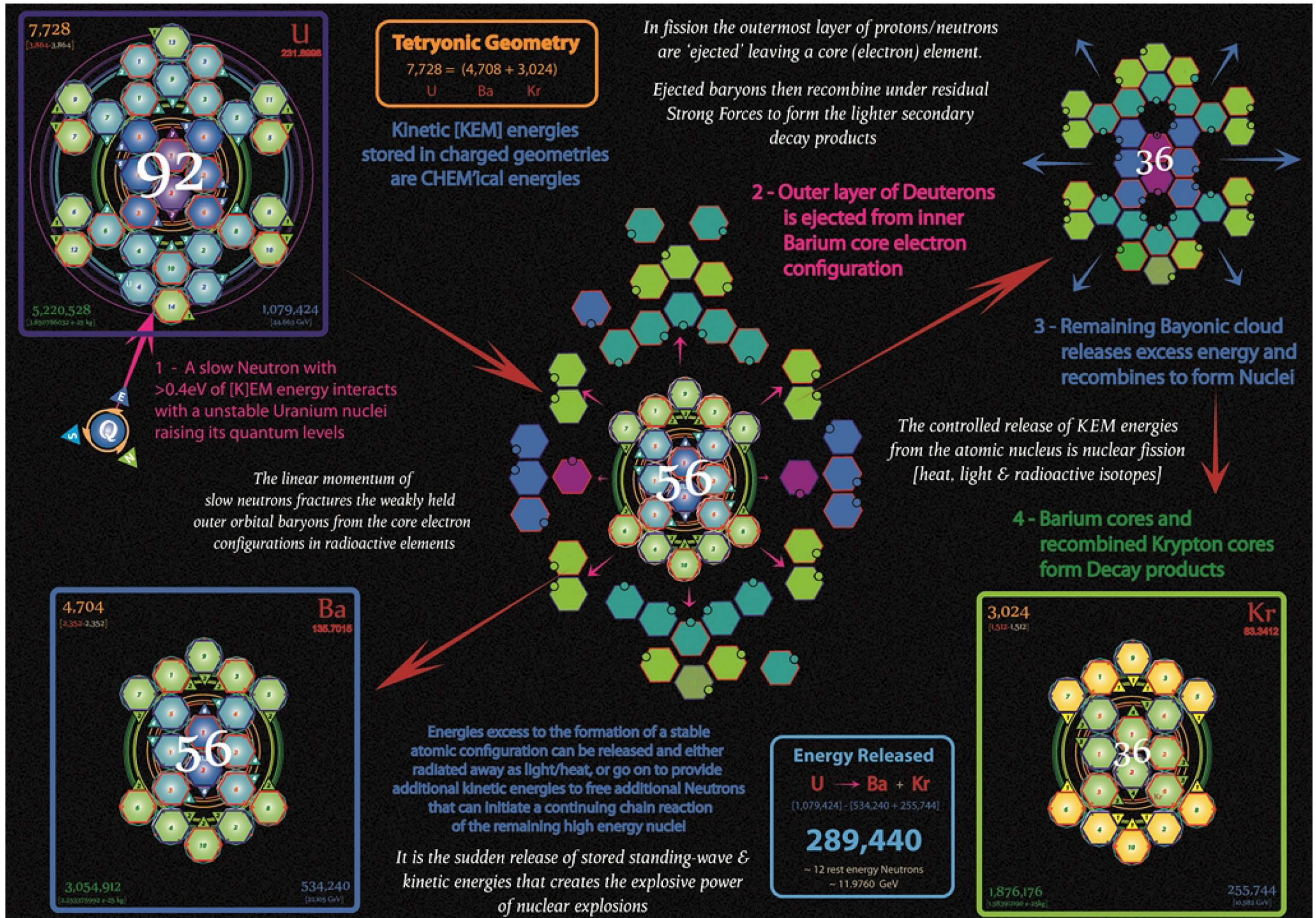
289,440

~ 12 rest energy Neutrons

~ 11.9760 GeV



Krypton



Tetryonics 60.13 - Nuclear Fission process



The production of light as a result of the passing of sound waves through a liquid medium.

The sound waves cause the formation of bubbles that emit bright flashes of light when they collapse.

Sonoluminescence

Sonoluminescence is the first hint at the energies that can be released from Tetryonic collapse and involves the emission of short bursts of light from imploding bubbles in a liquid when excited by sound.

