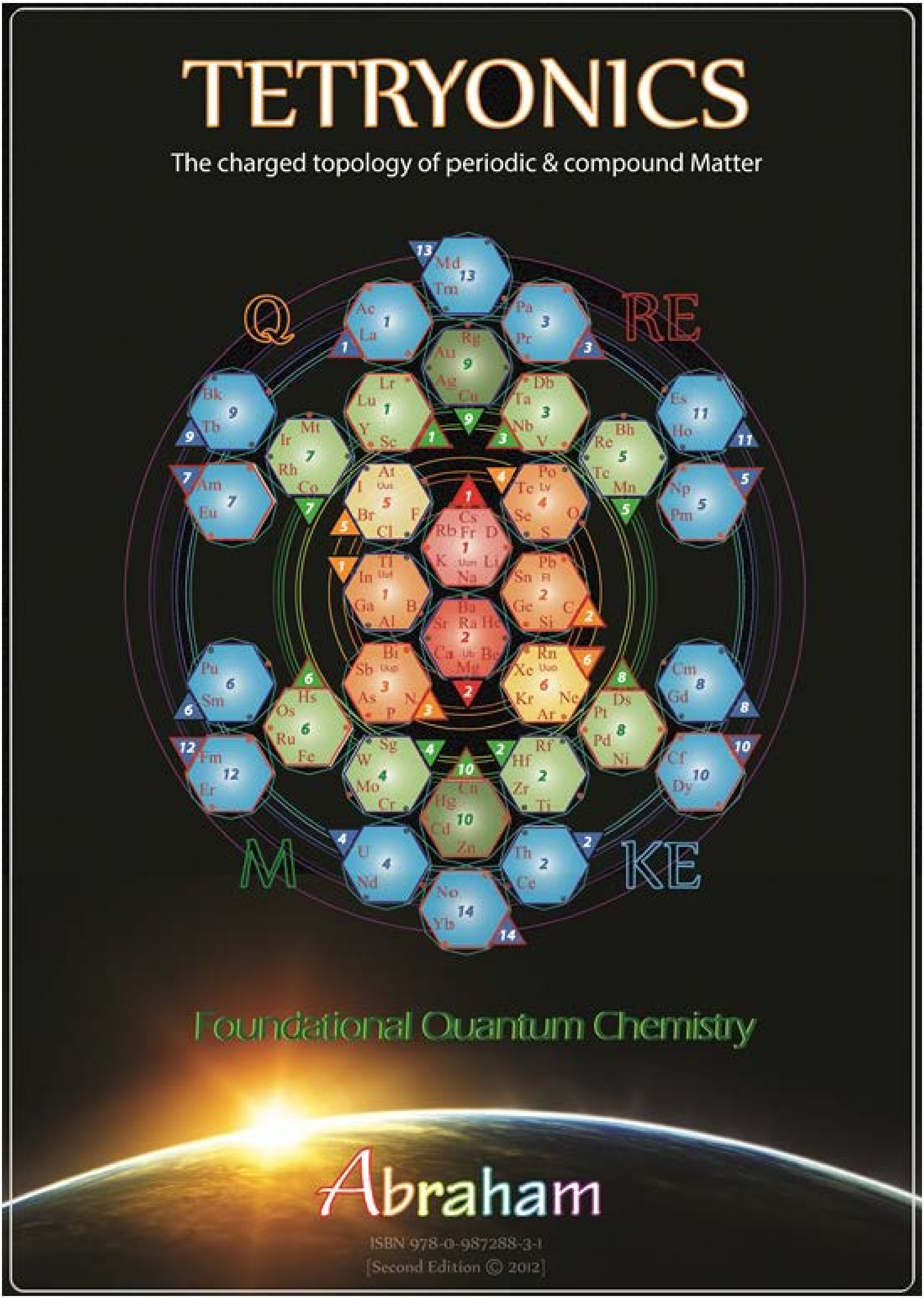
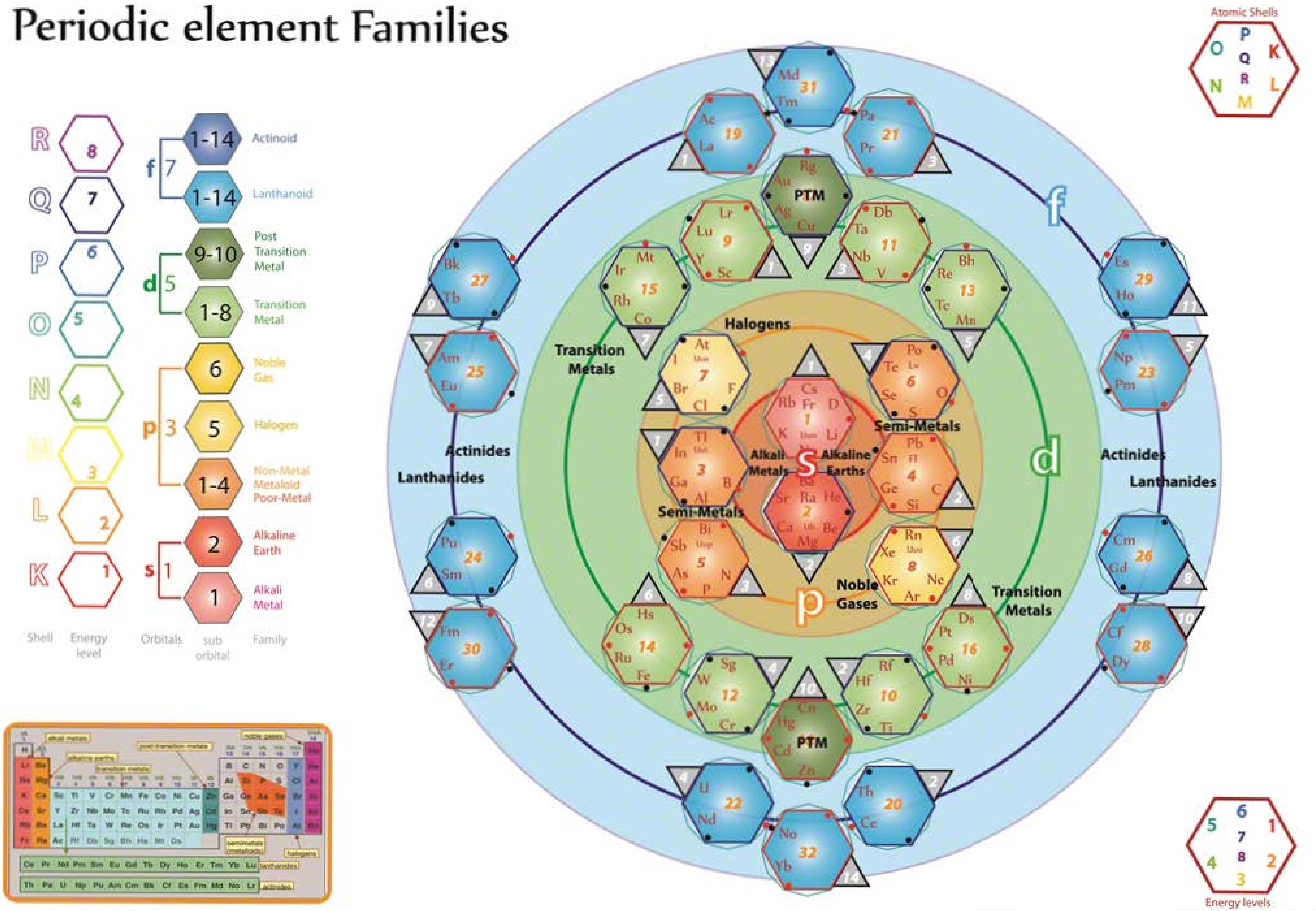
Copyright ABRAHAM [2008] - All rights reserved



Periodic element Families

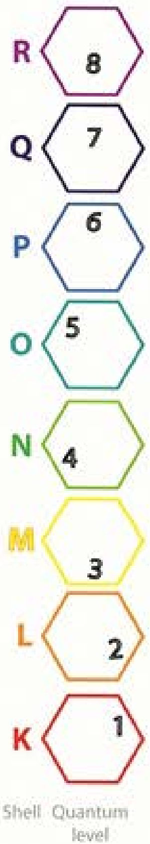


Copyright ABRAHAM [2008] - All rights reserved

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.

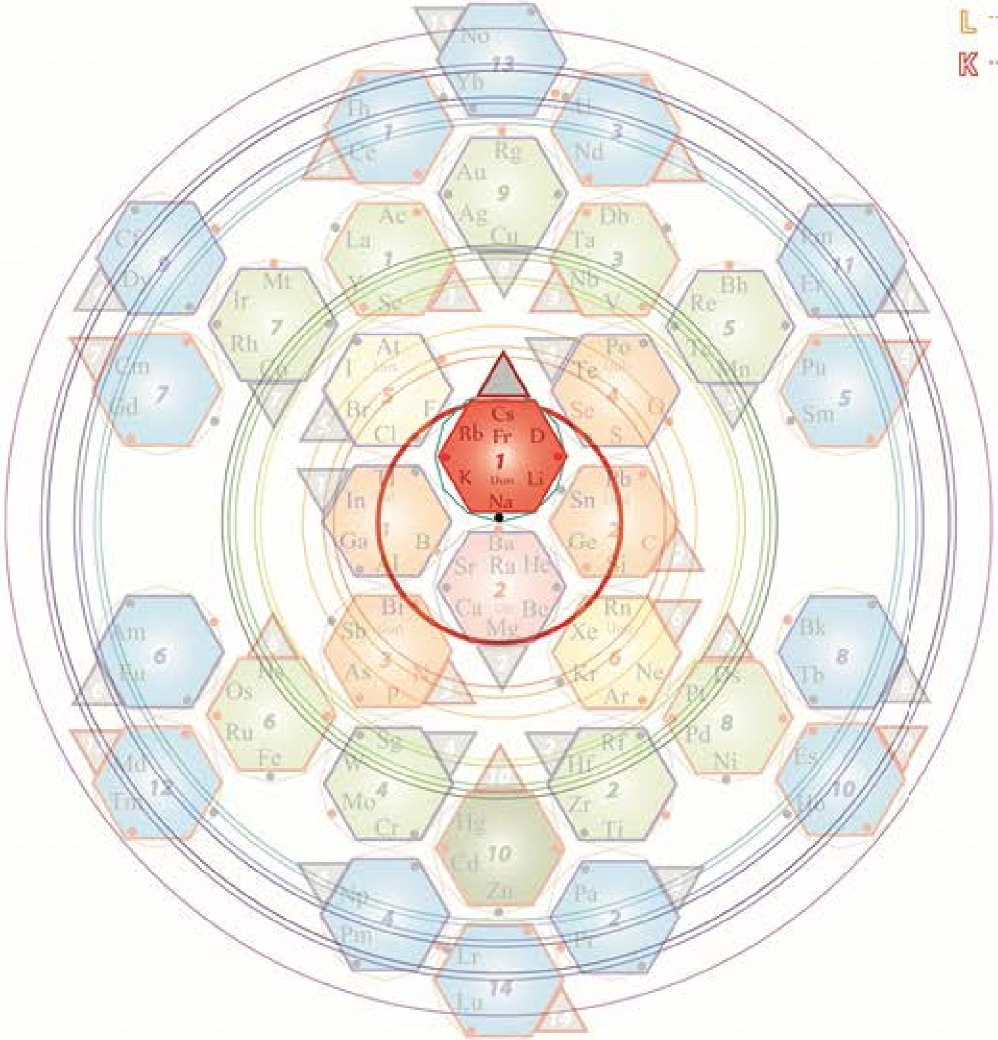
These elements all have one electron in their outermost shell, so the energetically preferred state of achieving a filled electron shell is to lose one electron to form a singly charged positive ion.



s Orbital

n1-8

s1 sub-orbital



8 Alkaline Metals

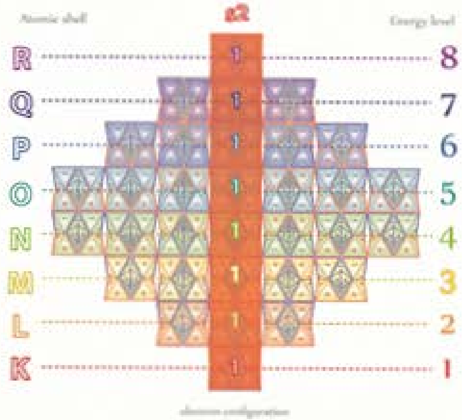
The alkali metals are all highly reactive and are never found in elemental form in nature.

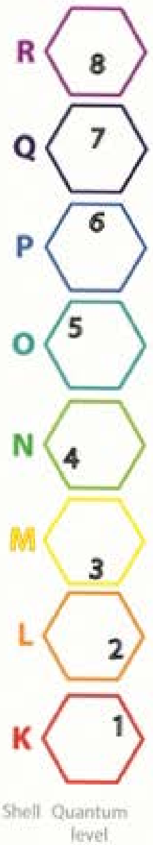
As a result, in the laboratory they are stored under mineral oil. They also tarnish easily and have low melting points and densities. Potassium and rubidium possess a weak radioactive characteristic (harmless) due to the presence of long duration radioactive isotopes.

Copyright ABRAHAM [2008] - All rights reserved

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.

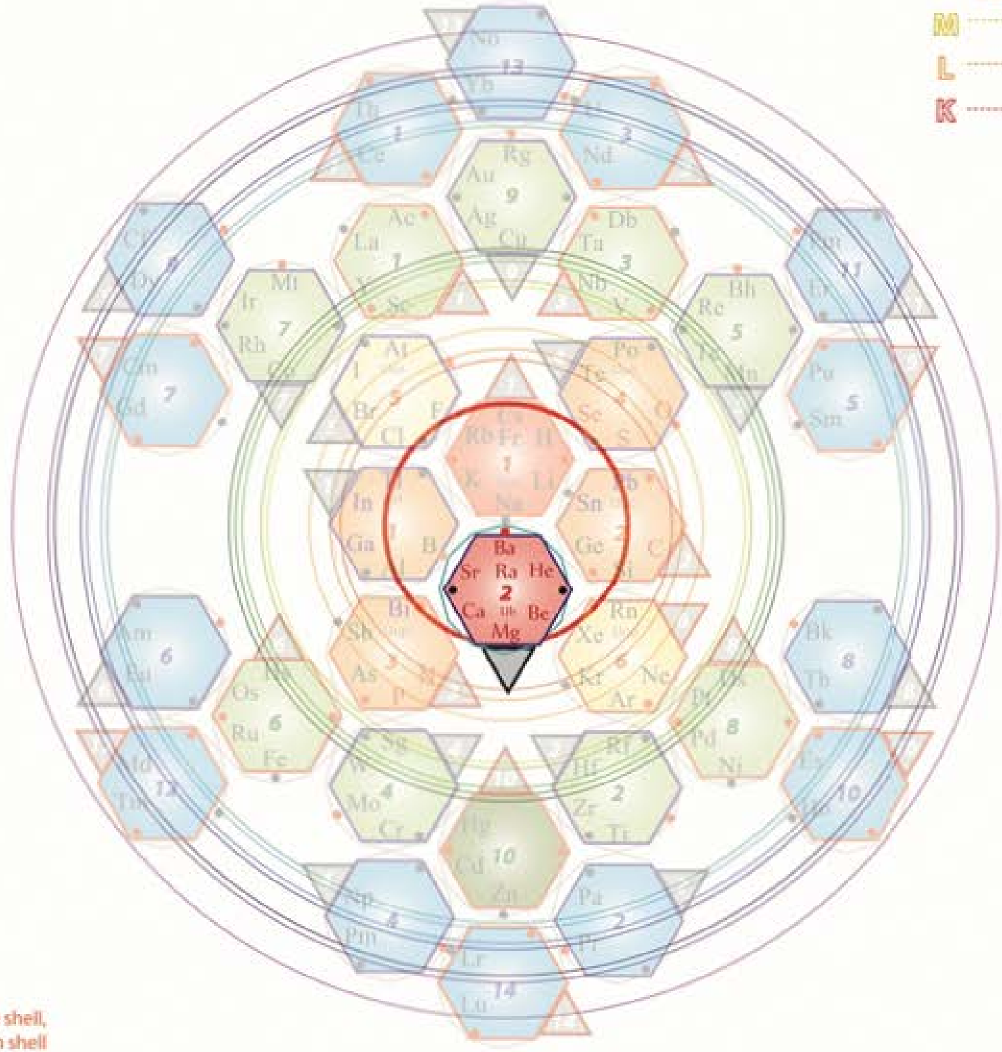




s Orbital

n1-8

s2 sub-orbital



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.

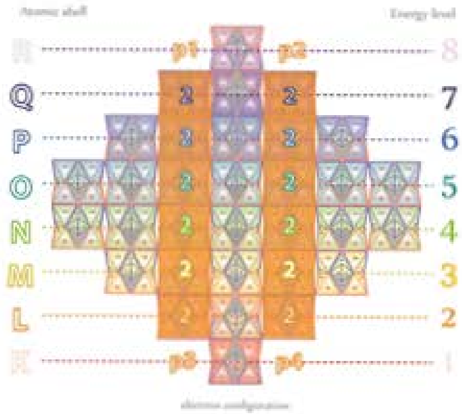
Copyright ABRAHAM [2008] - All rights reserved

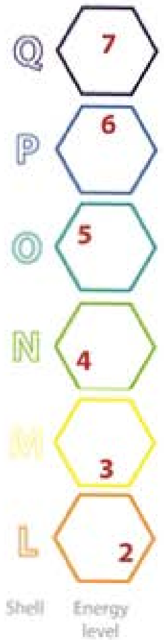
Metalloids

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

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

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

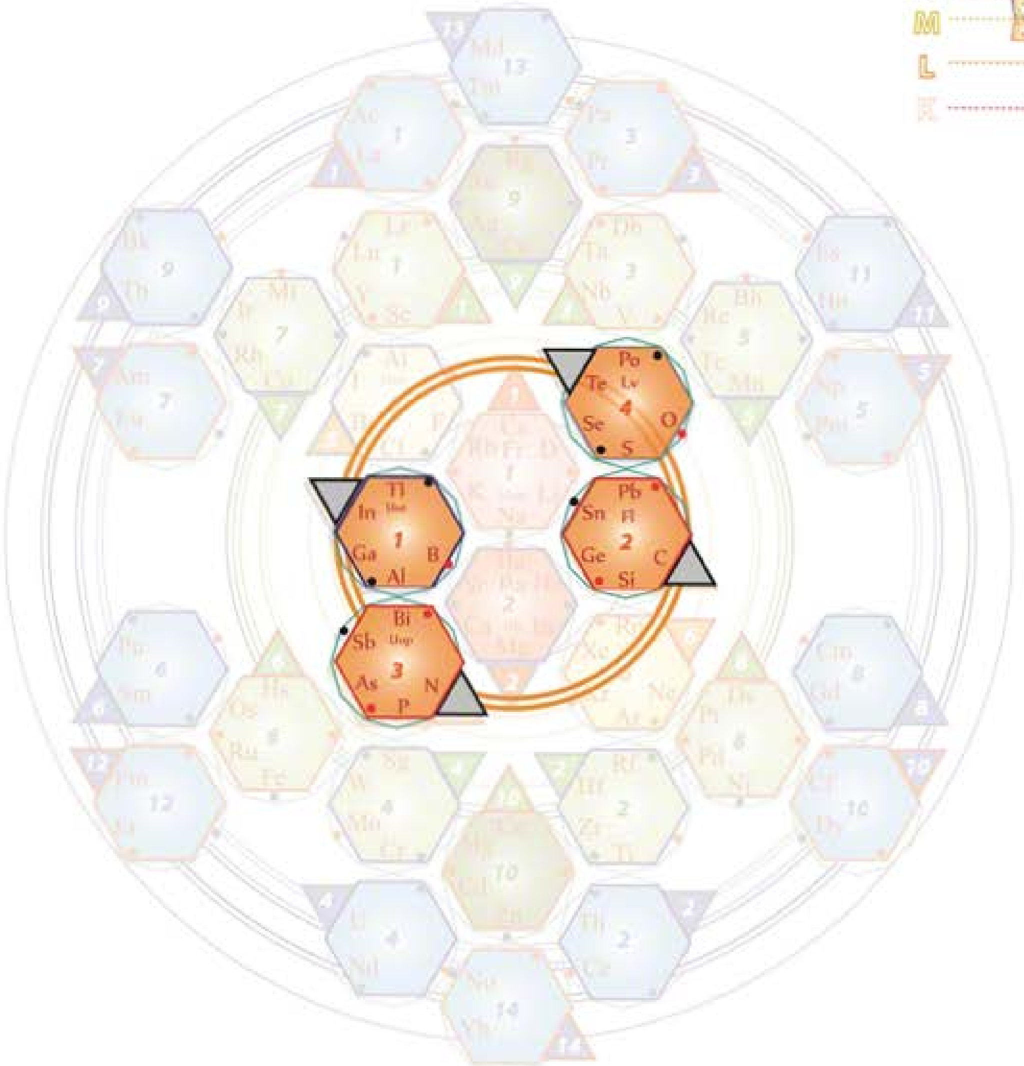




2 p-Orbitals

n2-7

p1-4 sub-orbitals



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 metaloids are partway between those of metals and semiconductors.

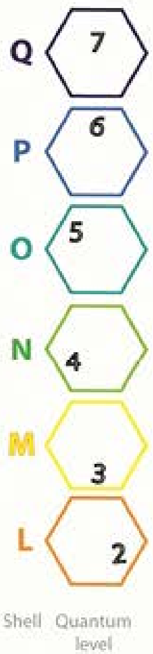
Copyright ABRAHAM [2008] - All rights reserved

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 (IO3−) can be found in many minerals and in seawater.

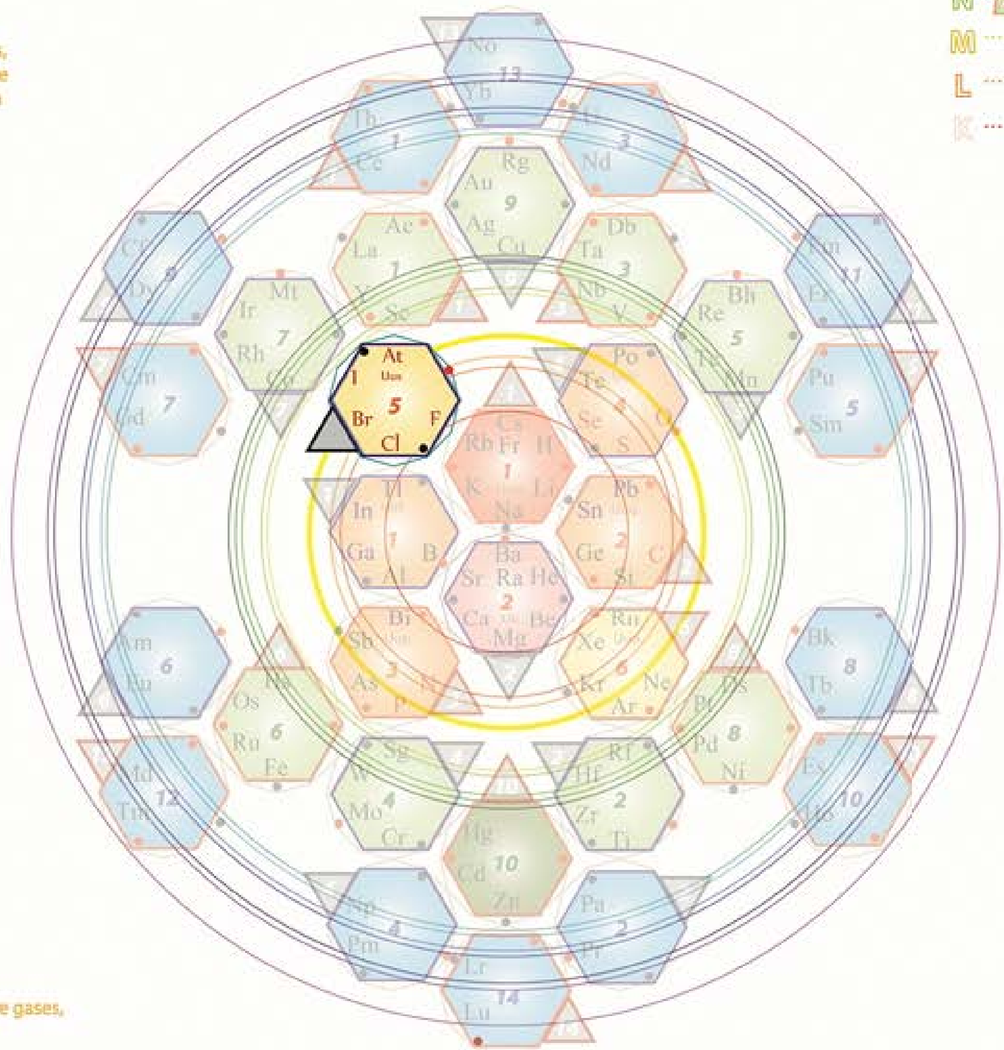
Halogenated organic compounds can also be found as natural products in living organisms. In their elemental forms, the halogens exist as diatomic molecules, but these only have a fleeting existence in nature and are much more common in the laboratory and in industry.



p3 Orbital

n2-7

p5 sub-orbital



6 Halogens

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

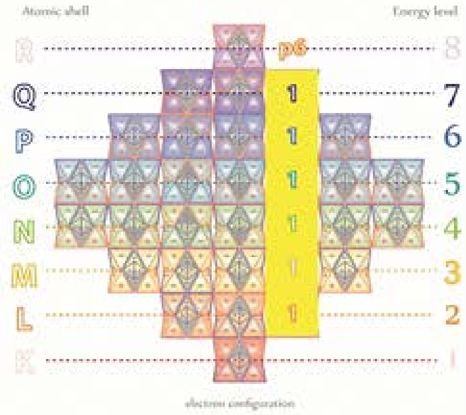
Group 17 is therefore the only periodic table group exhibiting all three states of matter at room temperature

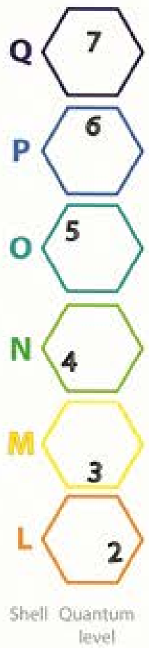
Copyright ABRAHAM [2008] - All rights reserved

Nobel Gases

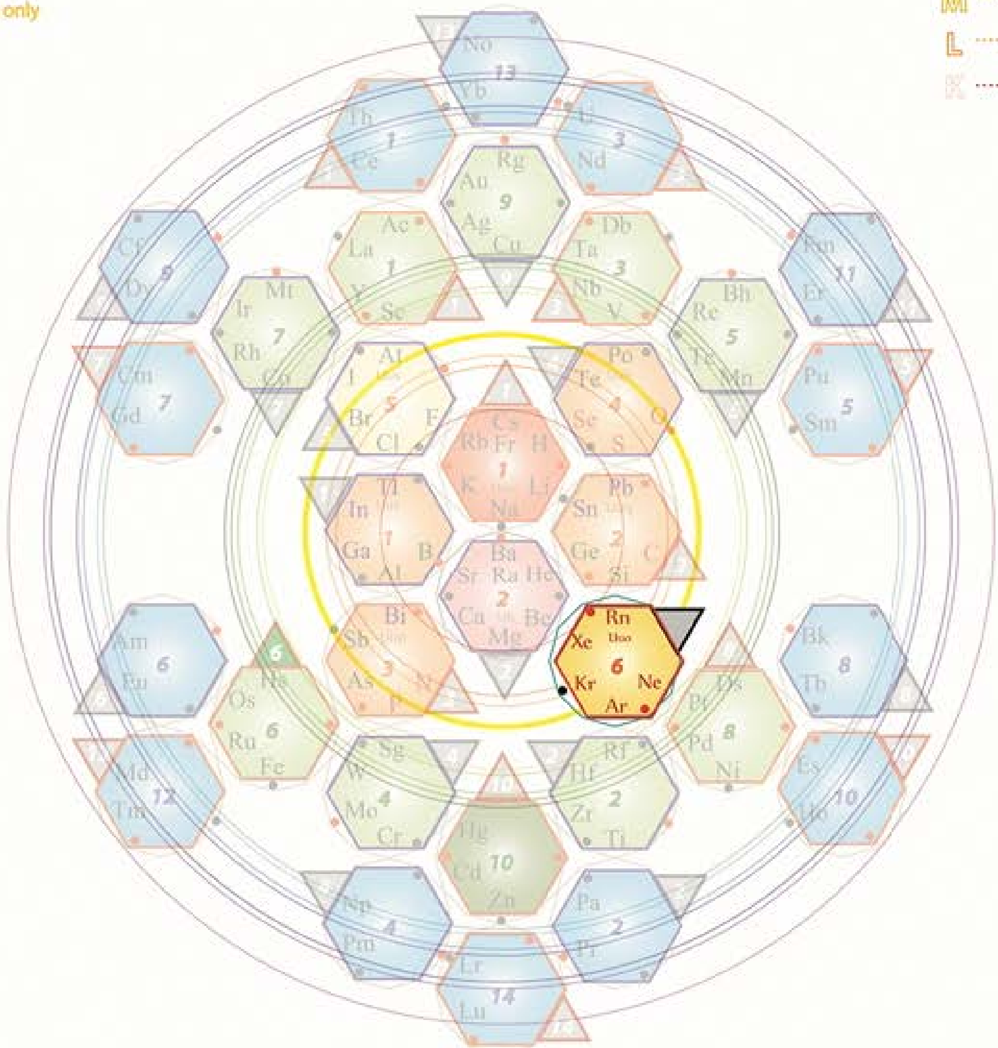
The properties of the noble gases can be well explained by modern theories of atomic structure: their outer shell of valence electrons is considered to be "full", giving them little tendency to participate in chemical reactions, and only a few hundred noble gas compounds have been prepared.

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.





completed
p3 Orbital
n2-7
p6 sub-orbital



6
Nobel Gases

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.

Copyright ABRAHAM [2008] - All rights reserved

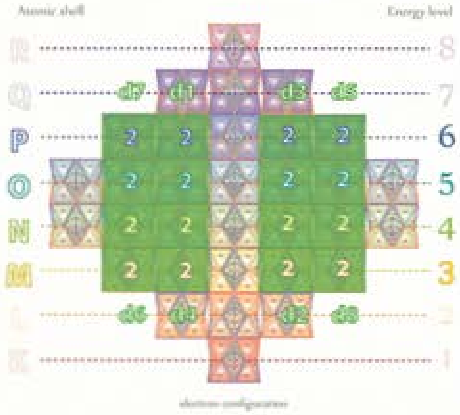
Transitional Metals

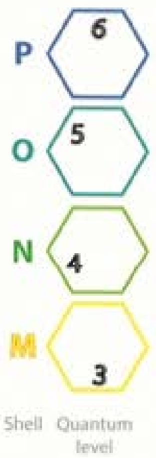
In chemistry, the term transition metal commonly refers to any element in the d-block of the periodic table, including the group 12 elements zinc, cadmium and mercury.

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.

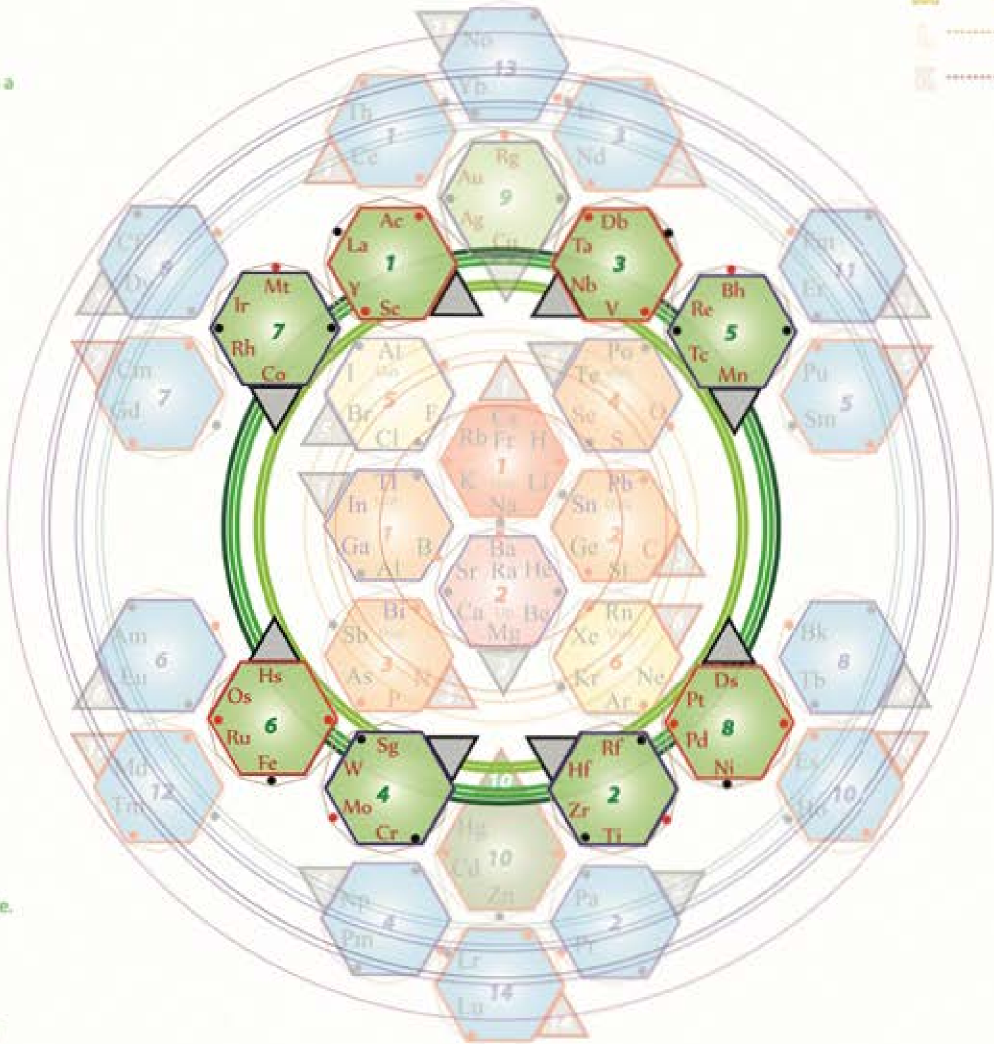




4 d-Orbitals

n3-6

d1-8 sub-orbitals



32 Transition Metals

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.

Copyright ABRAHAM [2008] - All rights reserved

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.

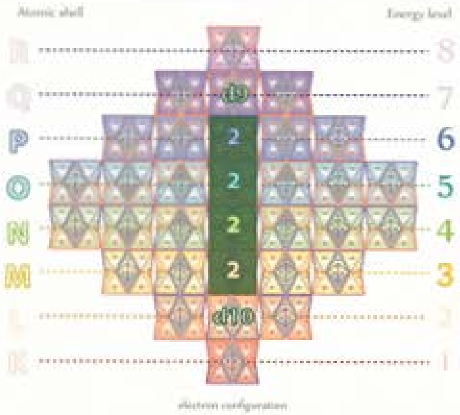
There are two IUPAC definitions of "transition element" that have been in apparent conflict with one another since September 2007.

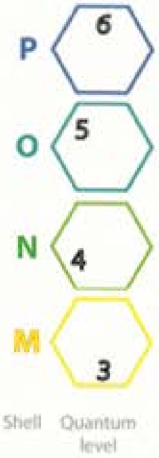
According to the first definition, transition metals are elements in group 3 through group 11.
In this case, post-transition metals include all of group 12—zinc, cadmium, mercury, and ununbium

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

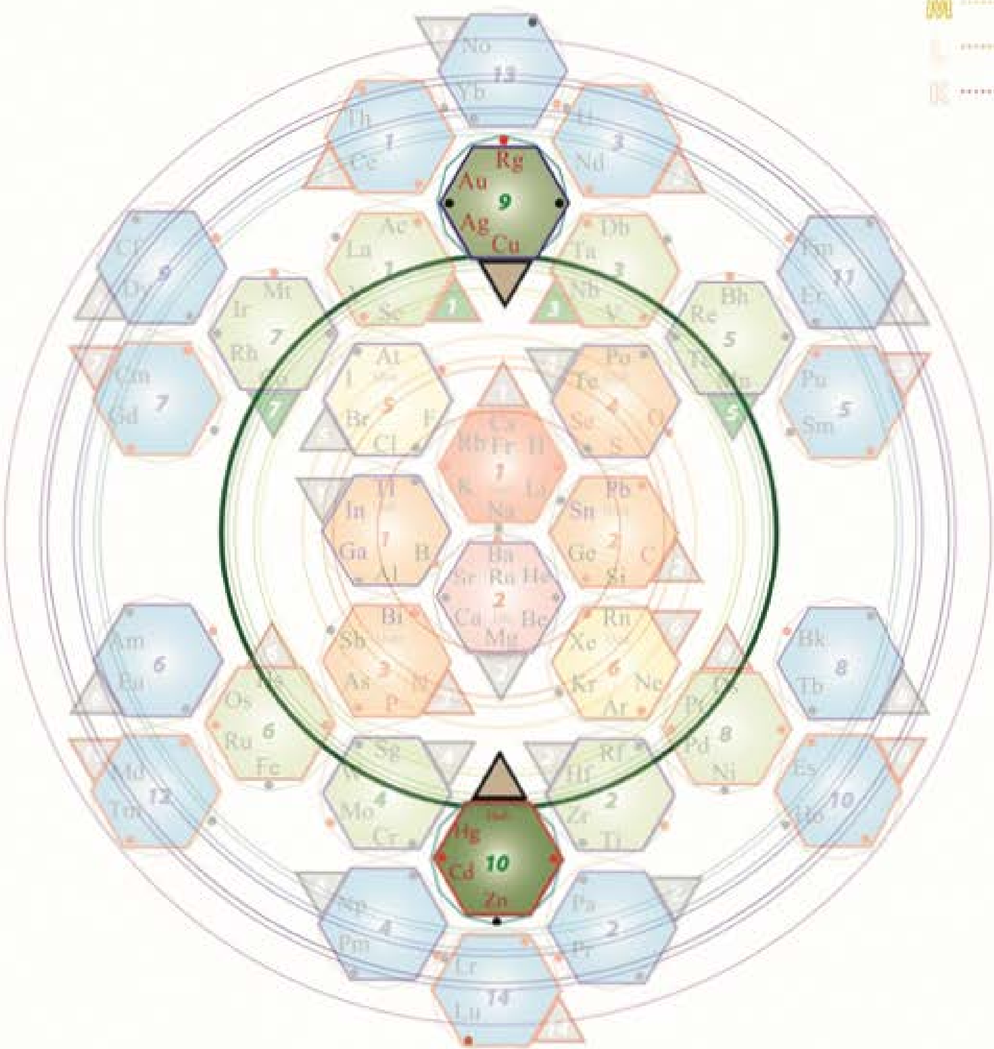




d5 Orbital

n3-6

d9-10 sub-orbitals



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.

Copyright ABRAHAM [2008] - All rights reserved

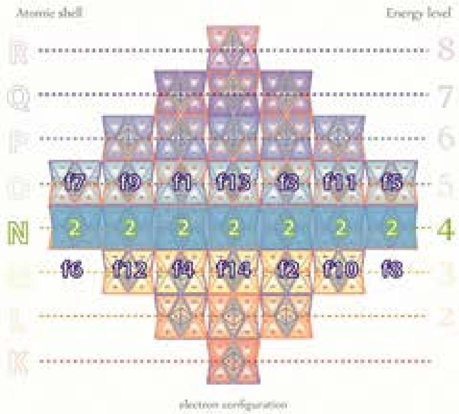
Lanthanoids

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.

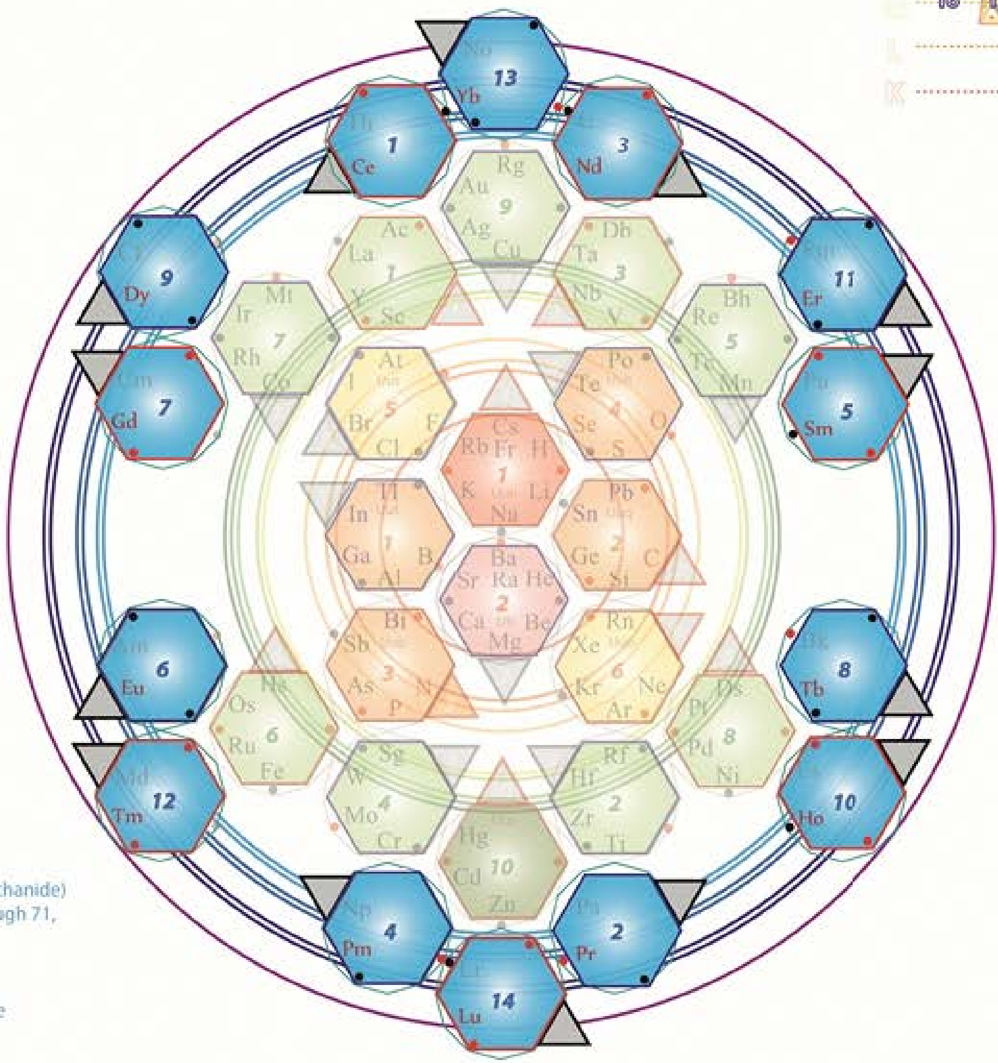
These elements are in fact fairly abundant in nature, although rare as compared to the "common" earths such as lime or magnesia. Cerium is the 26th most abundant element in the Earth's crust, neodymium is more abundant than gold and even thulium (the least common naturally-occurring lanthanoid) is more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



7 f-Orbitals

n4

f1-14 sub-orbitals



14 Lanthanoids

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).

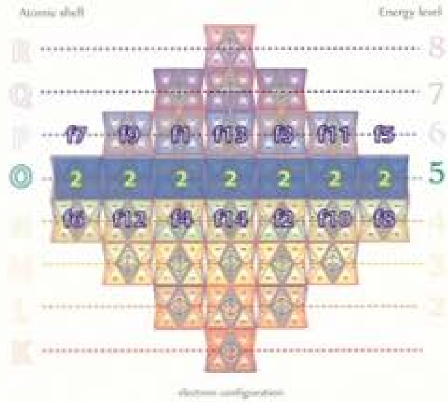
Copyright ABRAHAM [2008] - All rights reserved

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

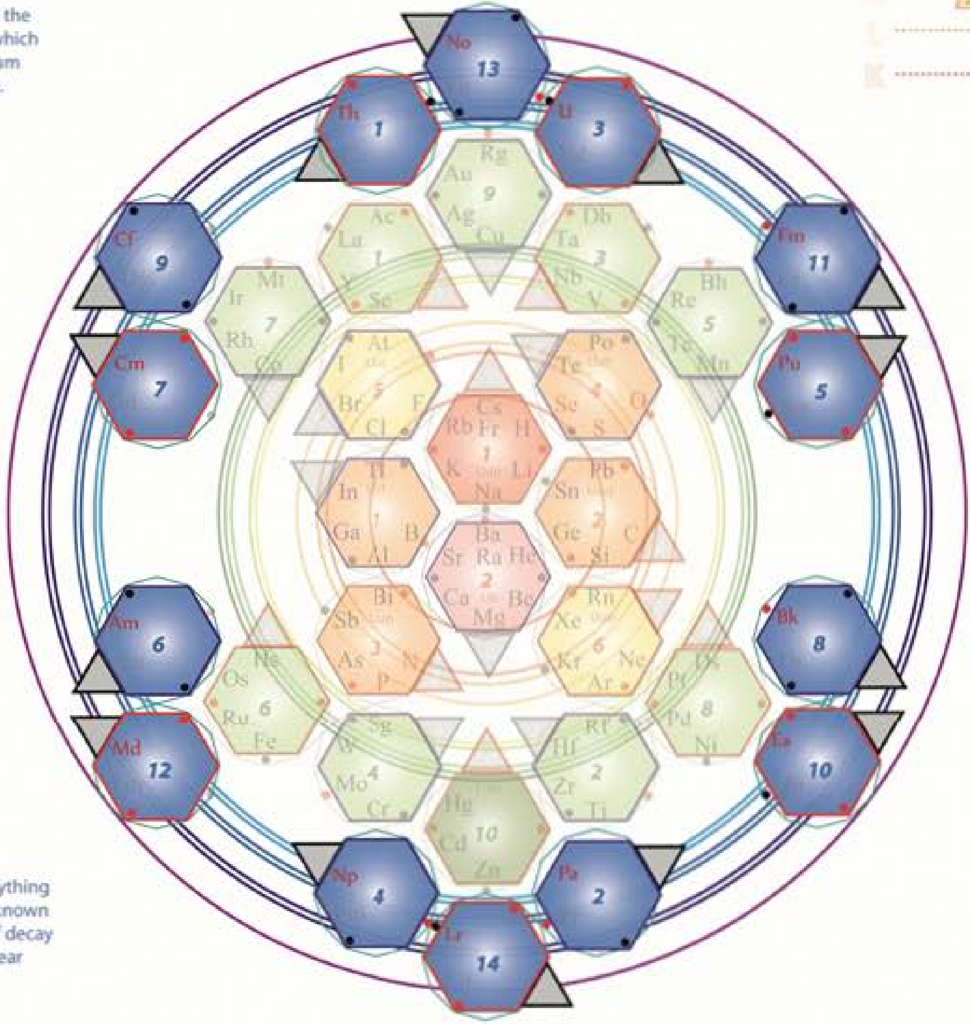
o 5

Shell Quantum level

7 f-Orbitals

n5

f1-14 sub-orbitals



14 Actinoids

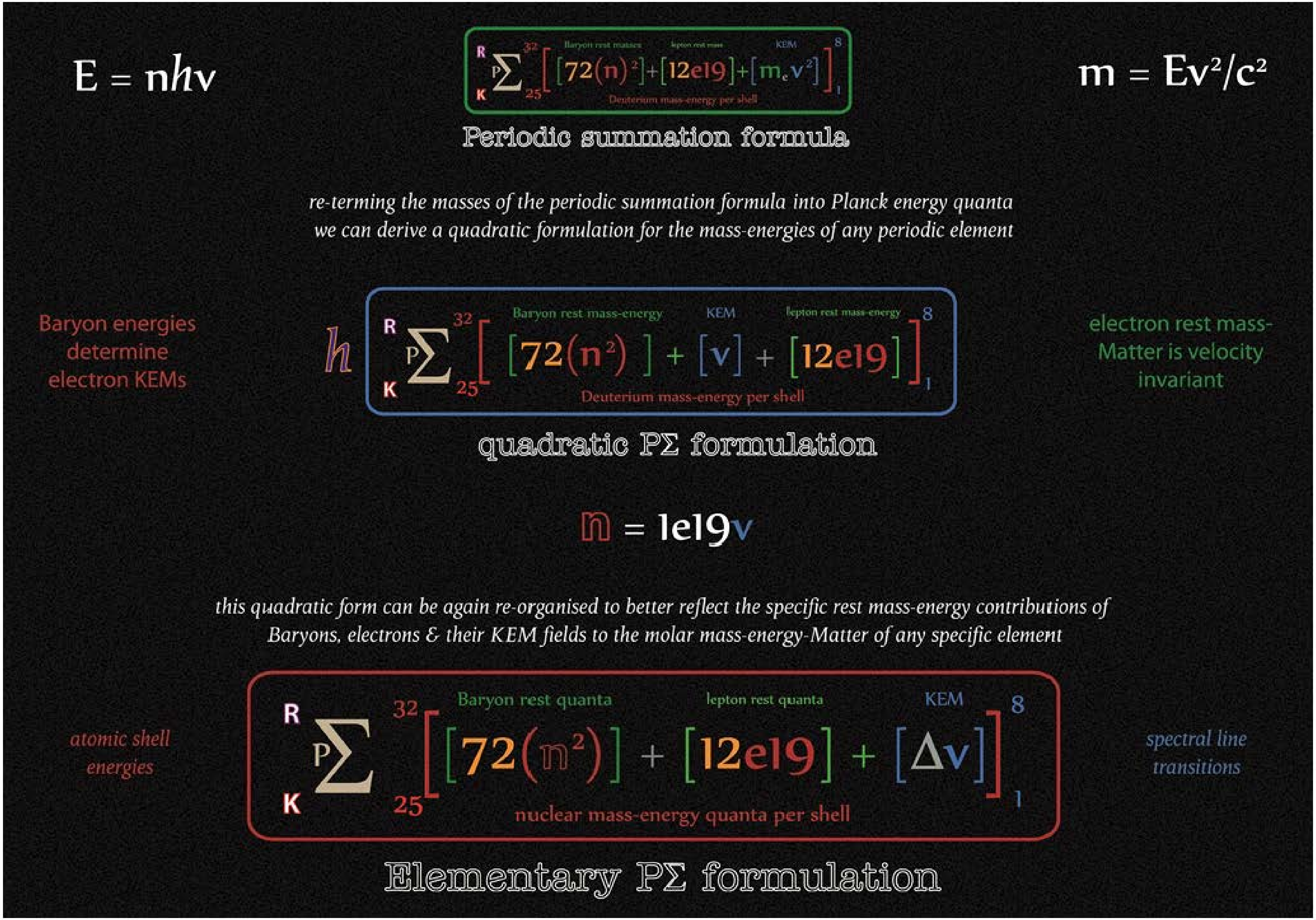
Only thorium and uranium occur naturally in the earth's crust in anything more than trace quantities. Neptunium and plutonium have been known to show up naturally in trace amounts in uranium ores as a result of decay or bombardment. The remaining actinoids were discovered in nuclear fallout, or were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