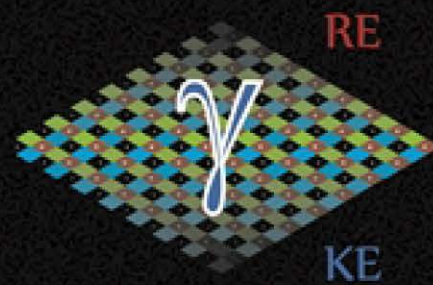
It is a key step on the road to realising technologies that can provide Humanity with clean, safe, efficient Energy production through the conversion of Matter into various forms of EM radiation

Sonoluminescence is the result of energy releases from the collapse of standing-wave Matter topologies within Fluids

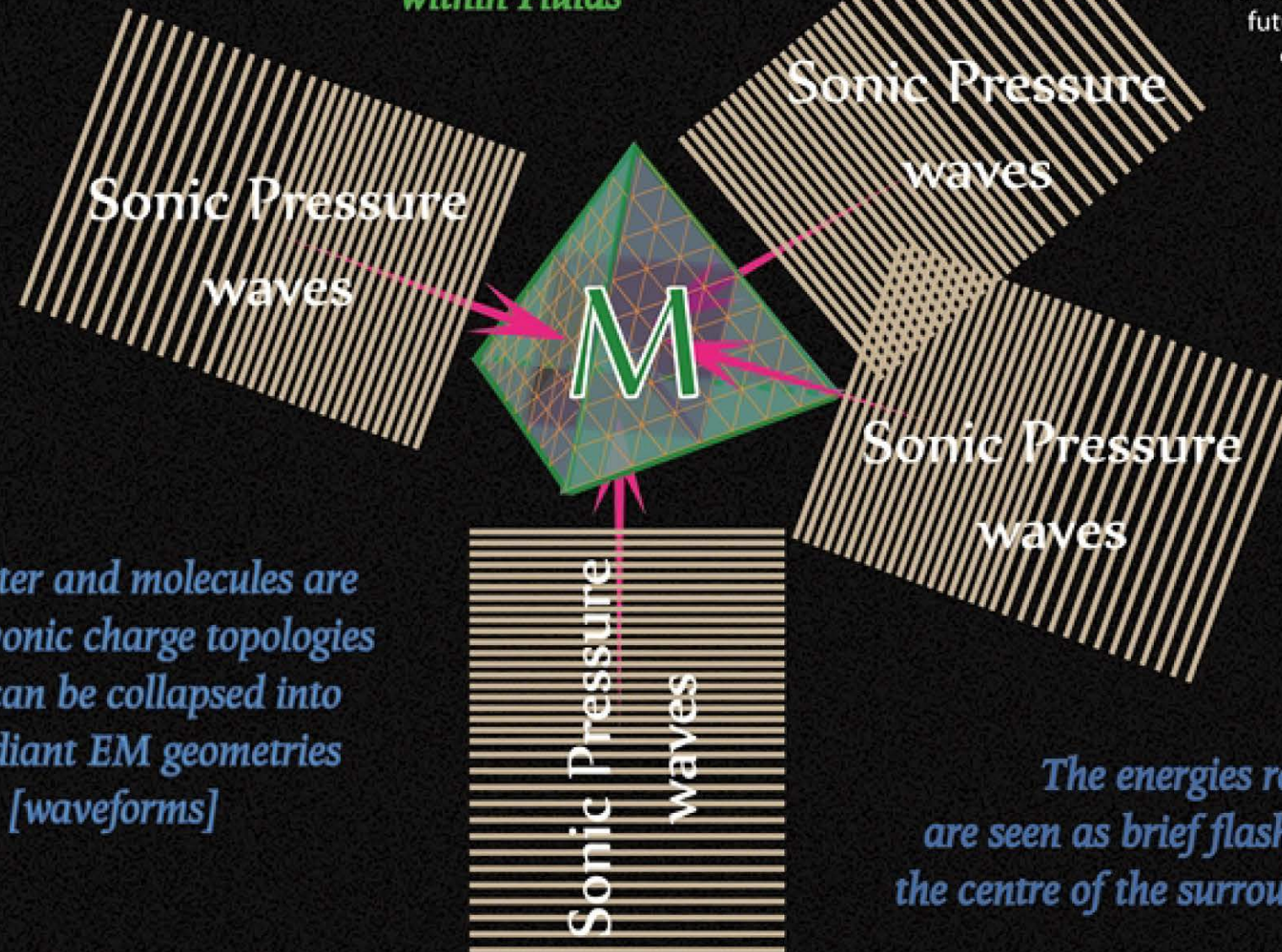
Finding an efficient means of inducing and managing a controlled reaction where 3D Matter topologies are converted into 2D radiant energy is a key step on the path to creating a future energy source of all Humanity