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

5

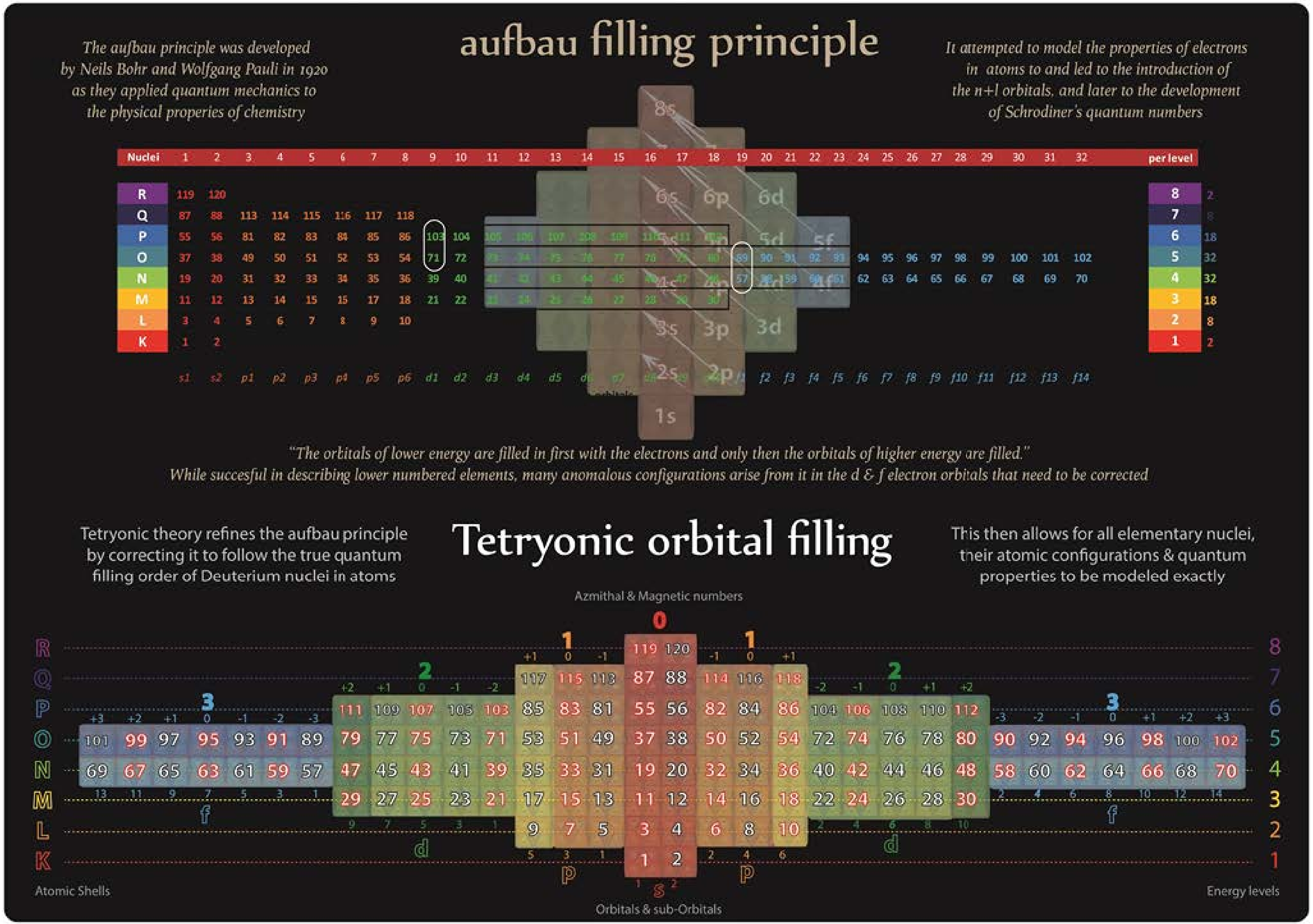
Quantum level

Copyright ABRAHAM [2008] - All rights reserved



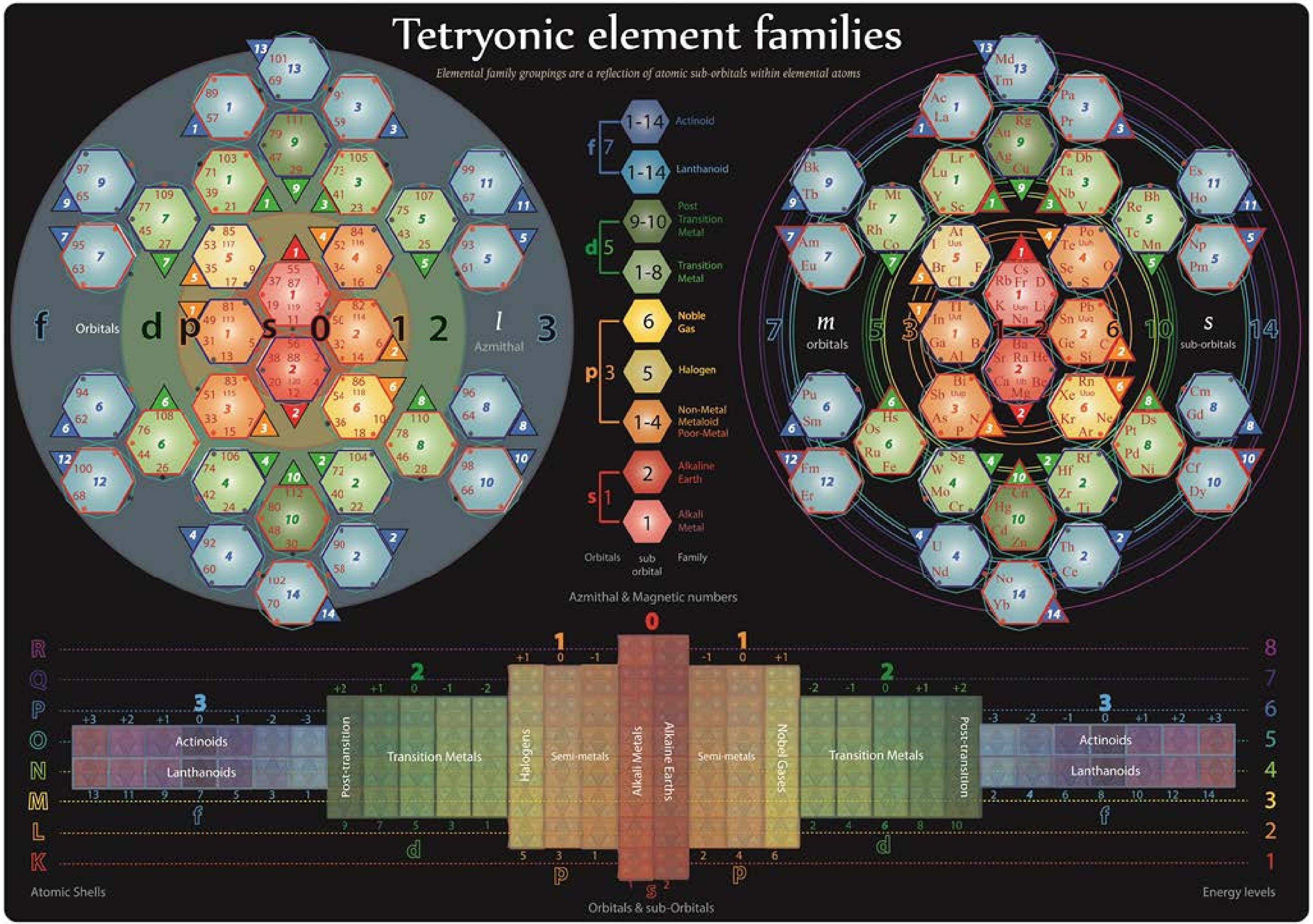
Tetryonics 52.13 - Periodic element summation formula

Copyright ABRAHAM [2008] - All rights reserved



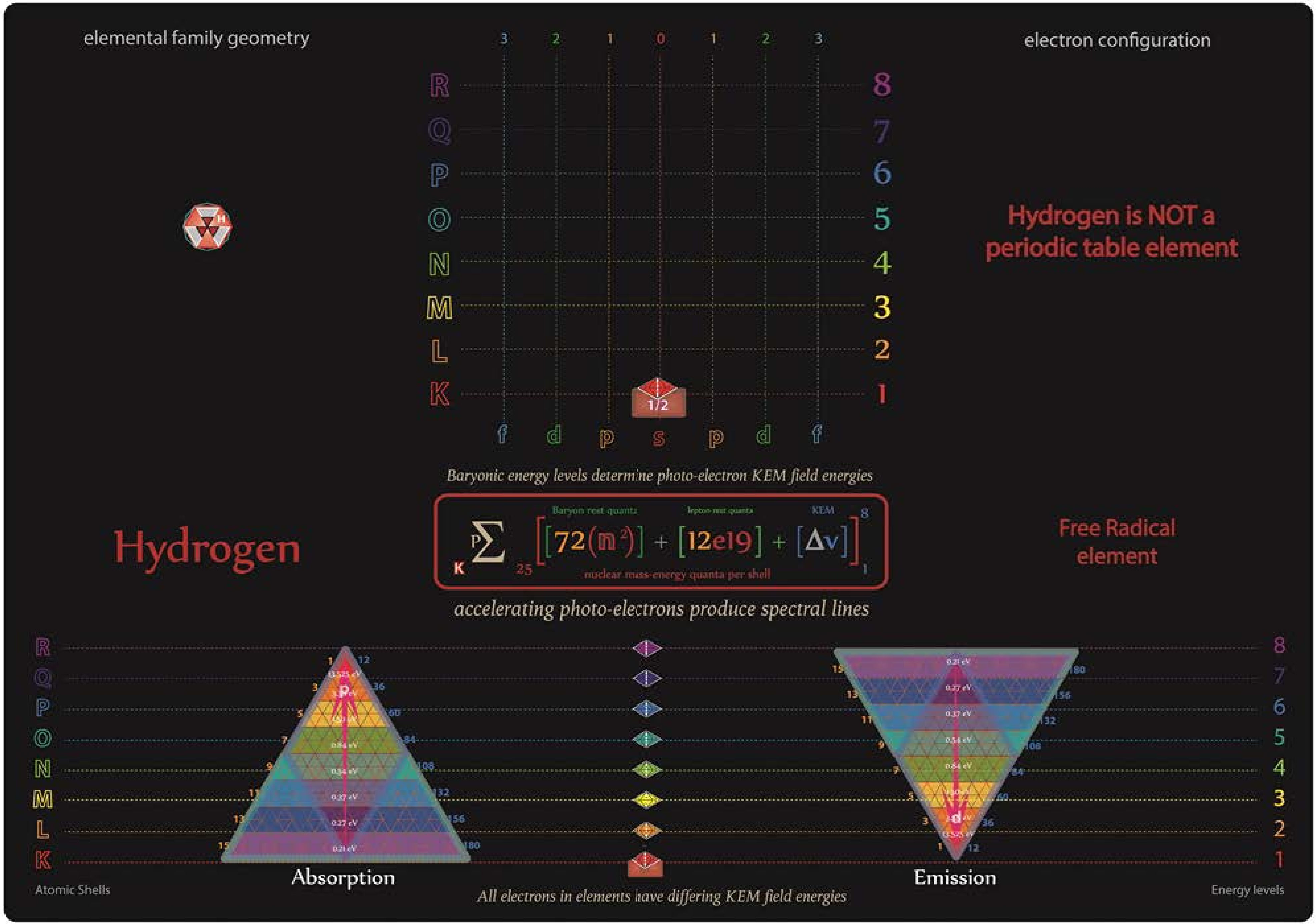
Tetryonics 52.14 - Tetryonic aufbau orbital filling

Copyright ABRAHAM [2008] - All rights reserved



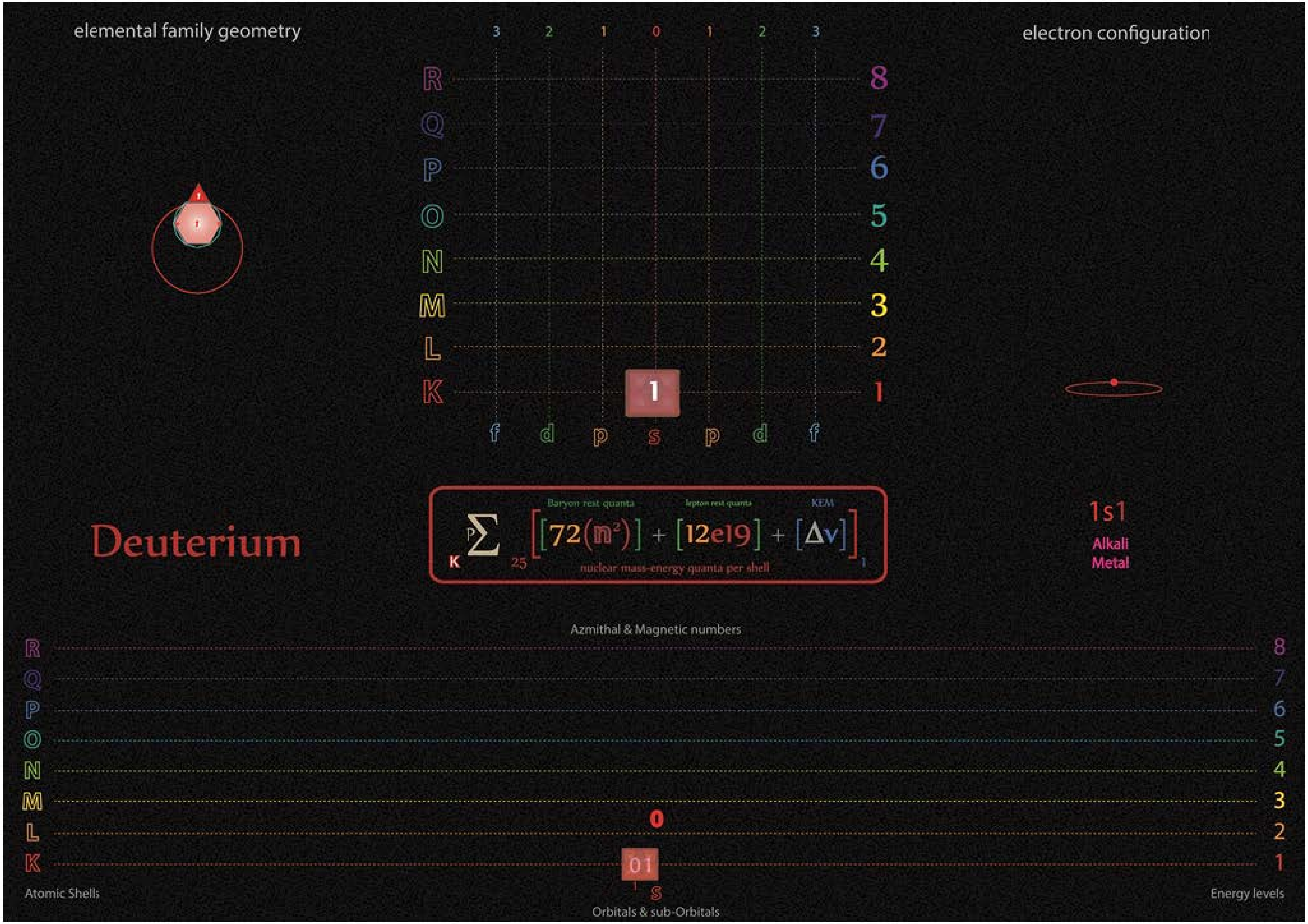
Tetryonics 52.15 - Tetryonic elemental families

Copyright ABRAHAM [2008] - All rights reserved



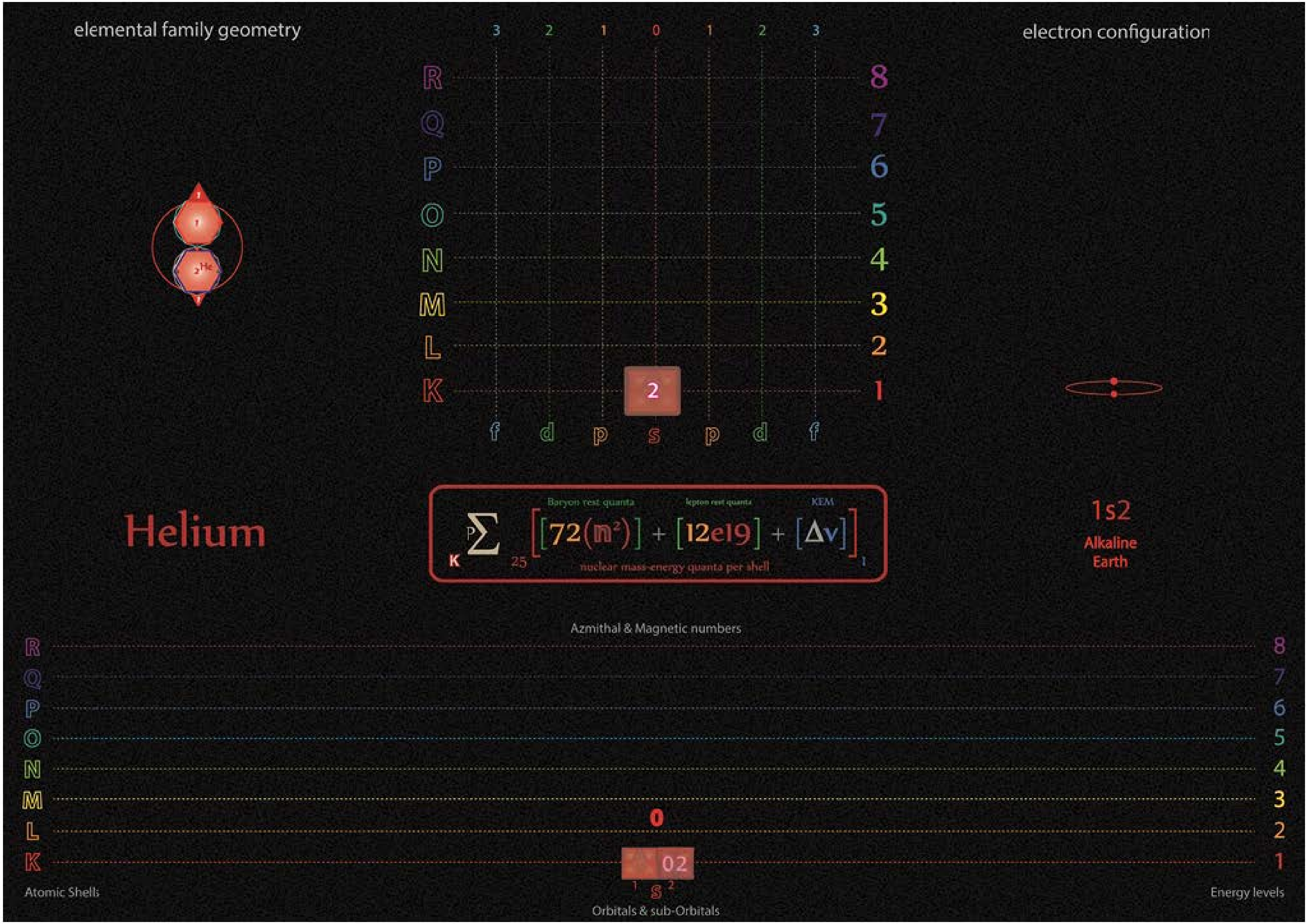
Tetryonics 53.00 - Hydrogen atomic config

Copyright ABRAHAM [2008] - All rights reserved



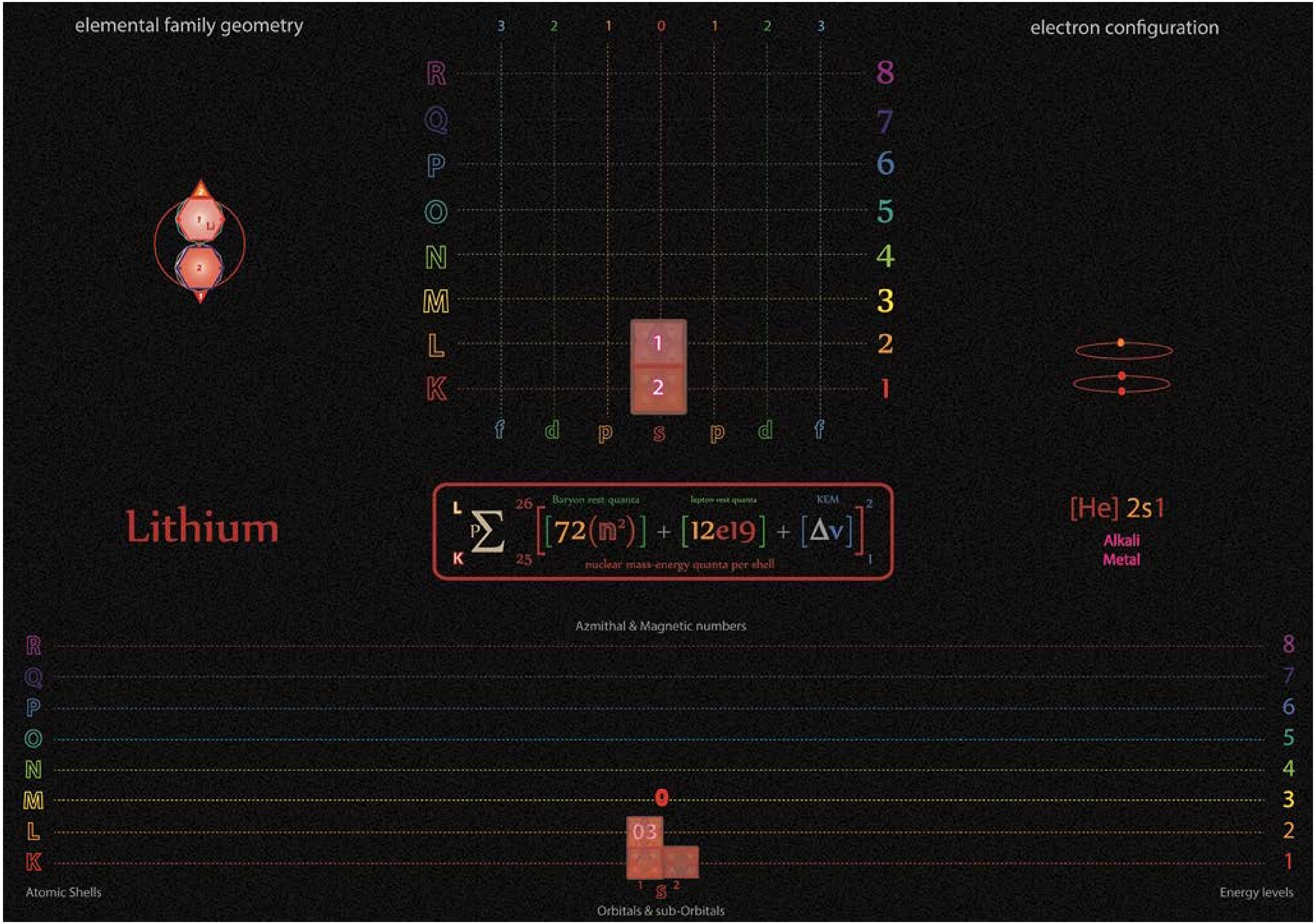
Tetryonics 53.01 - Deuterium atomic config

Copyright ABRAHAM [2008] - All rights reserved



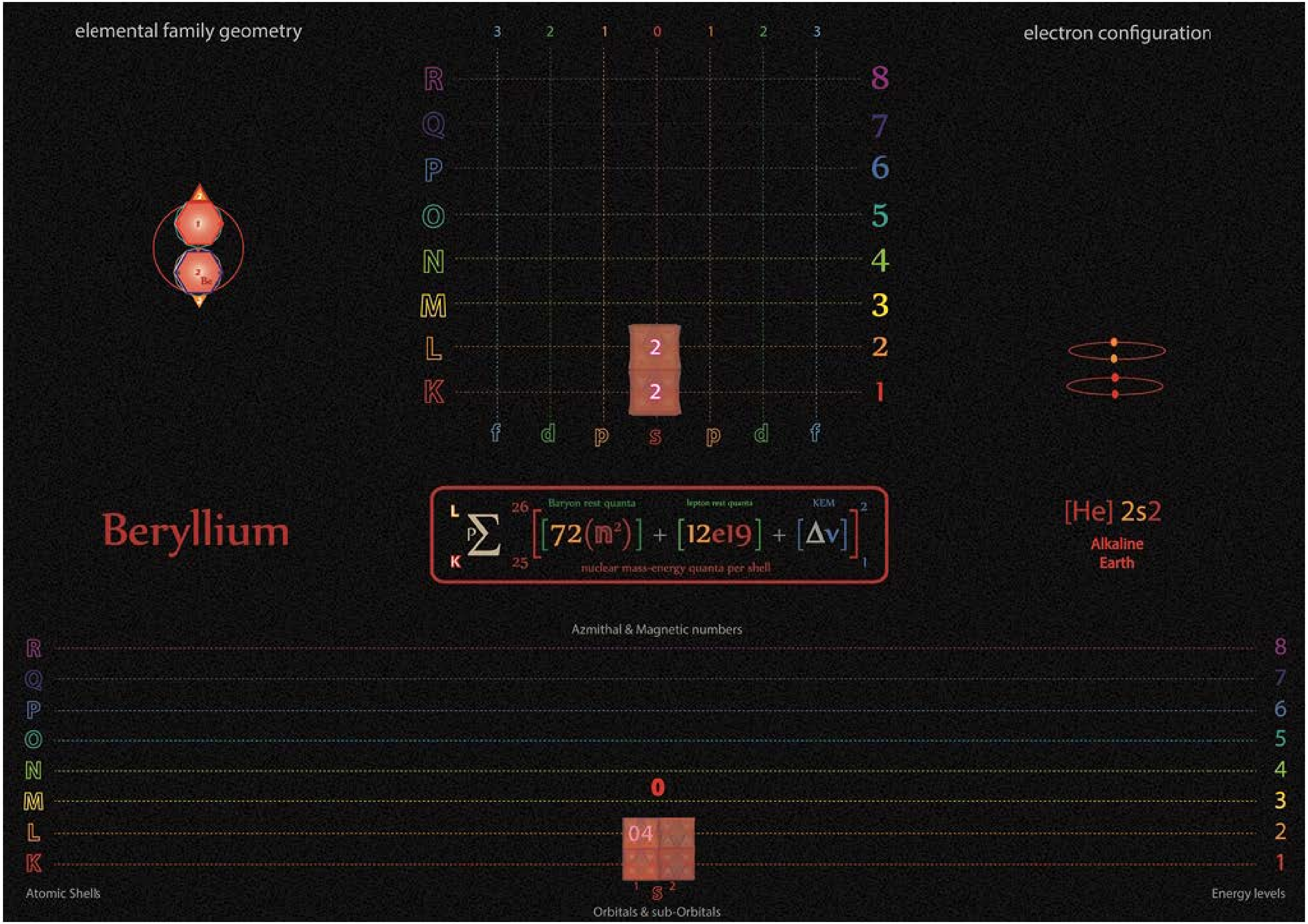
Tetryonics 53.02 - Helium atomic config

Copyright ABRAHAM [2008] - All rights reserved

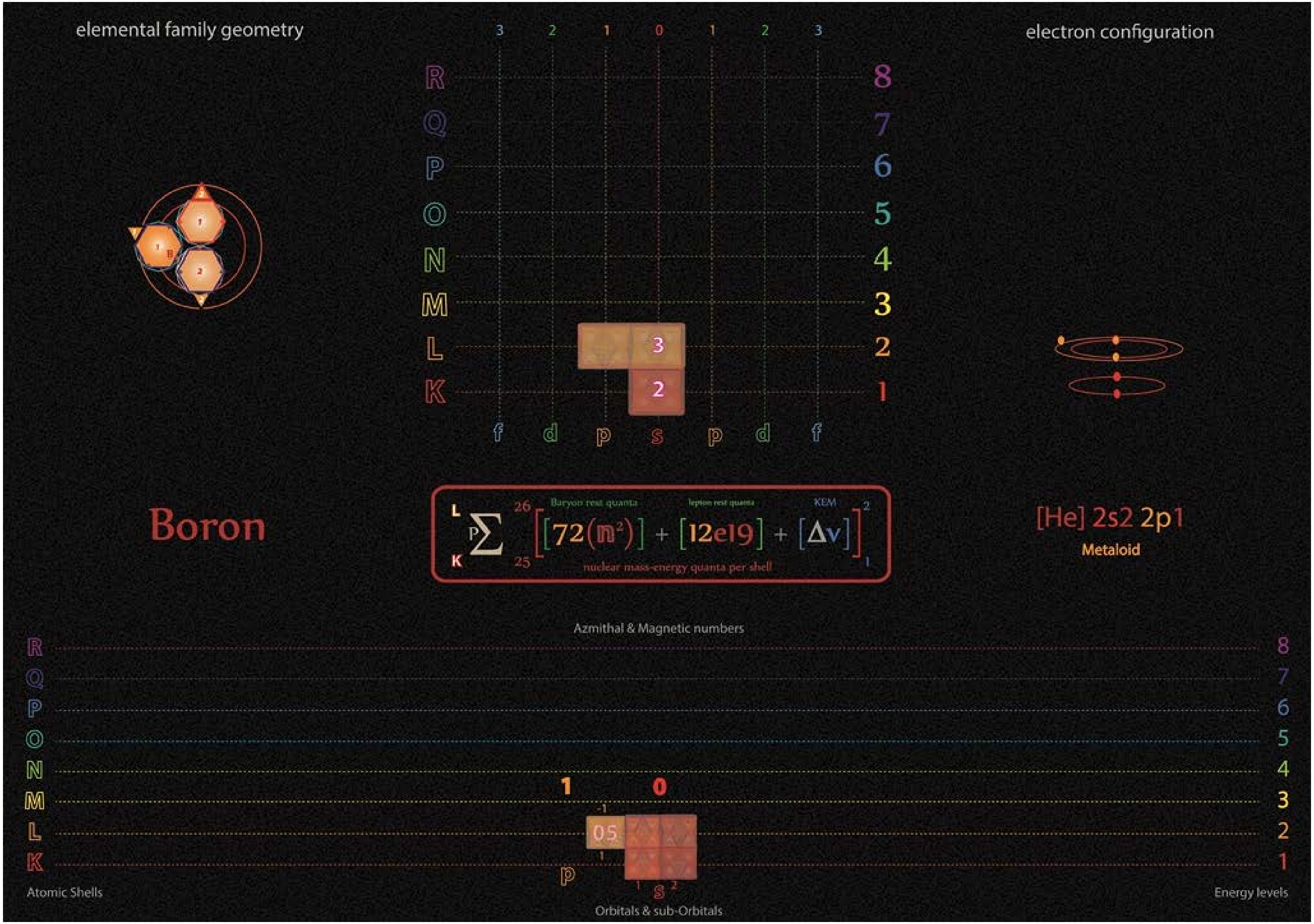


Tetryonics 53.03 - Lithium atomic config

Copyright ABRAHAM [2008] - All rights reserved

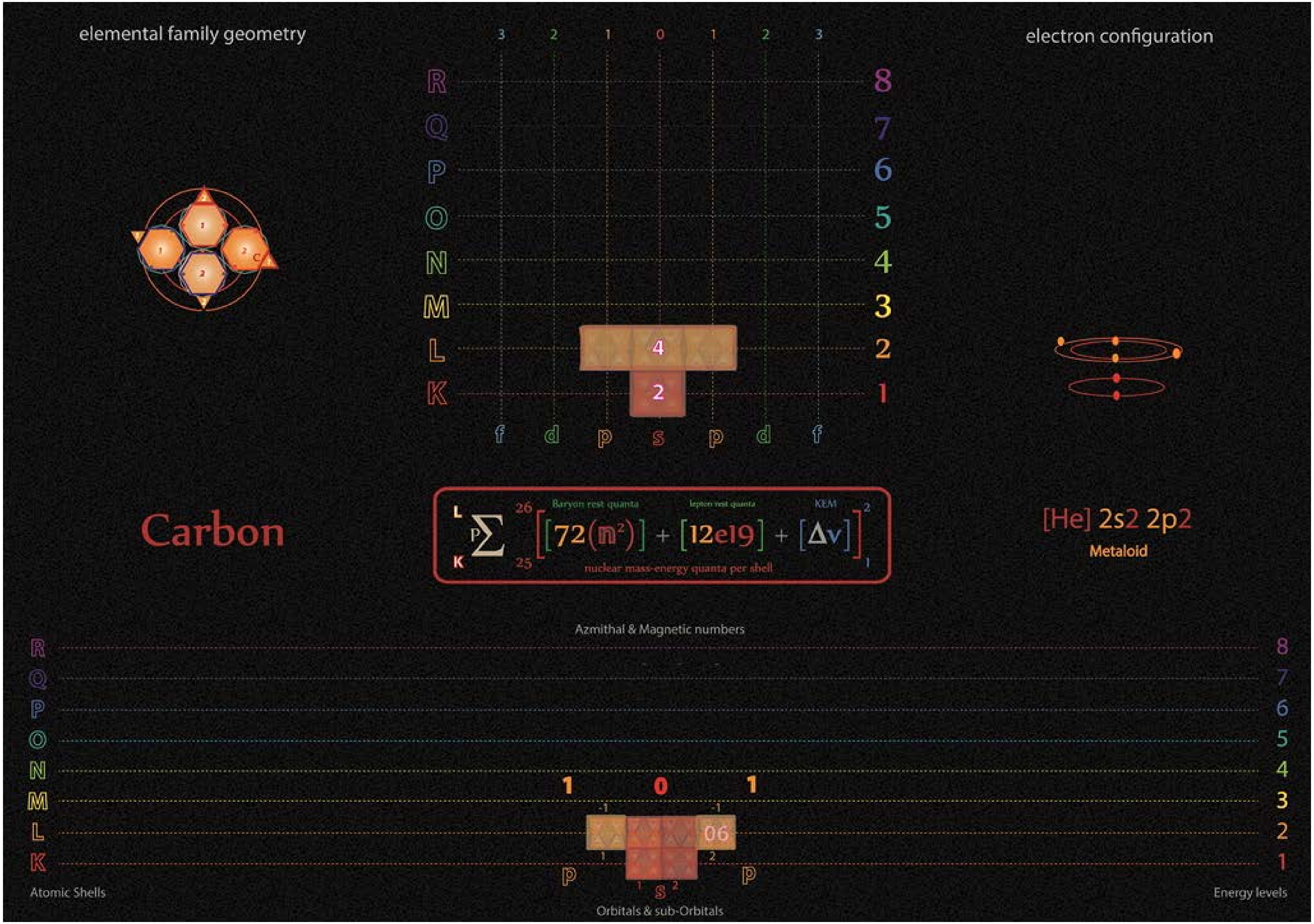


Copyright ABRAHAM [2008] - All rights reserved



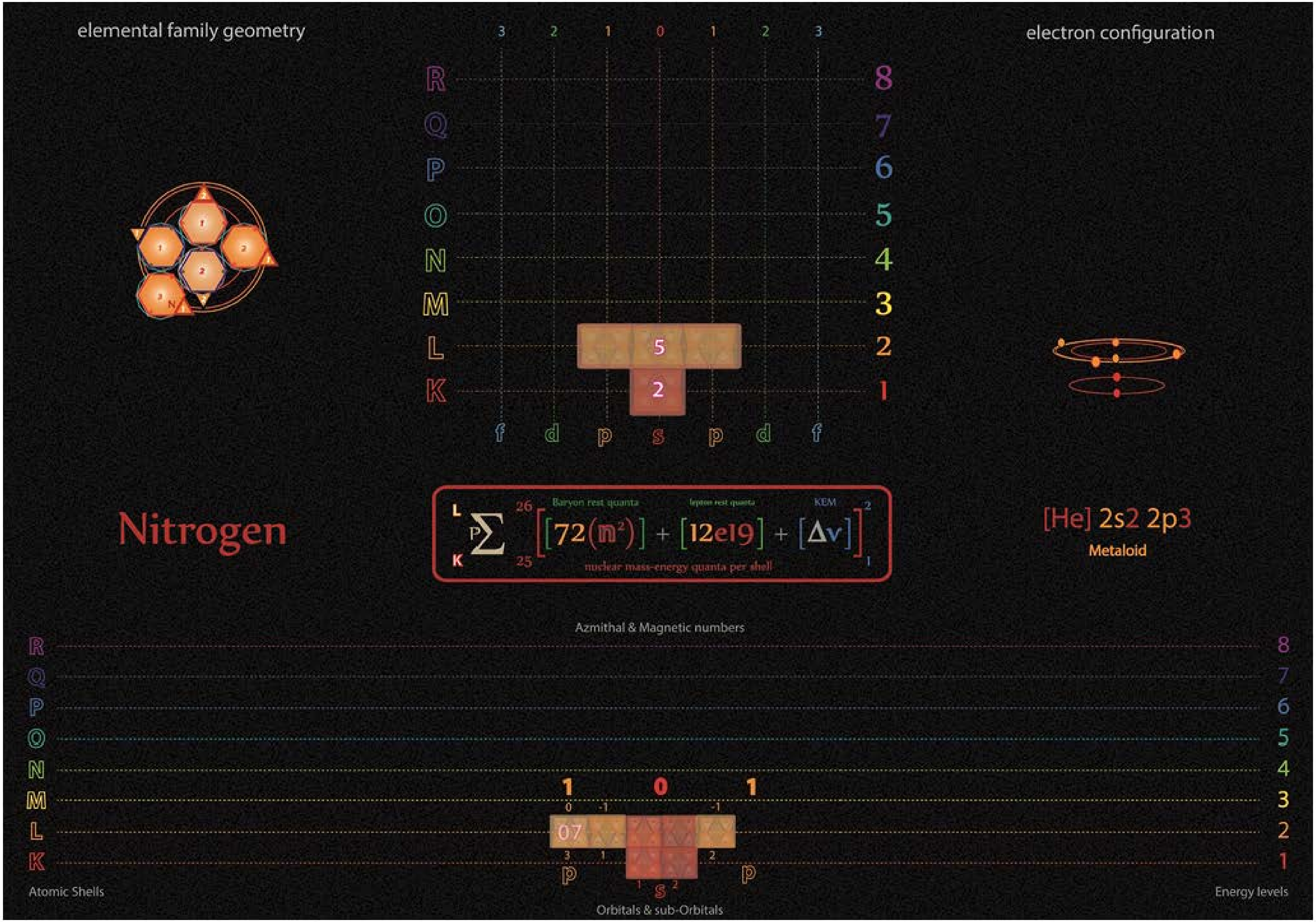
Tetryonics 53.05 - Boron atomic config

Copyright ABRAHAM [2008] - All rights reserved



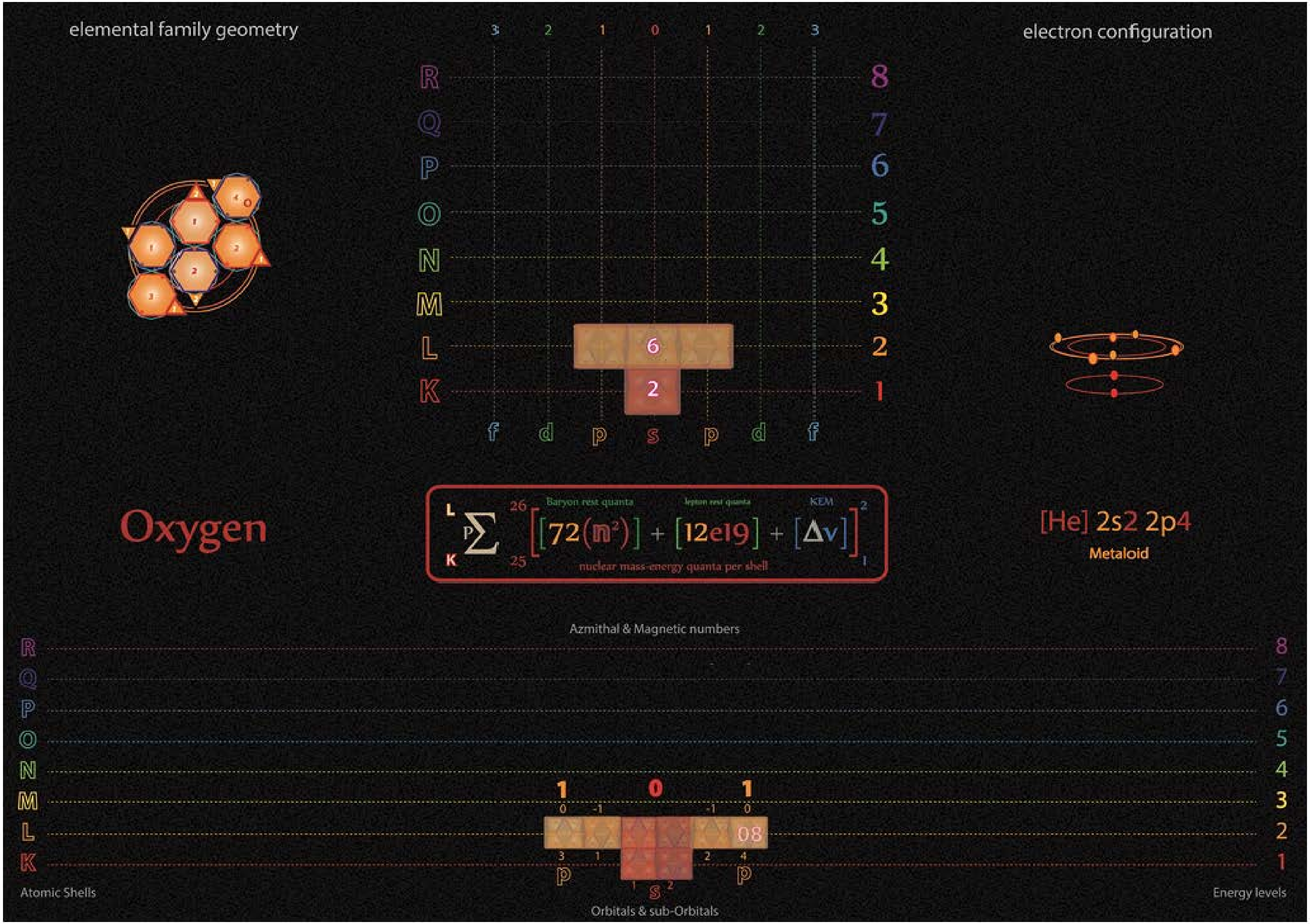
Tetryonics 53.06 - Carbon atomic config

Copyright ABRAHAM [2008] - All rights reserved



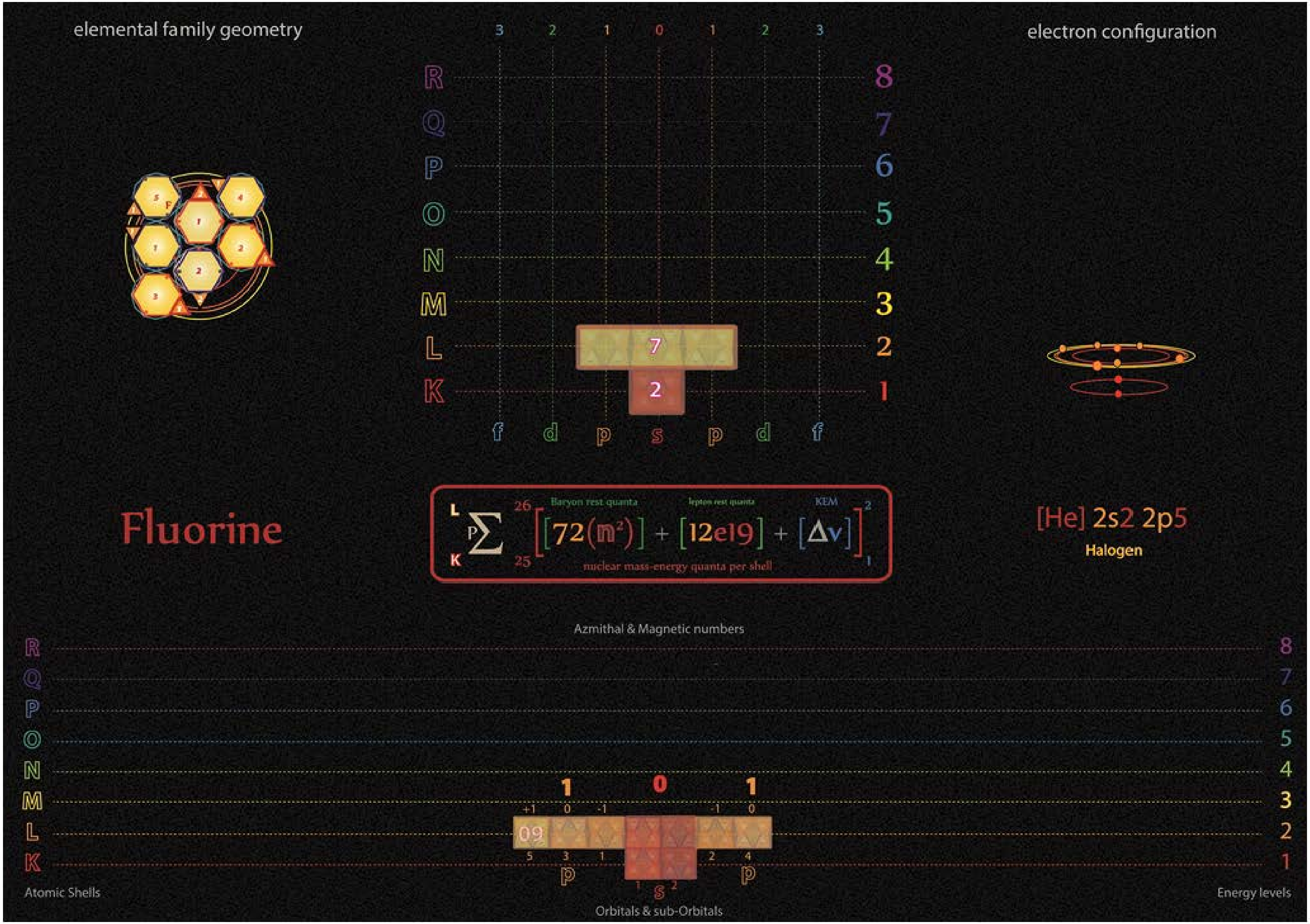
Tetryonics 53.07 - Nitrogen atomic config