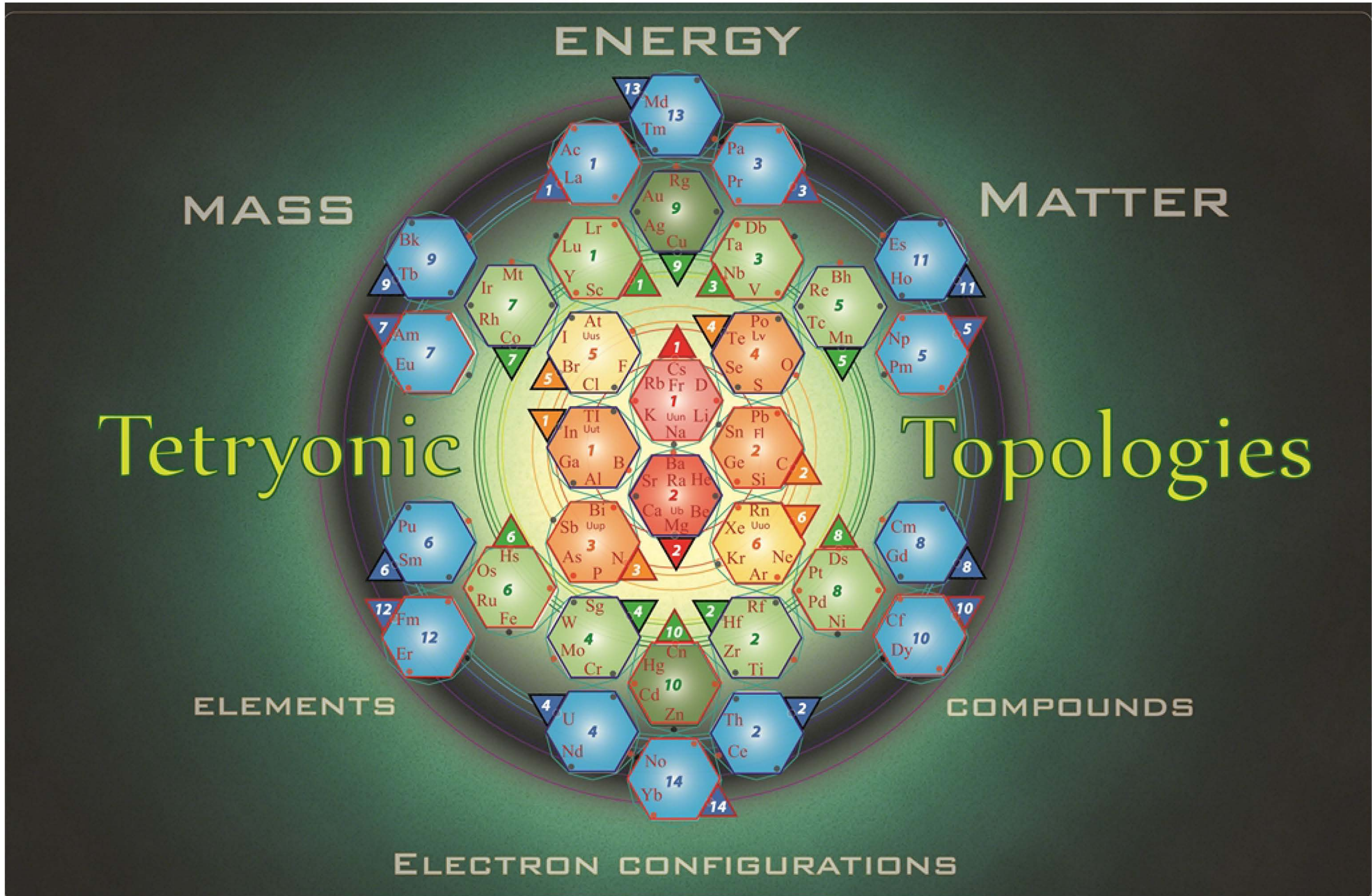
The gauge transformation of Matter into EM radiation is the most efficient form of energy release available to us