Copyright ABRAHAM [2008] - All rights reserved



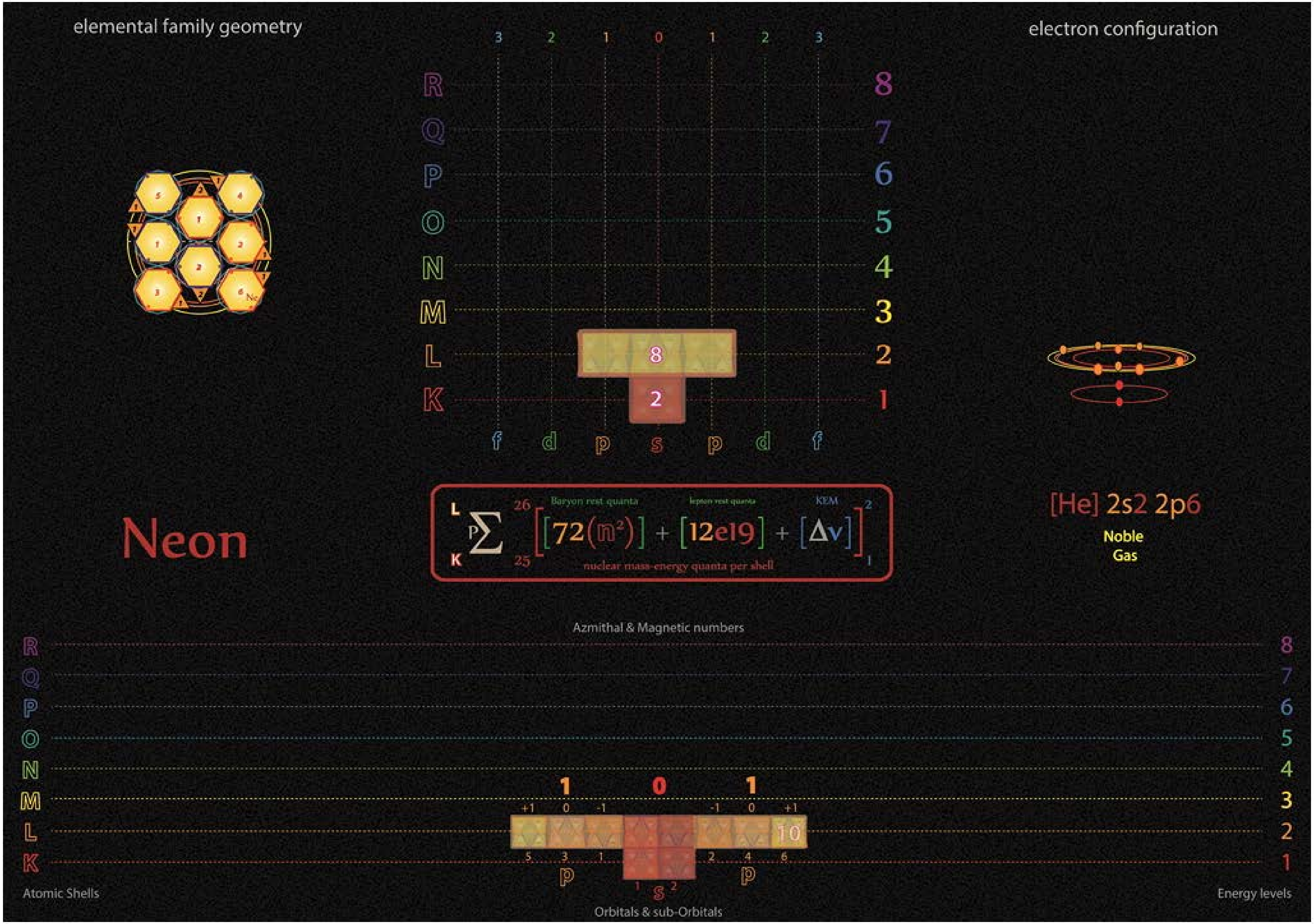
Tetryonics 53.08 - Oxygen atomic config

Copyright ABRAHAM [2008] - All rights reserved

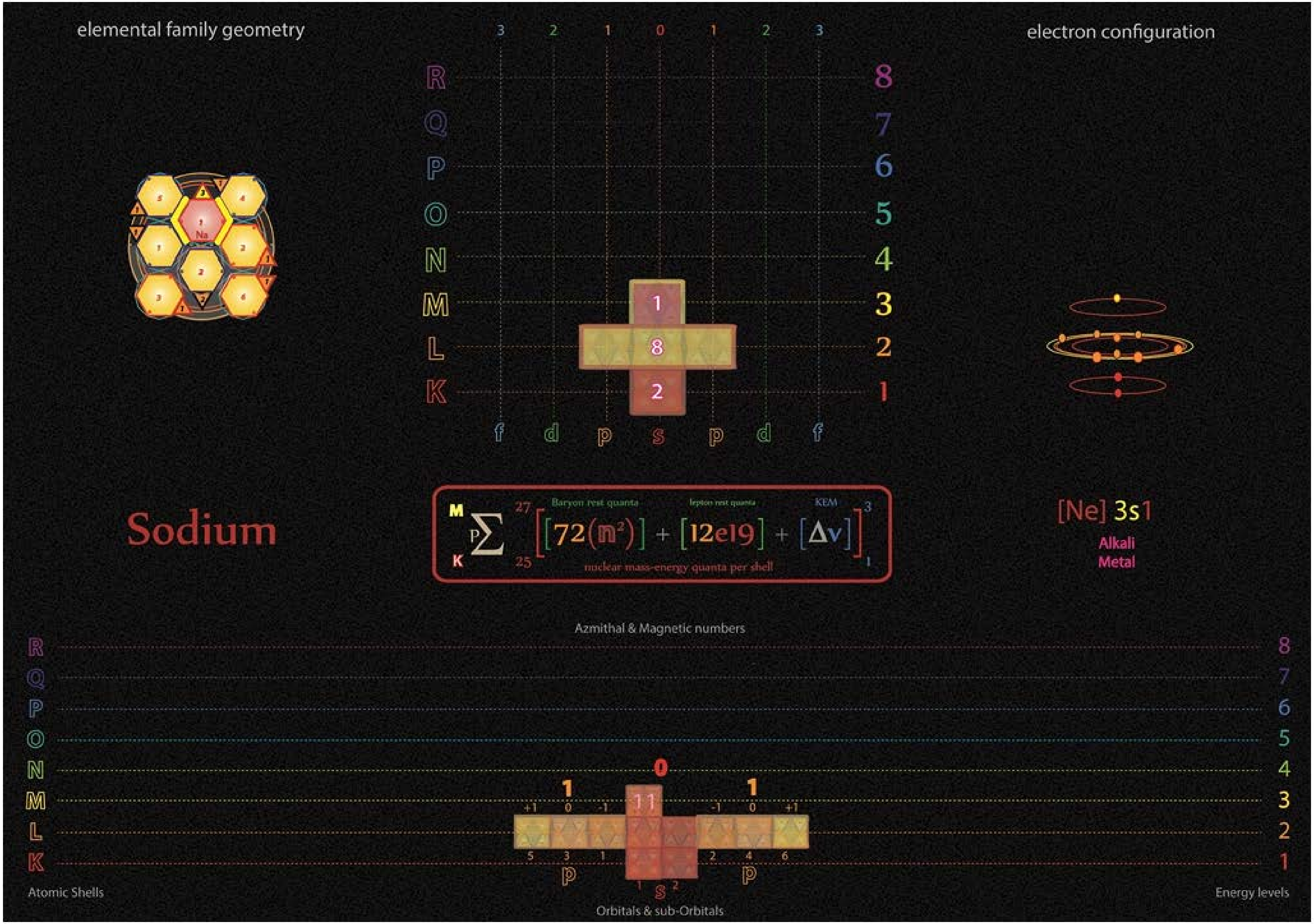


Tetryonics 53.09 - Fluorine atomic config

Copyright ABRAHAM [2008] - All rights reserved

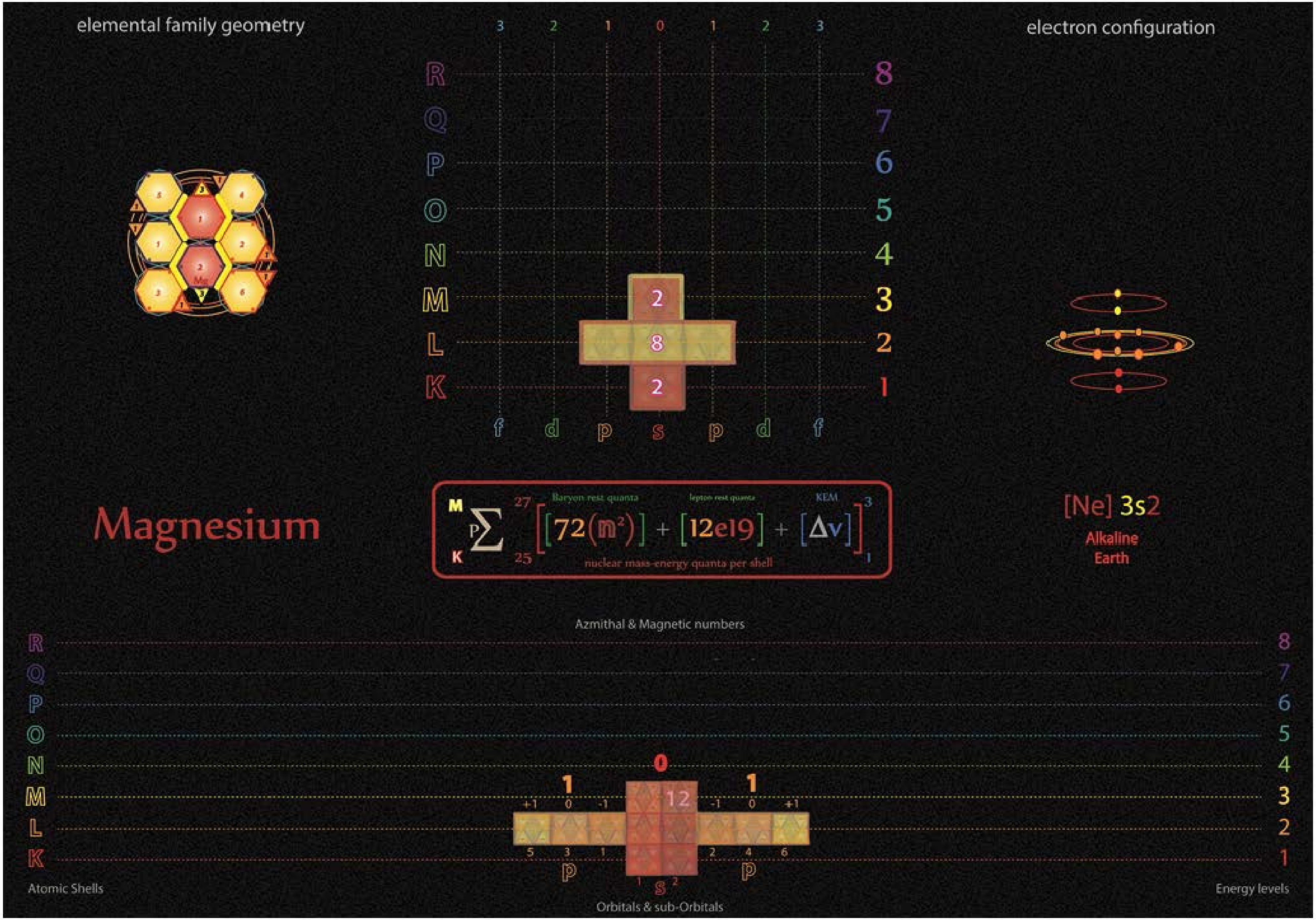


Tetryonics 53.10 - Neon atomic config



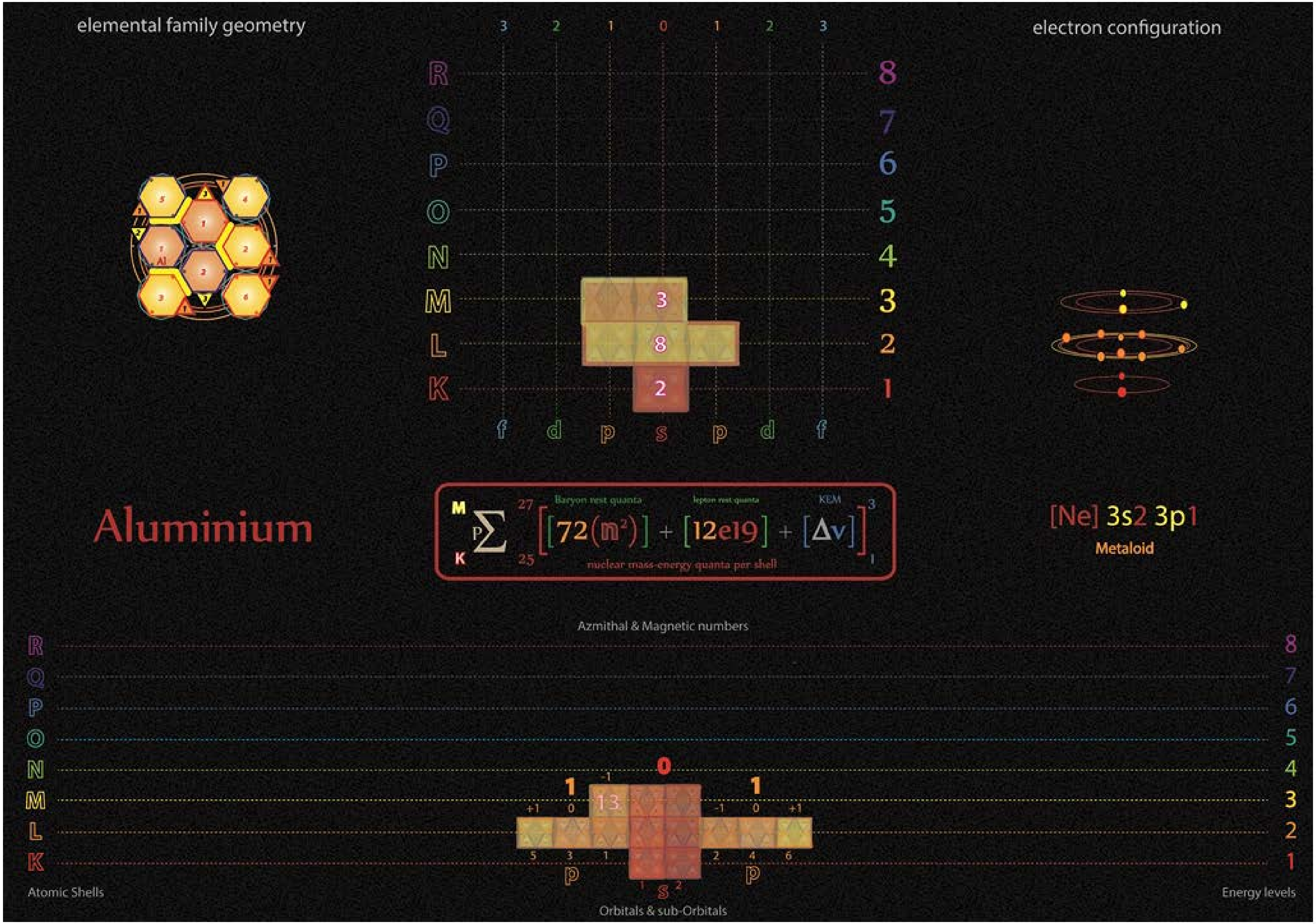
Tetryonics 53.11 - Sodium atomic config

Copyright ABRAHAM [2008] - All rights reserved

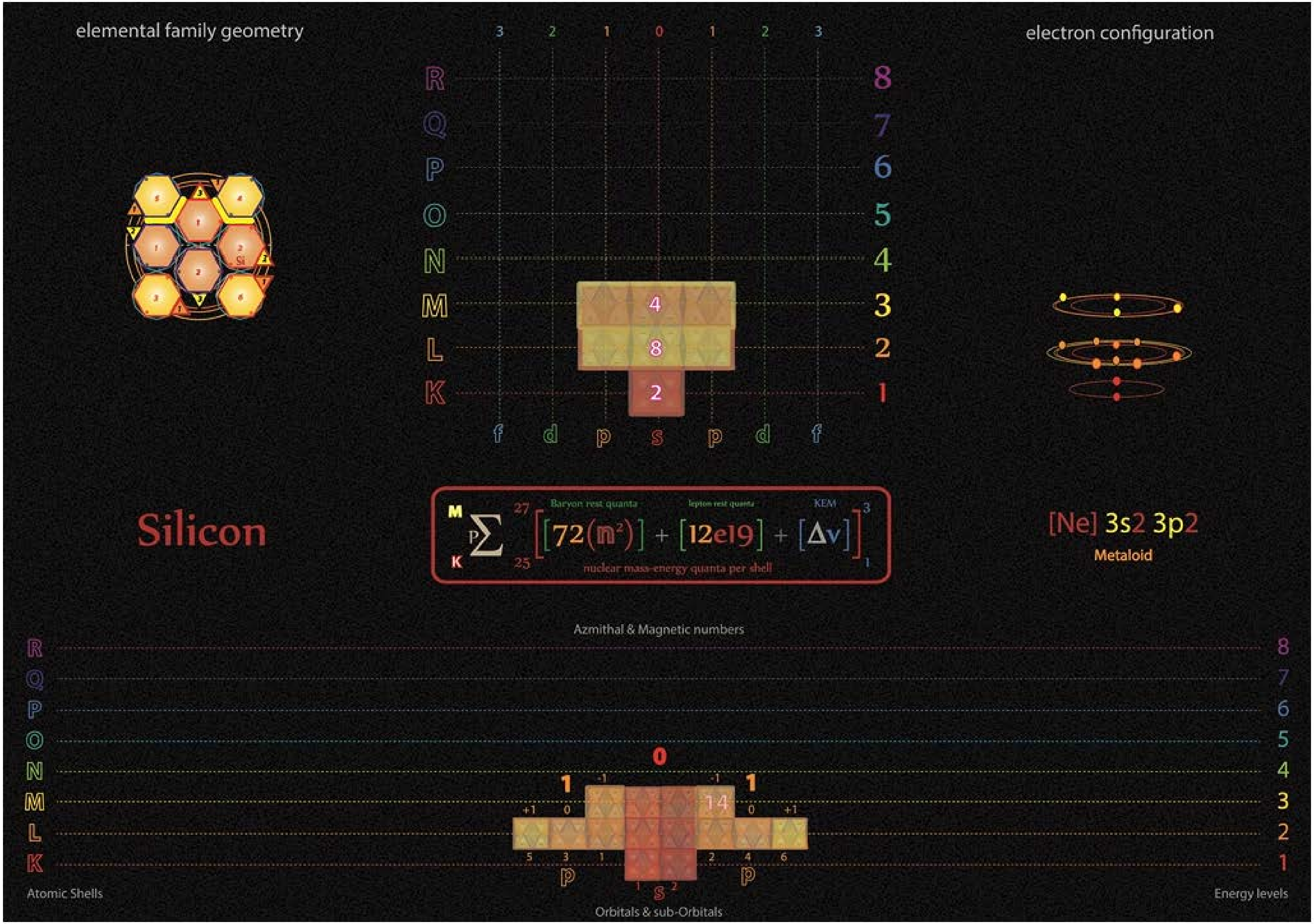


Tetryonics 53.12 - Magnesium atomic config

Copyright ABRAHAM [2008] - All rights reserved

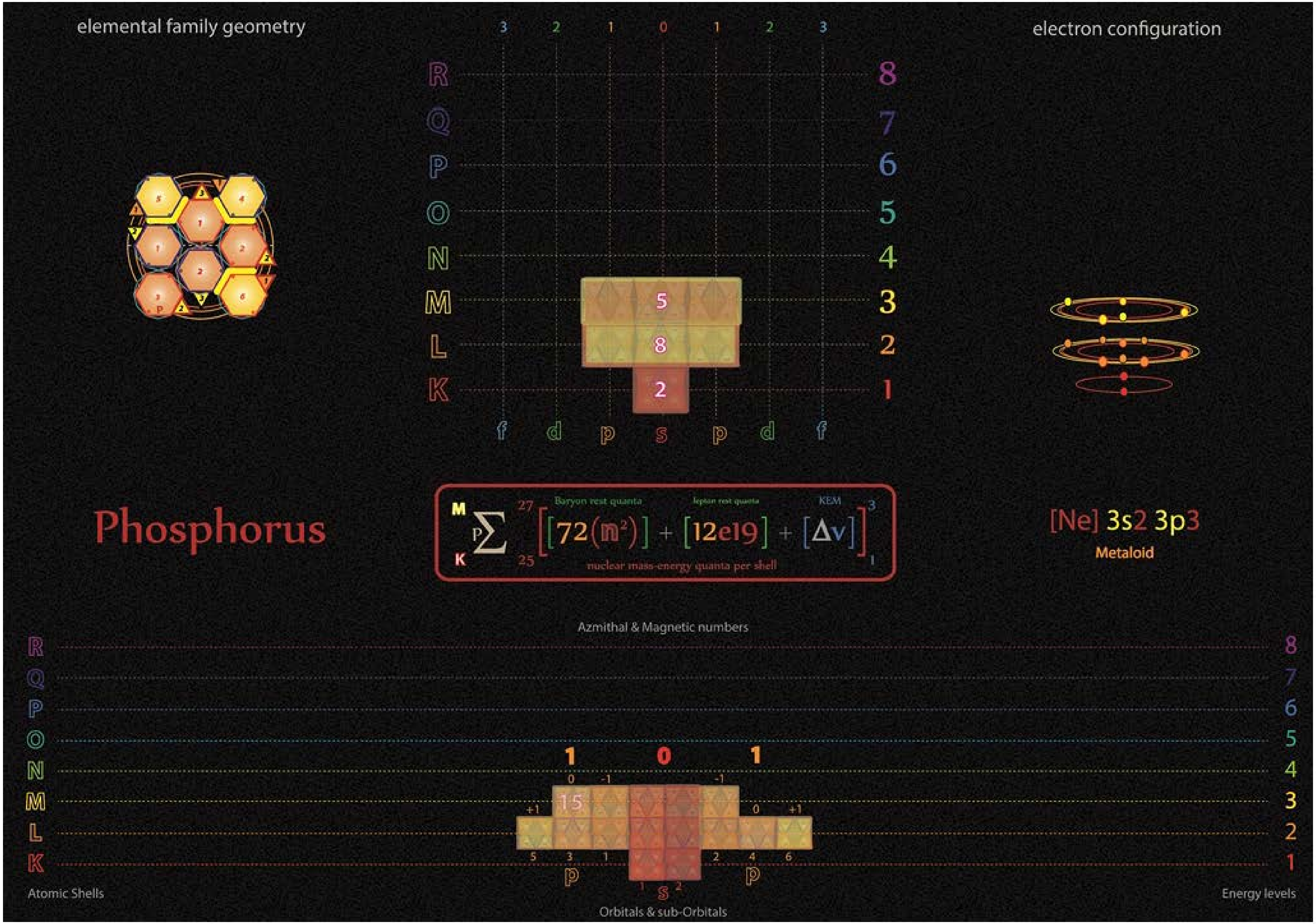


Tetryonics 53.13 - Aluminium atomic config



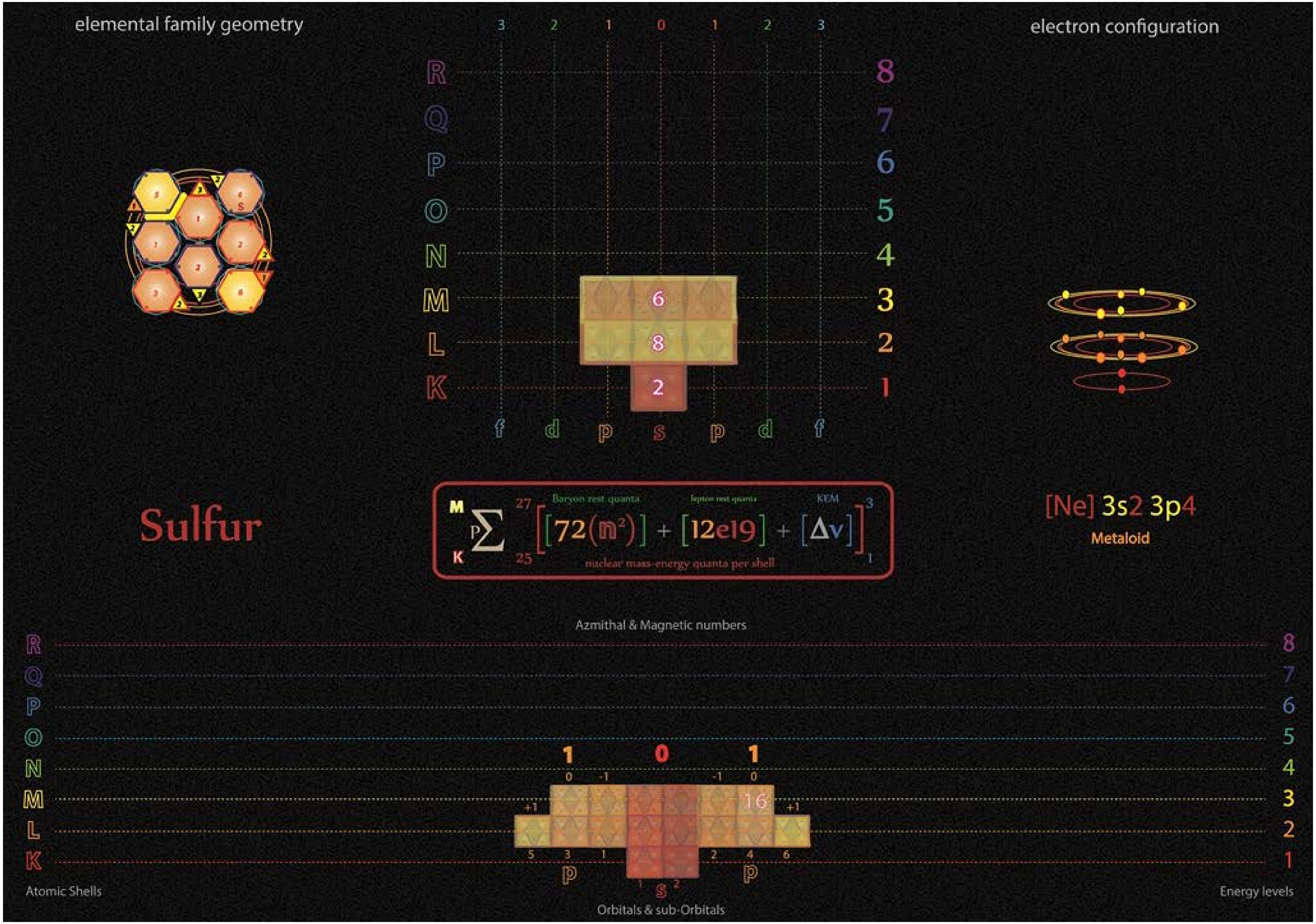
Tetryonics 53.14 - Silicon atomic config

Copyright ABRAHAM [2008] - All rights reserved

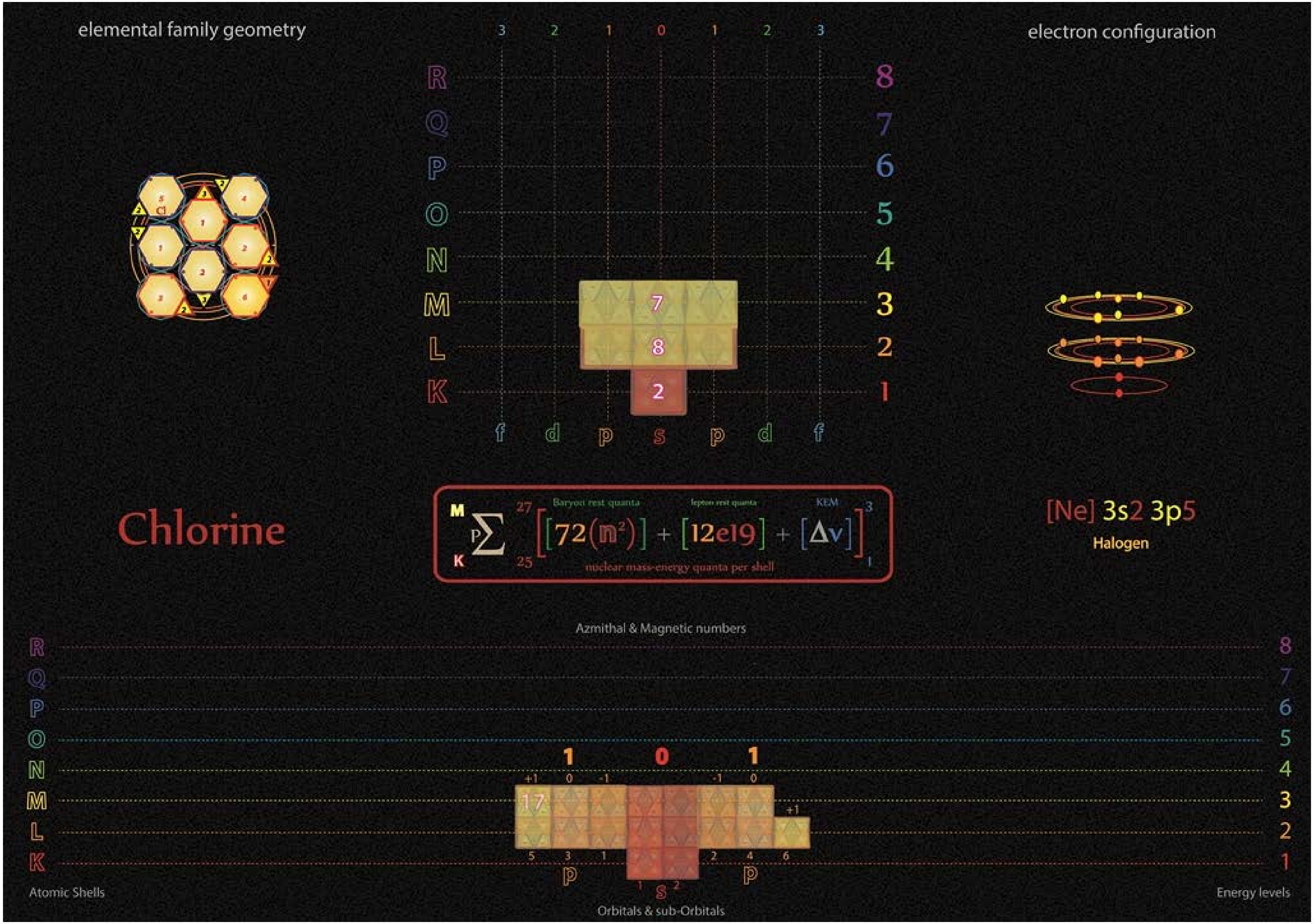


Tetryonics 53.15 - Phosphorus atomic config

Copyright ABRAHAM [2008] - All rights reserved

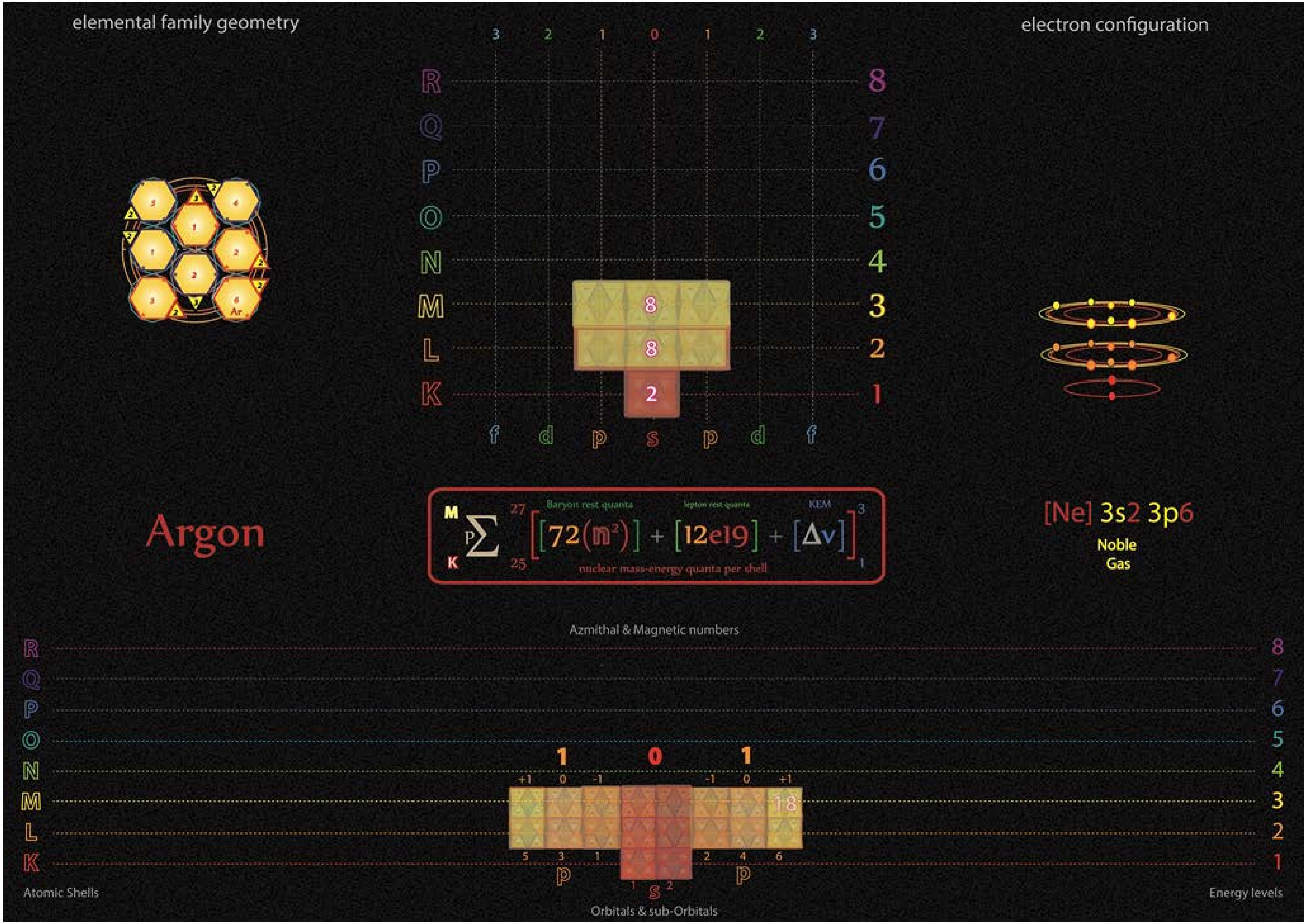


Tetryonics 53.16 - Sulfur atomic config

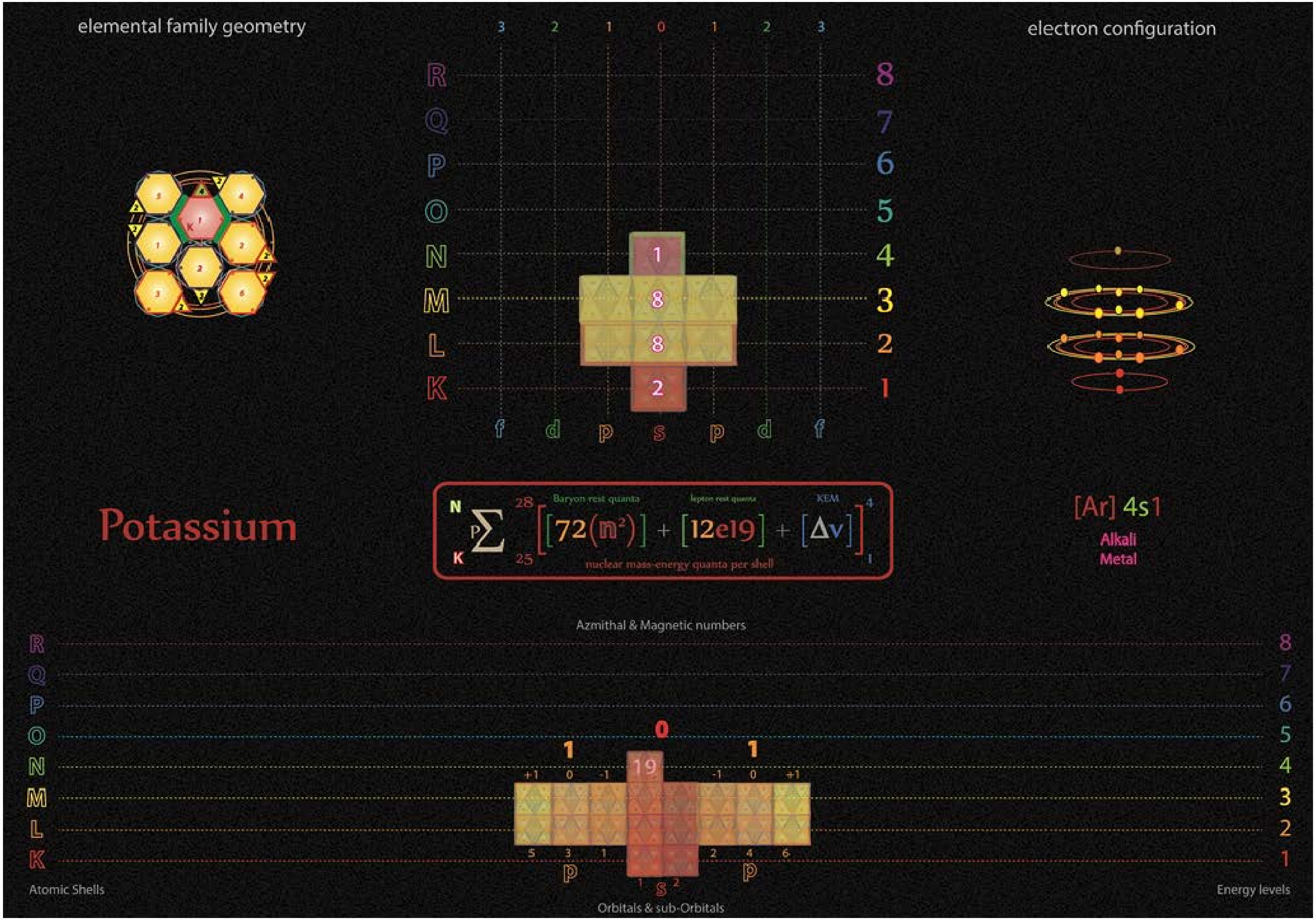


elemental family geometry
electron configuration
R Q P O N M L K
8 7 6 5 4 3 2 1
3 2 1 0 1 2 3
f d p s p d f
7
8
2
Chlorine
Baryon rest quanta
lepton rest quanta
KEM
[72(n²)] + [12e19] + [Δv]
nuclear mass-energy quanta per shell
[Ne] 3s2 3p5
Halogen
Azmithal & Magnetic numbers
1 0 1
17
Atomic Shells
Energy levels
Orbitals & sub-Orbitals

Copyright ABRAHAM [2008] - All rights reserved

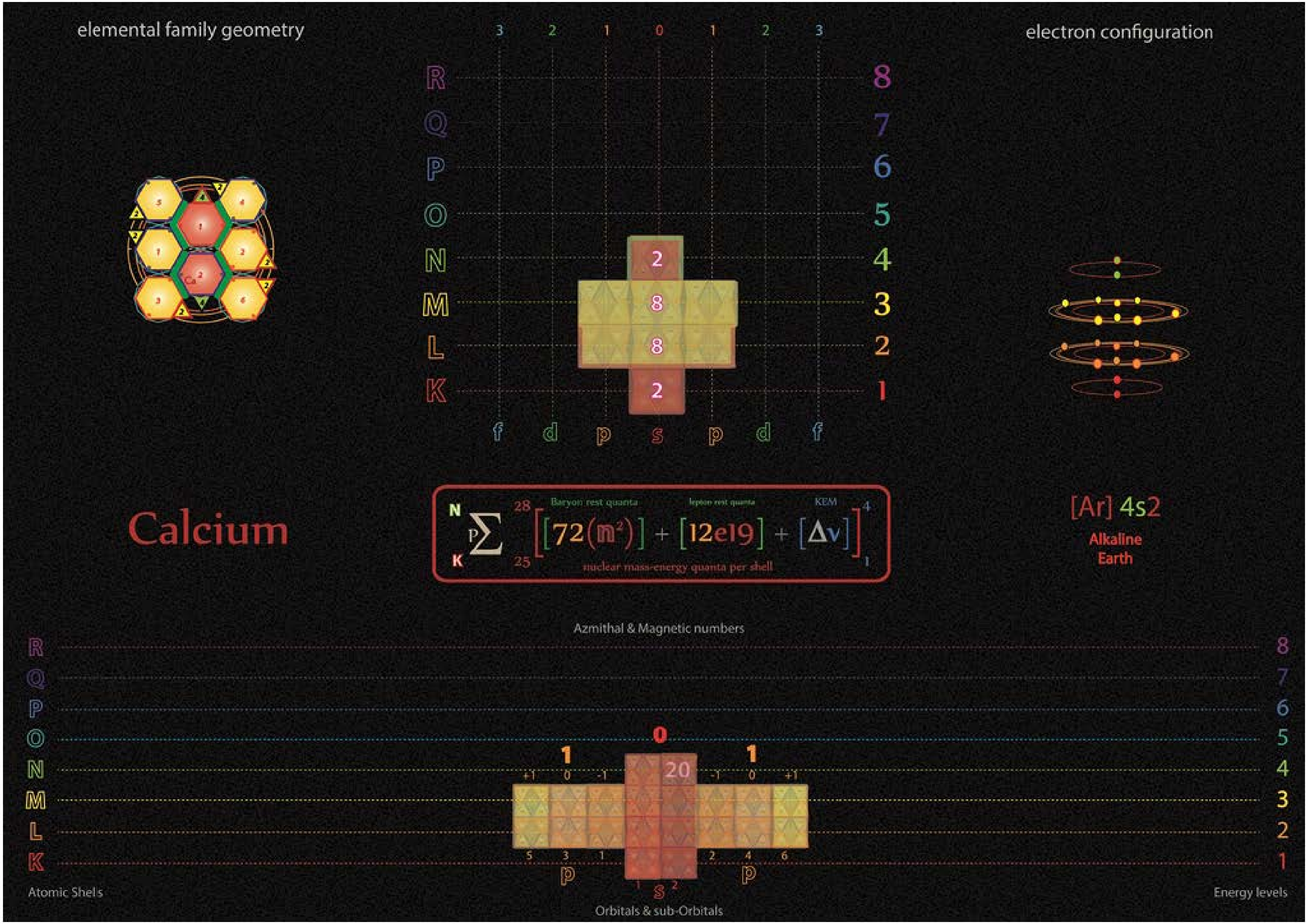


Copyright ABRAHAM [2008] - All rights reserved



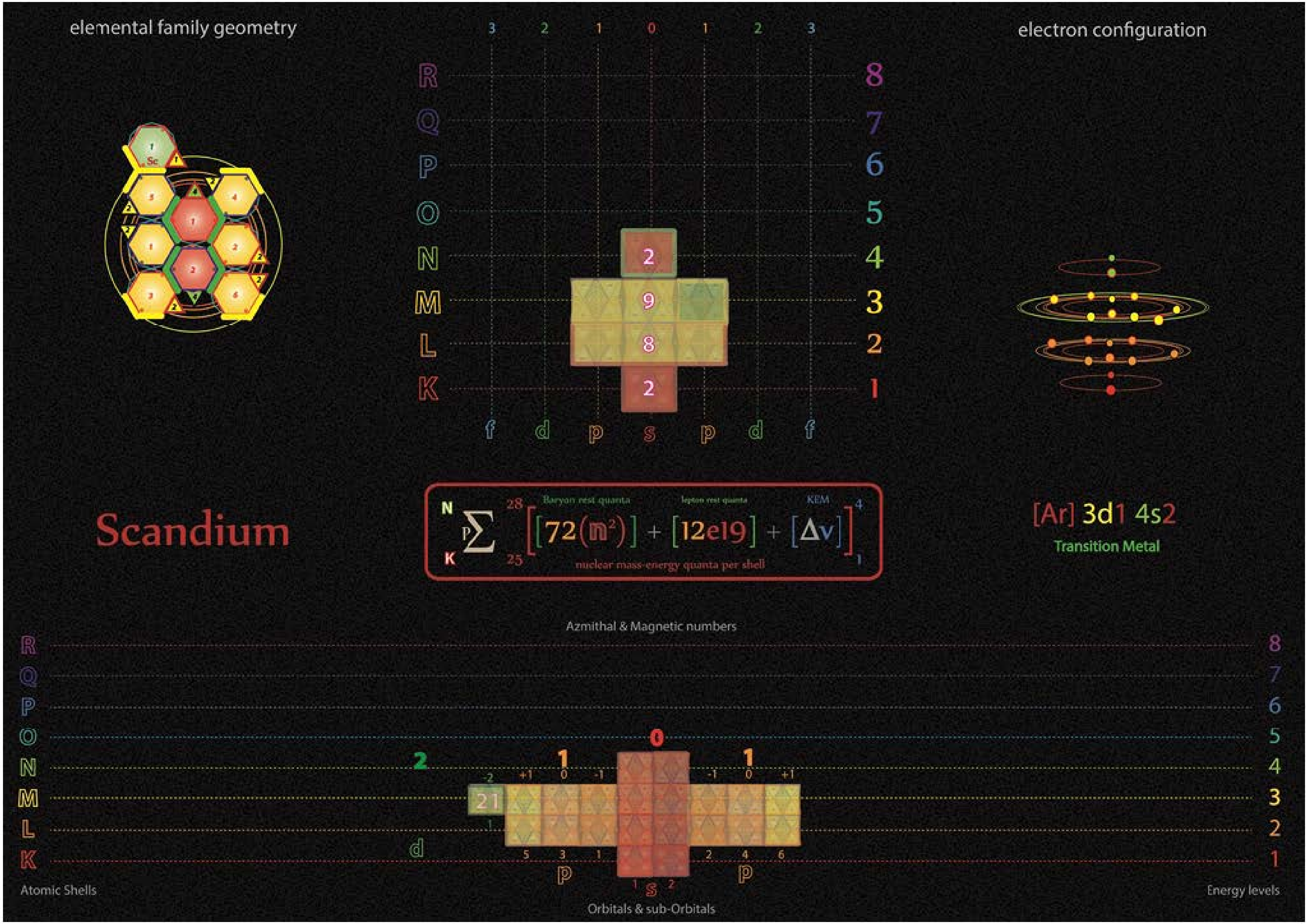
Tetryonics 53.19 - Potassium atomic config

Copyright ABRAHAM [2008] - All rights reserved



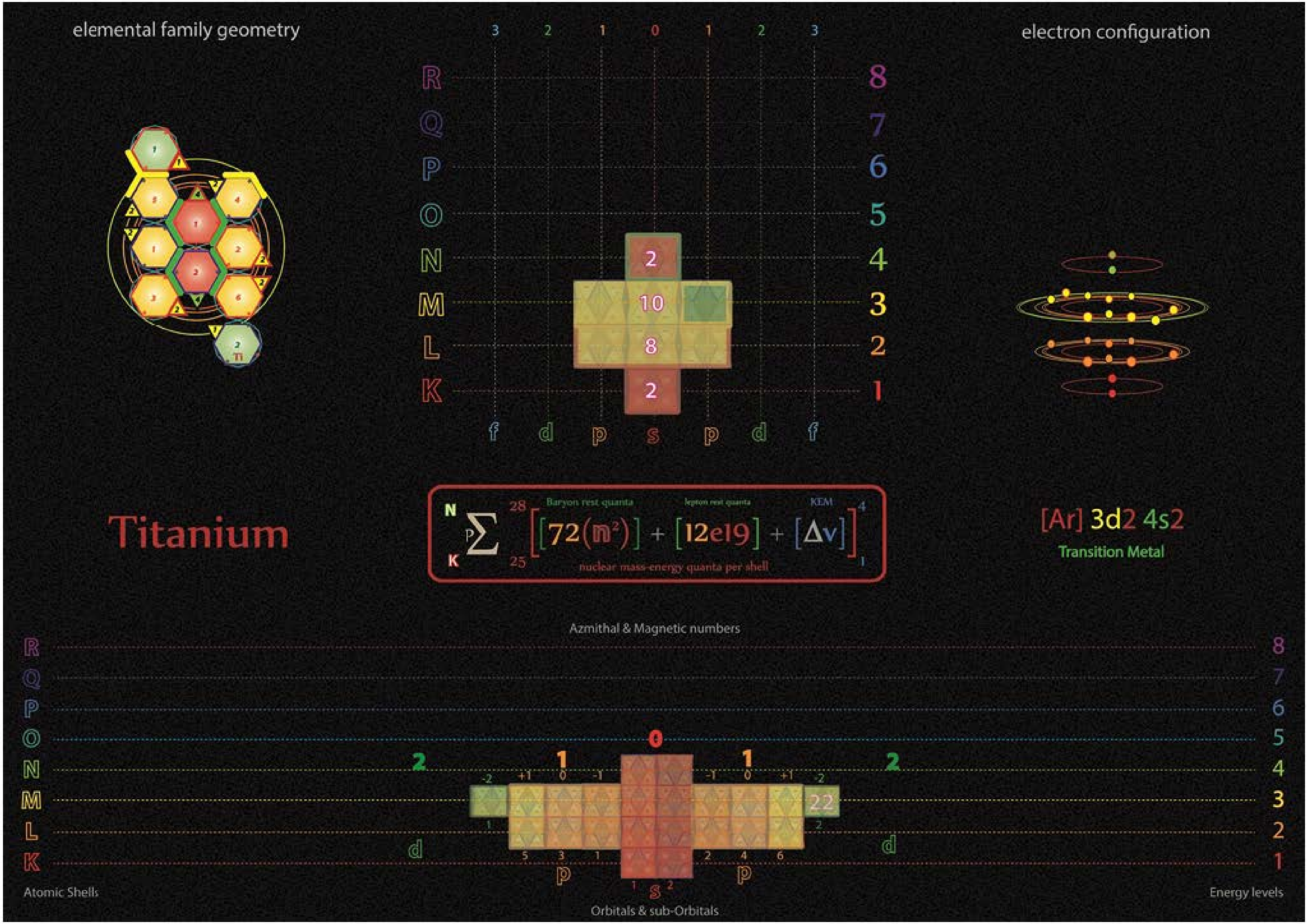
Tetryonics 53.20 - Calcium atomic config

Copyright ABRAHAM [2008] - All rights reserved



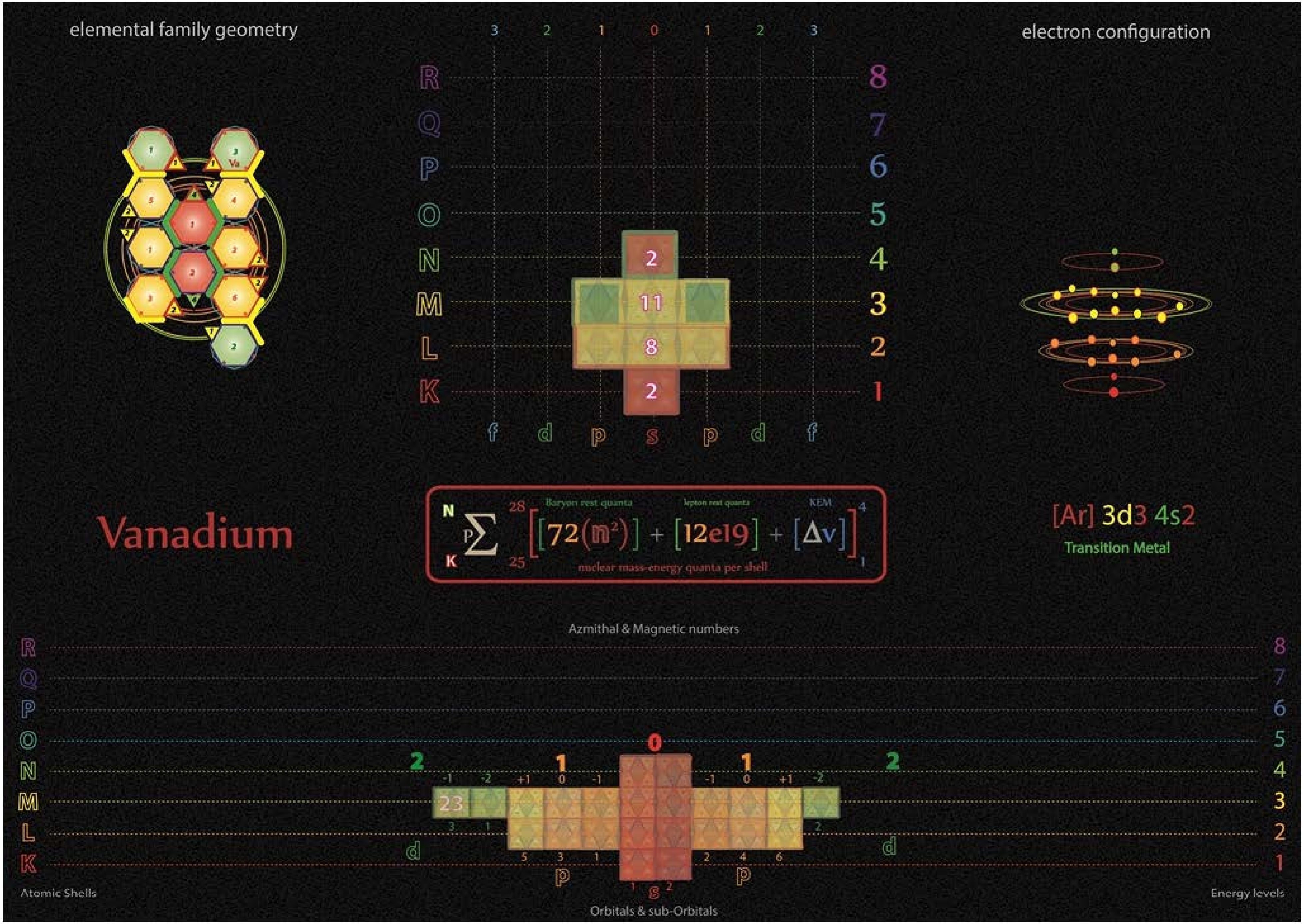
Tetryonics 53.21 - Scandium atomic config

Copyright ABRAHAM [2008] - All rights reserved



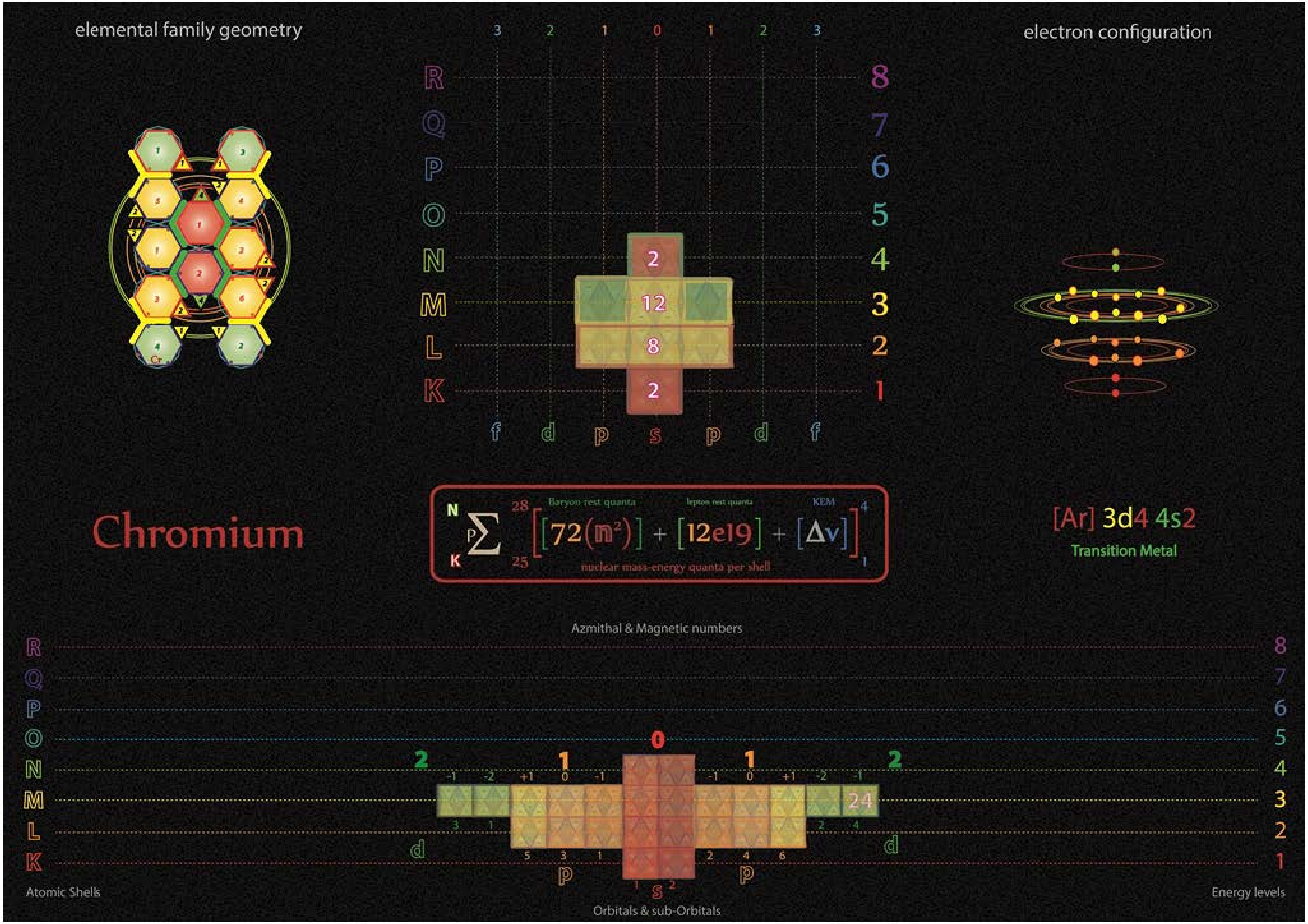
Tetryonics 53.22 - Titanium atomic config