All Matter and molecules are 3D Tetryonic charge topologies which can be collapsed into 2D radiant EM geometries [waveforms]

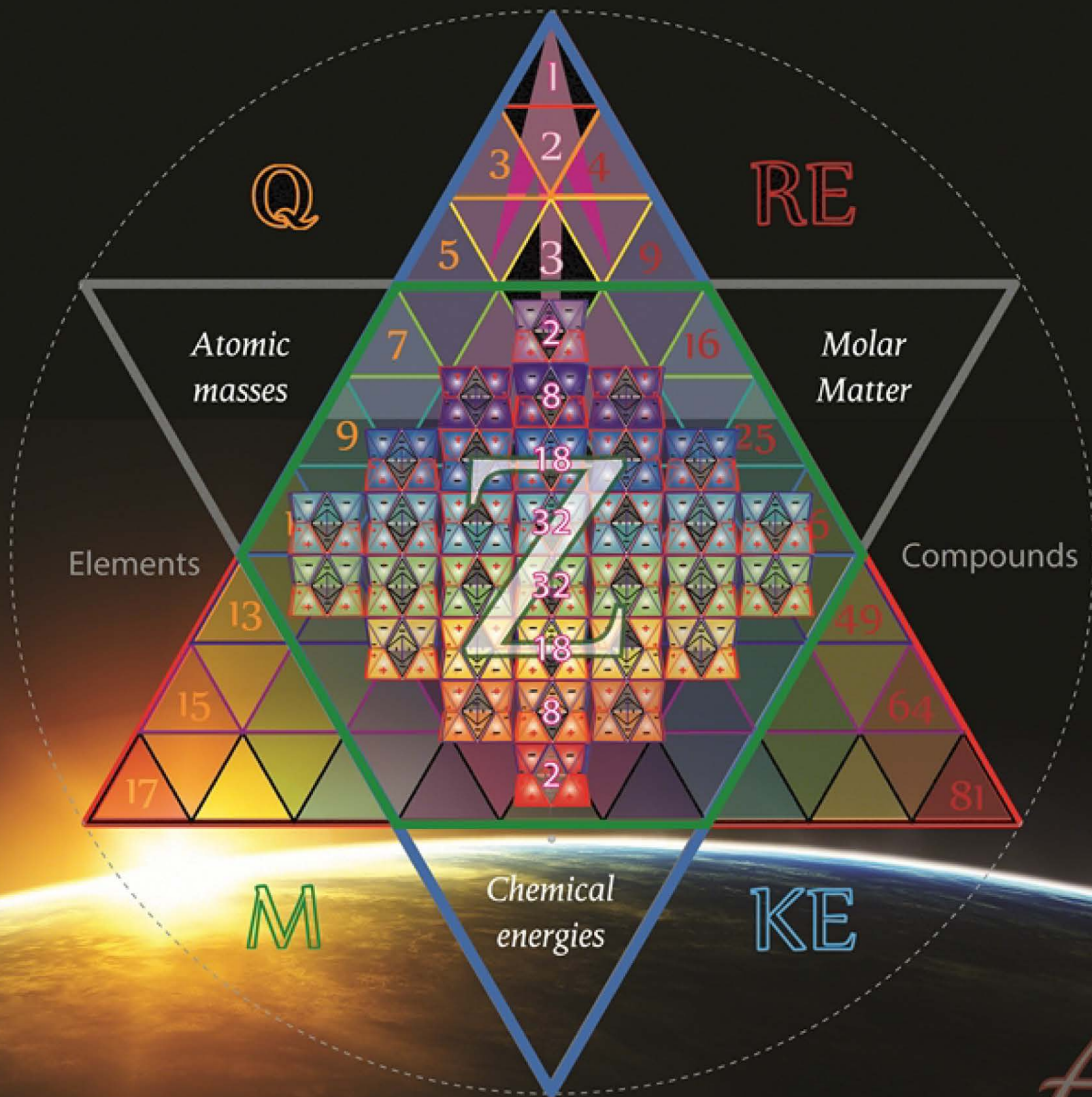


The energies released are seen as brief flashes of light at the centre of the surrounding medium



Tetryonic Chemistry

The charged topology of periodic and compound Matter



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[Second Edition © 2012]

Abraham