Copyright ABRAHAM [2008] - All rights reserved

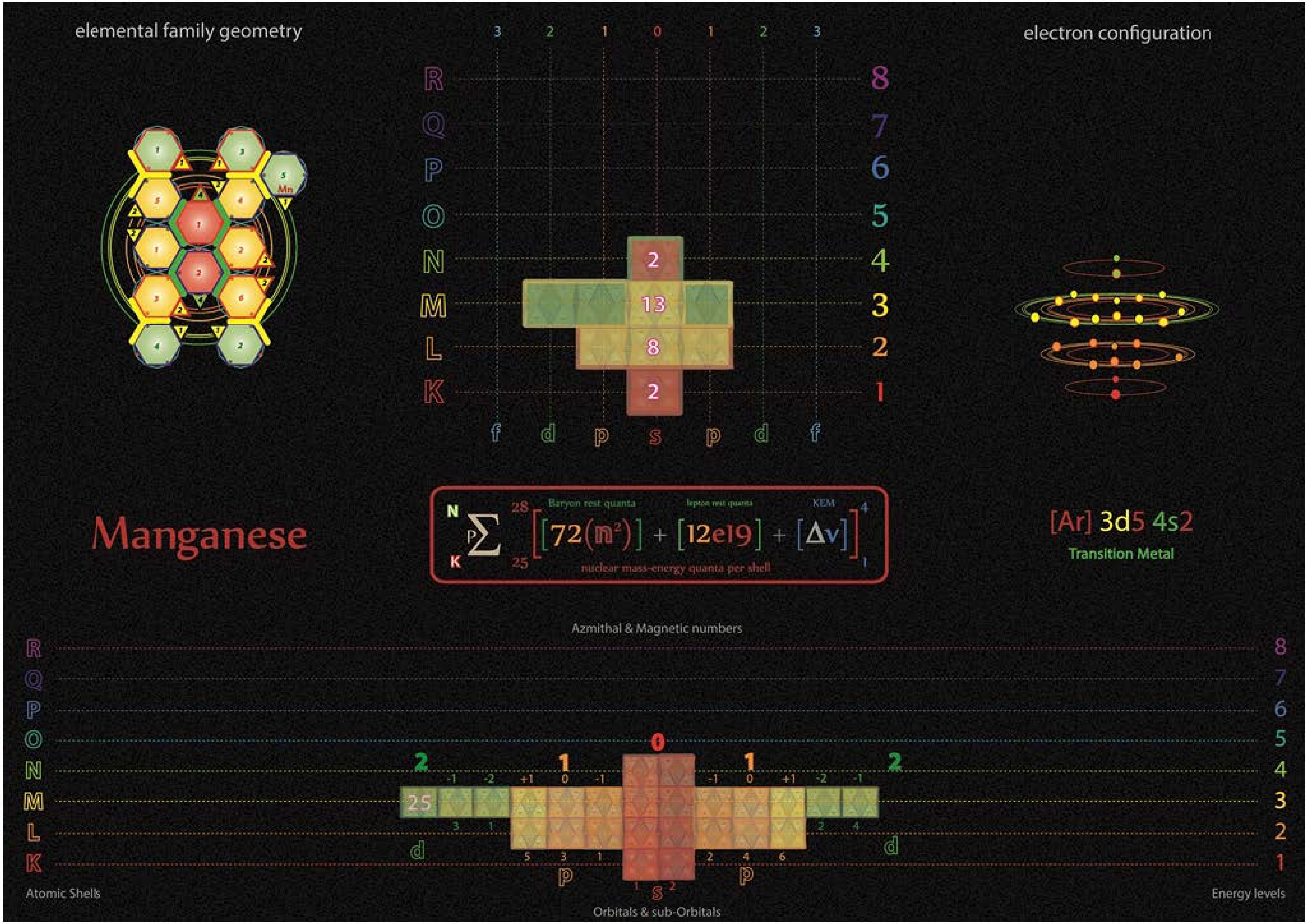


Tetryonics 53.23 - Vanadium atomic config

Copyright ABRAHAM [2008] - All rights reserved

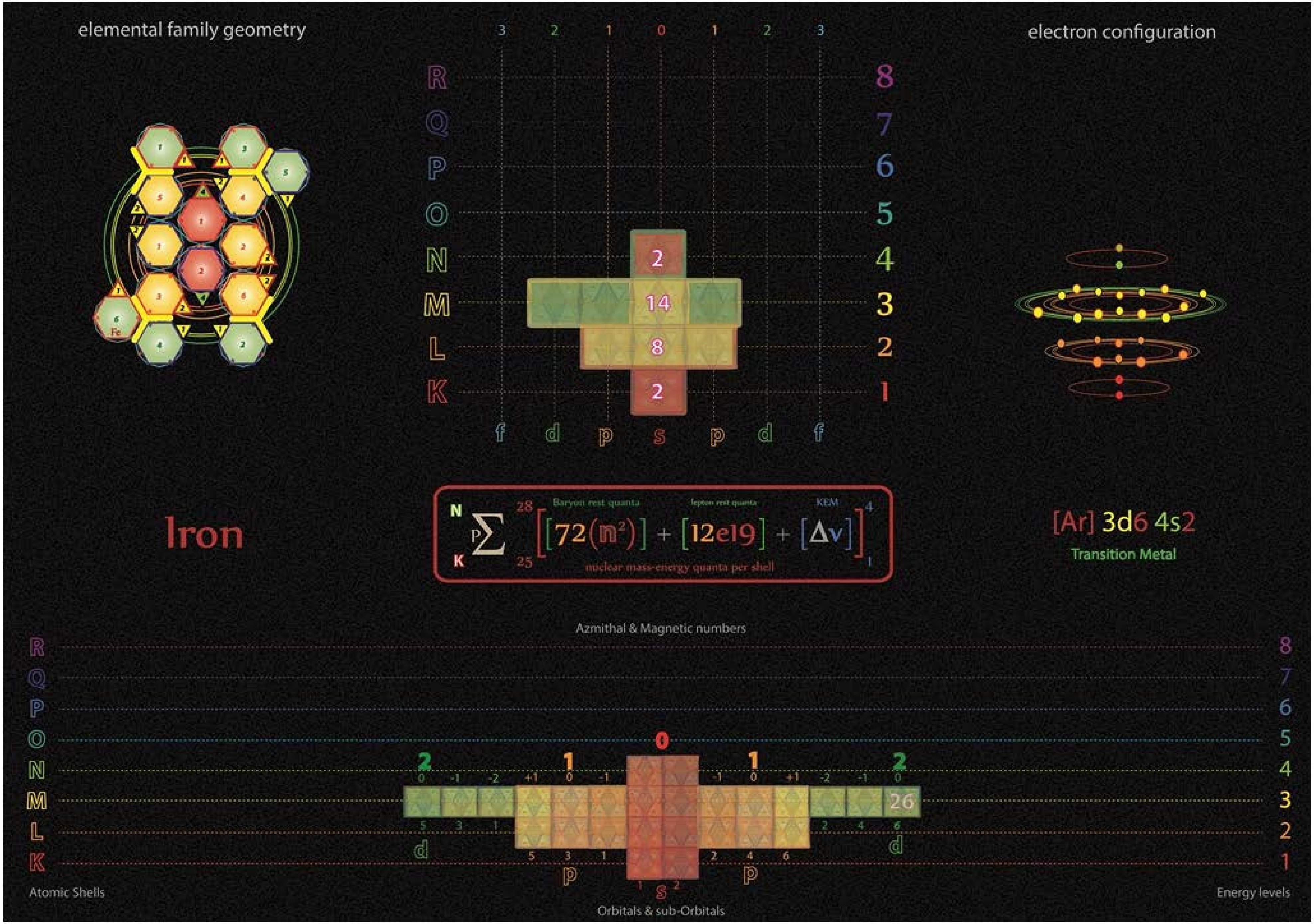


Copyright ABRAHAM [2008] - All rights reserved



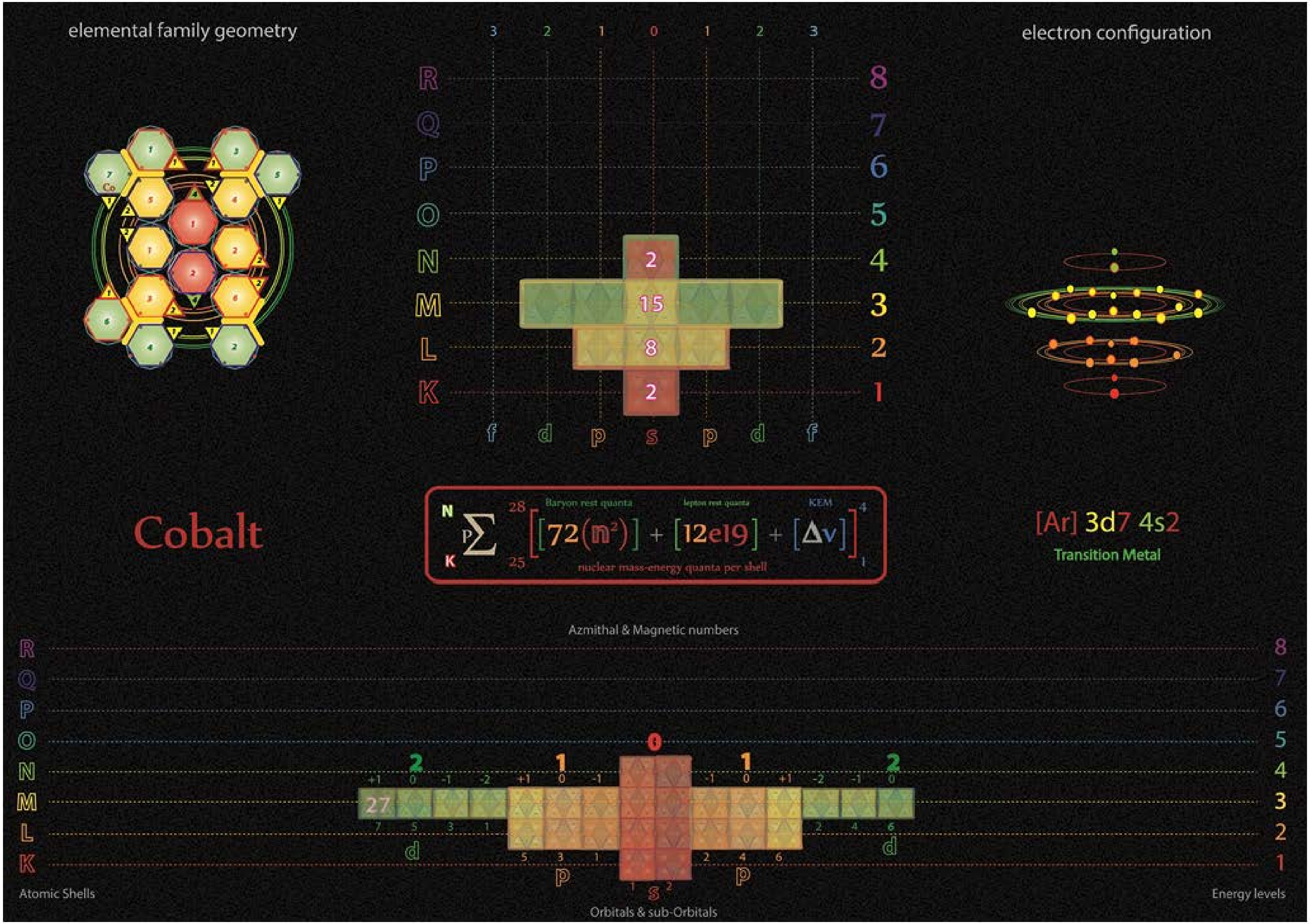
Tetryonics 53.25 - Manganese atomic config

Copyright ABRAHAM [2008] - All rights reserved



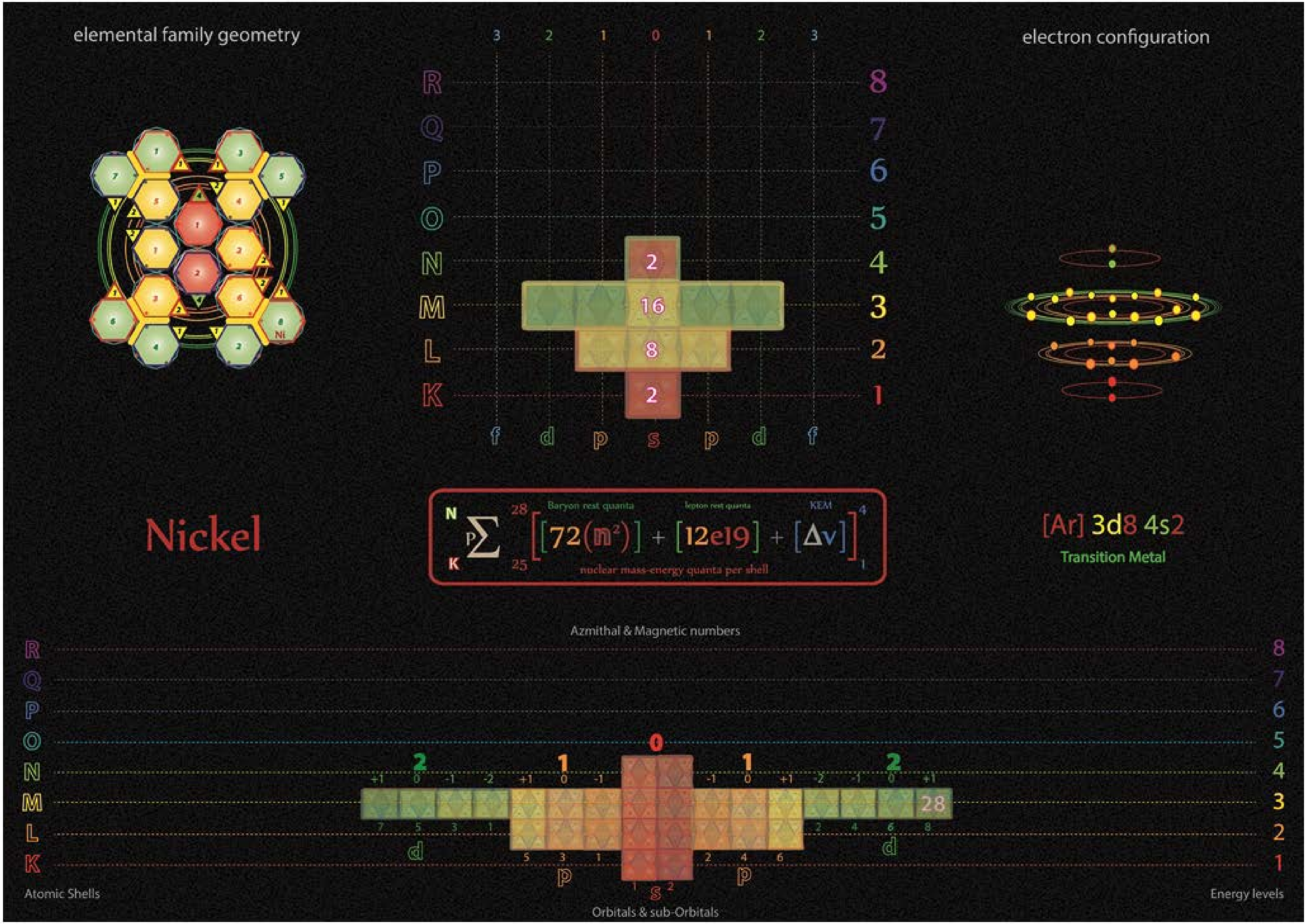
Tetryonics 53.26 - Iron atomic config

Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 53.27 - Cobalt atomic config

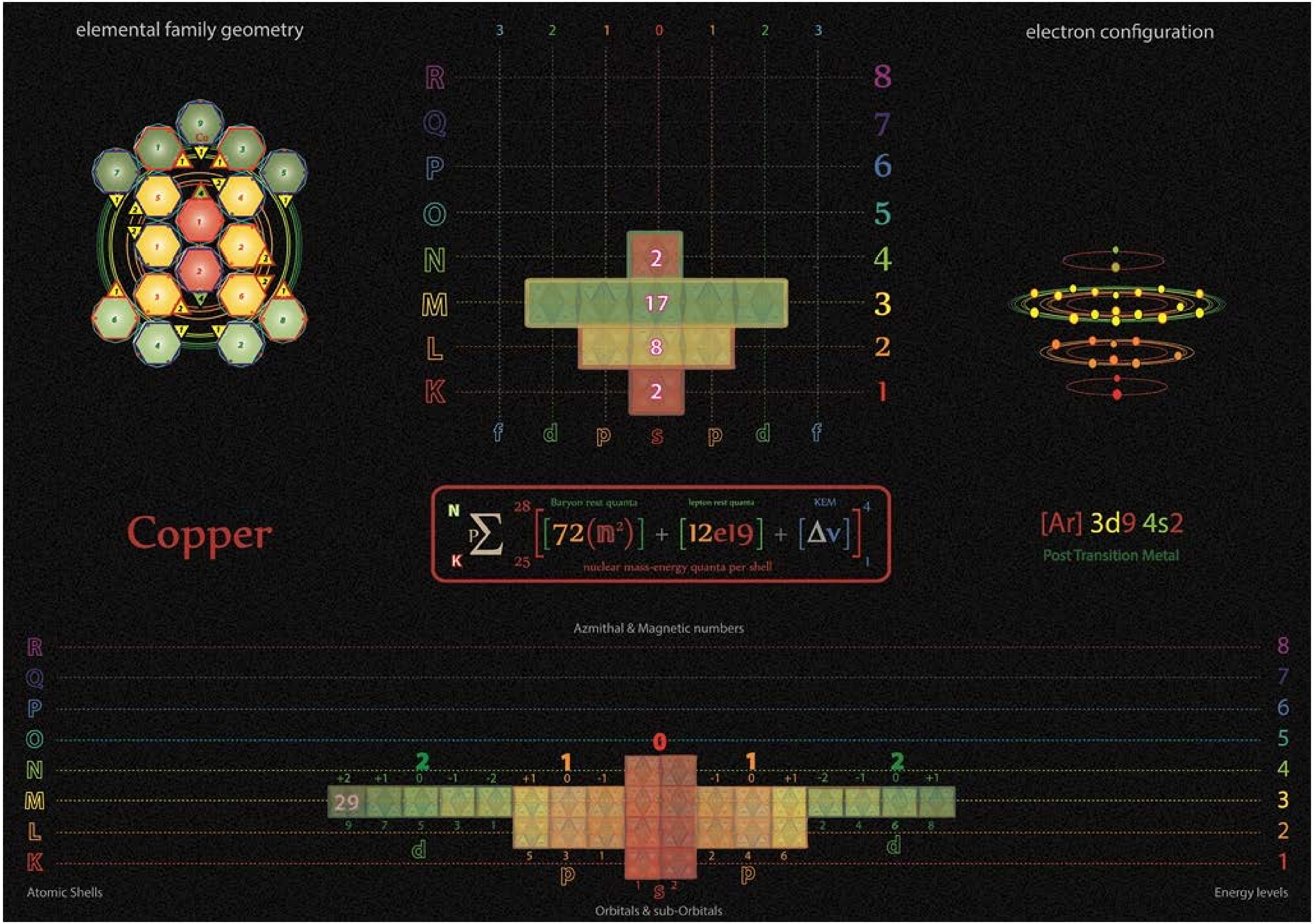
Copyright ABRAHAM [2008] - All rights reserved



$$\sum_{K}^{N} P \sum_{25}^{28} \left[[72(\mathrm{m}^2)] + [12e19] + [\Delta v] \right]_1^4$$

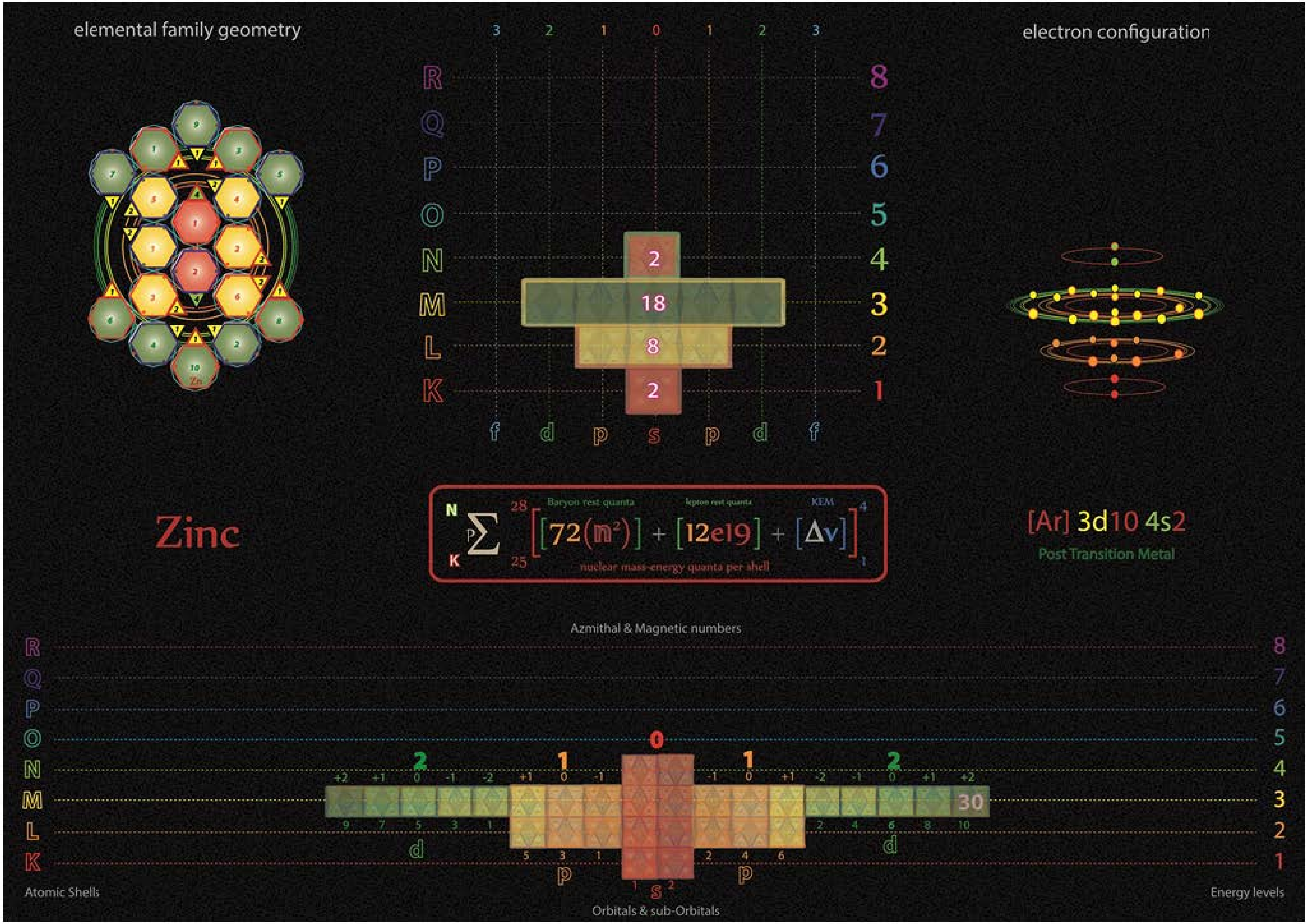
Tetryonics 53.28 - Nickel atomic config

Copyright ABRAHAM [2008] - All rights reserved

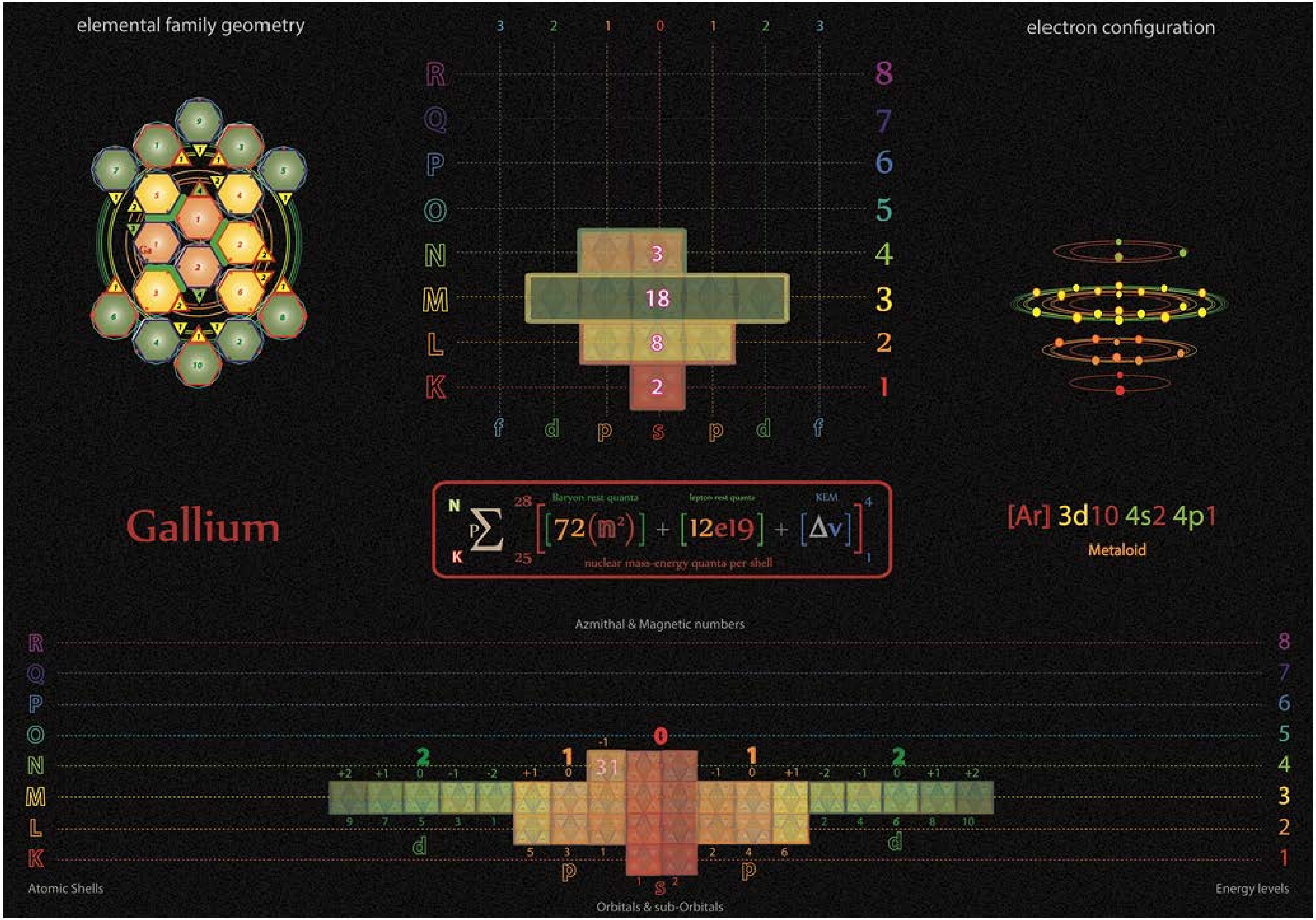


Tetryonics 53.29 - Copper atomic config

Copyright ABRAHAM [2008] - All rights reserved

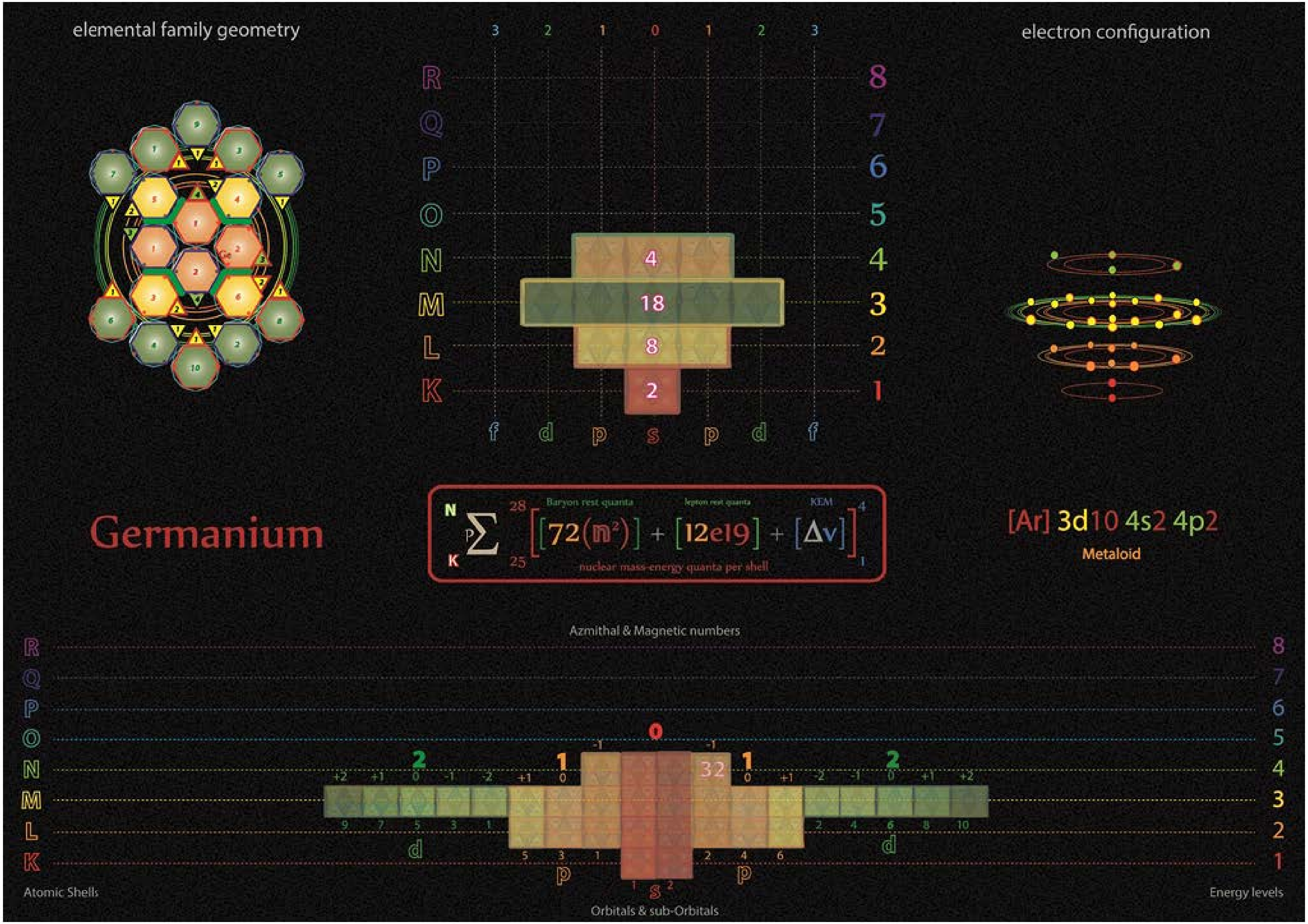


Tetryonics 53.30 - Zinc atomic config



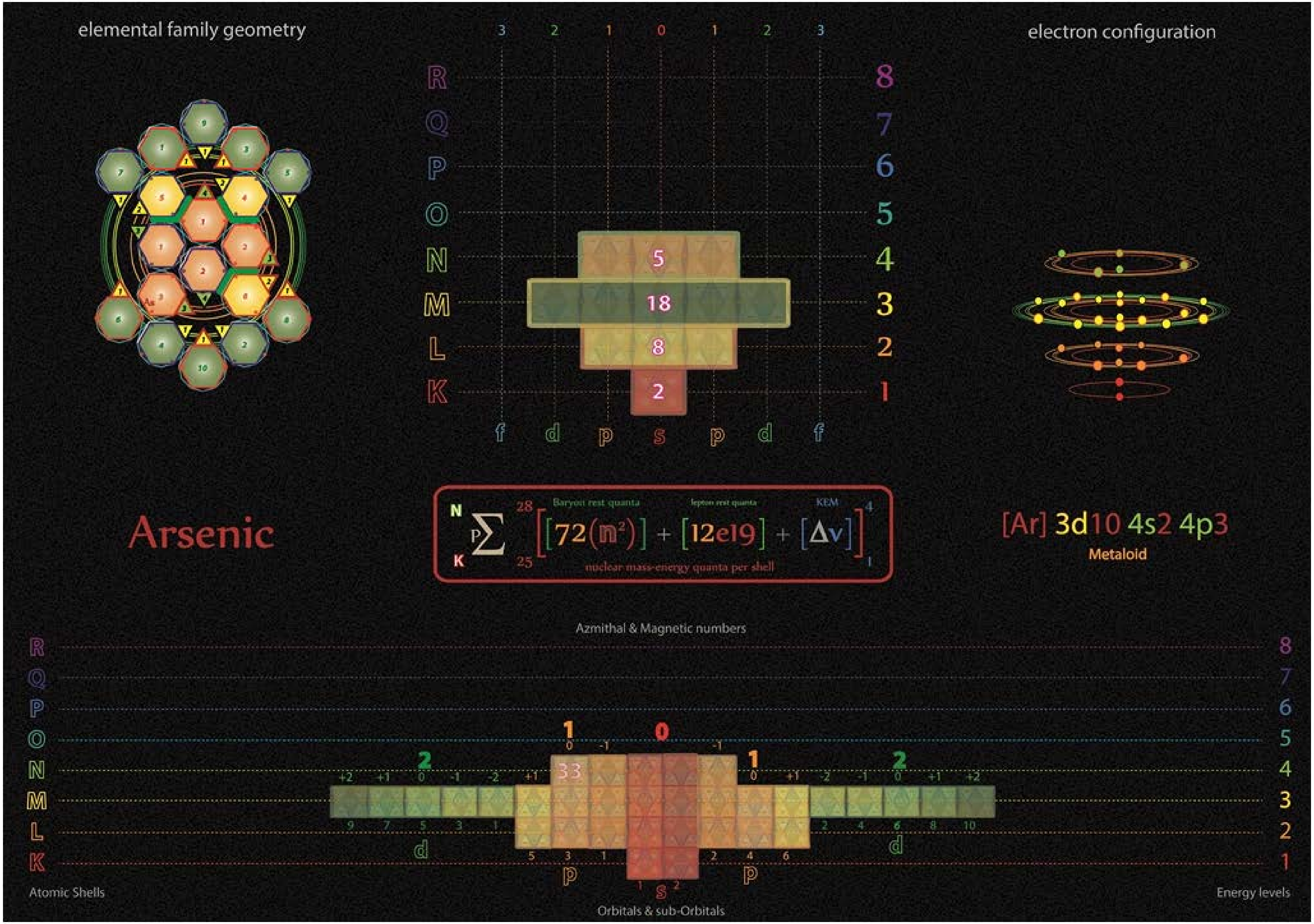
Tetryonics 53.31 - Gallium atomic config

Copyright ABRAHAM [2008] - All rights reserved



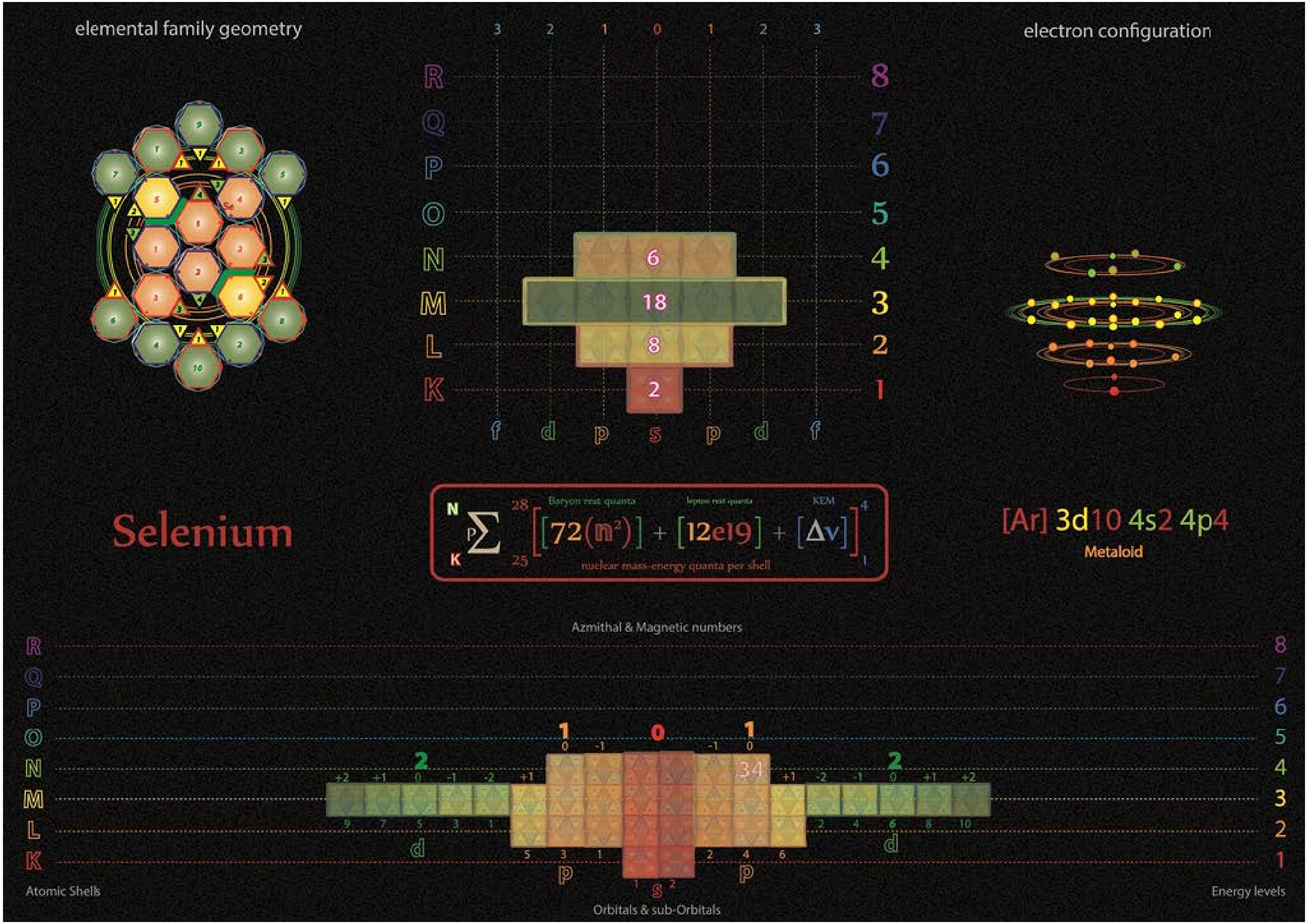
Tetryonics 53.32 - Germanium atomic config

Copyright ABRAHAM [2008] - All rights reserved

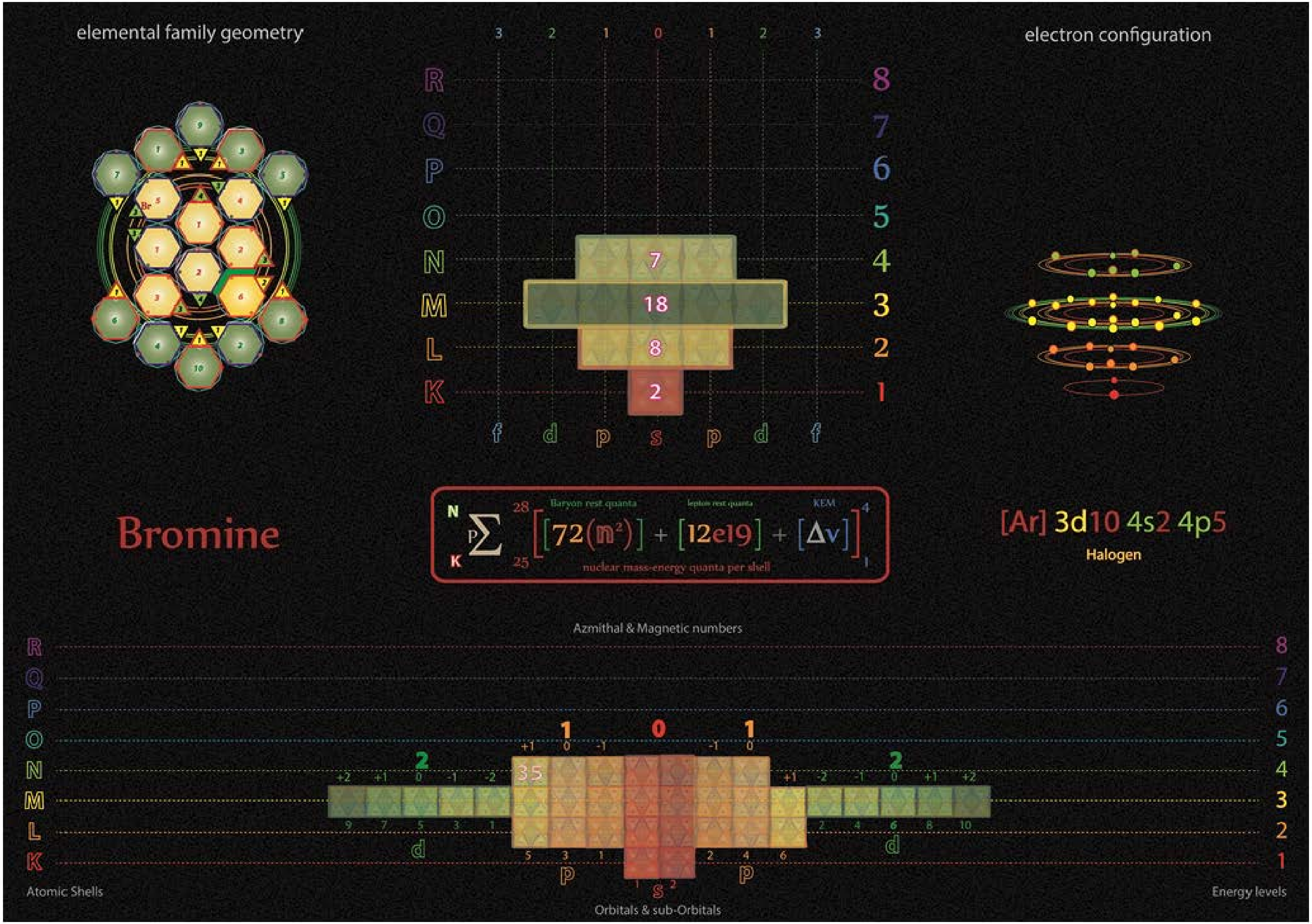


Tetryonics 53.33 - Arsenic atomic config

Copyright ABRAHAM [2008] - All rights reserved

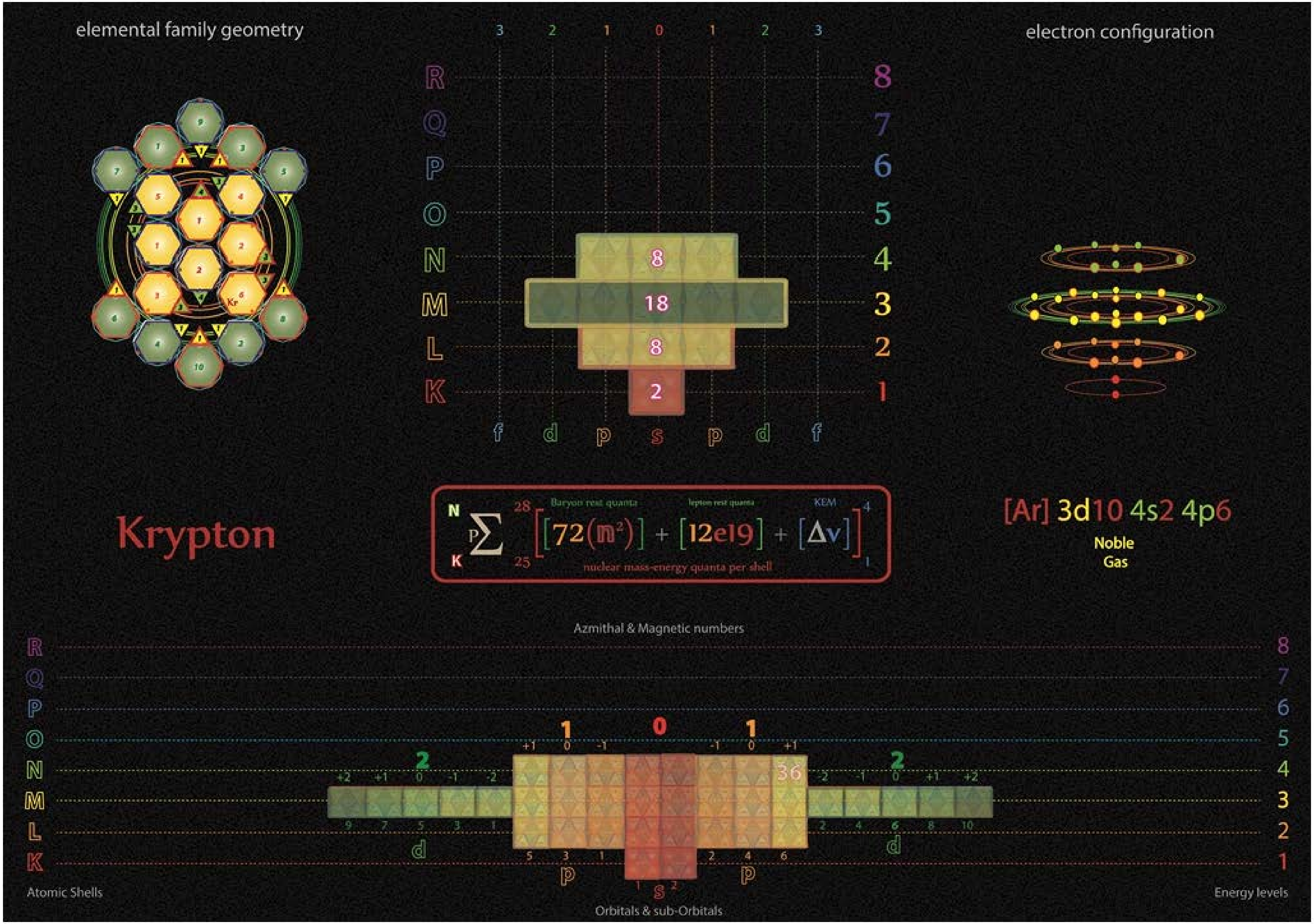


Tetryonics 53.34 - Selenium atomic config



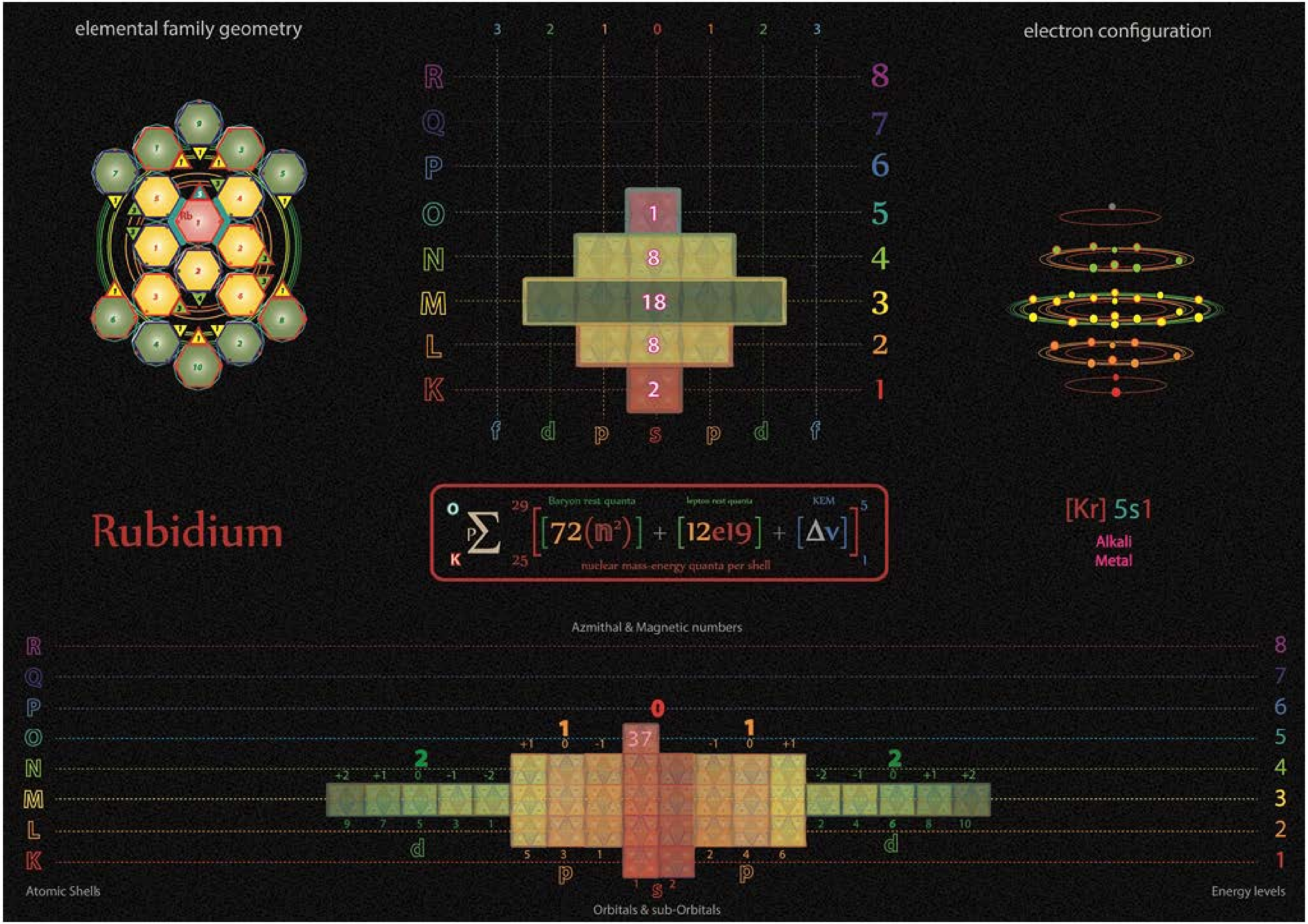
Tetryonics 53.35 - Bromine atomic config

Copyright ABRAHAM [2008] - All rights reserved



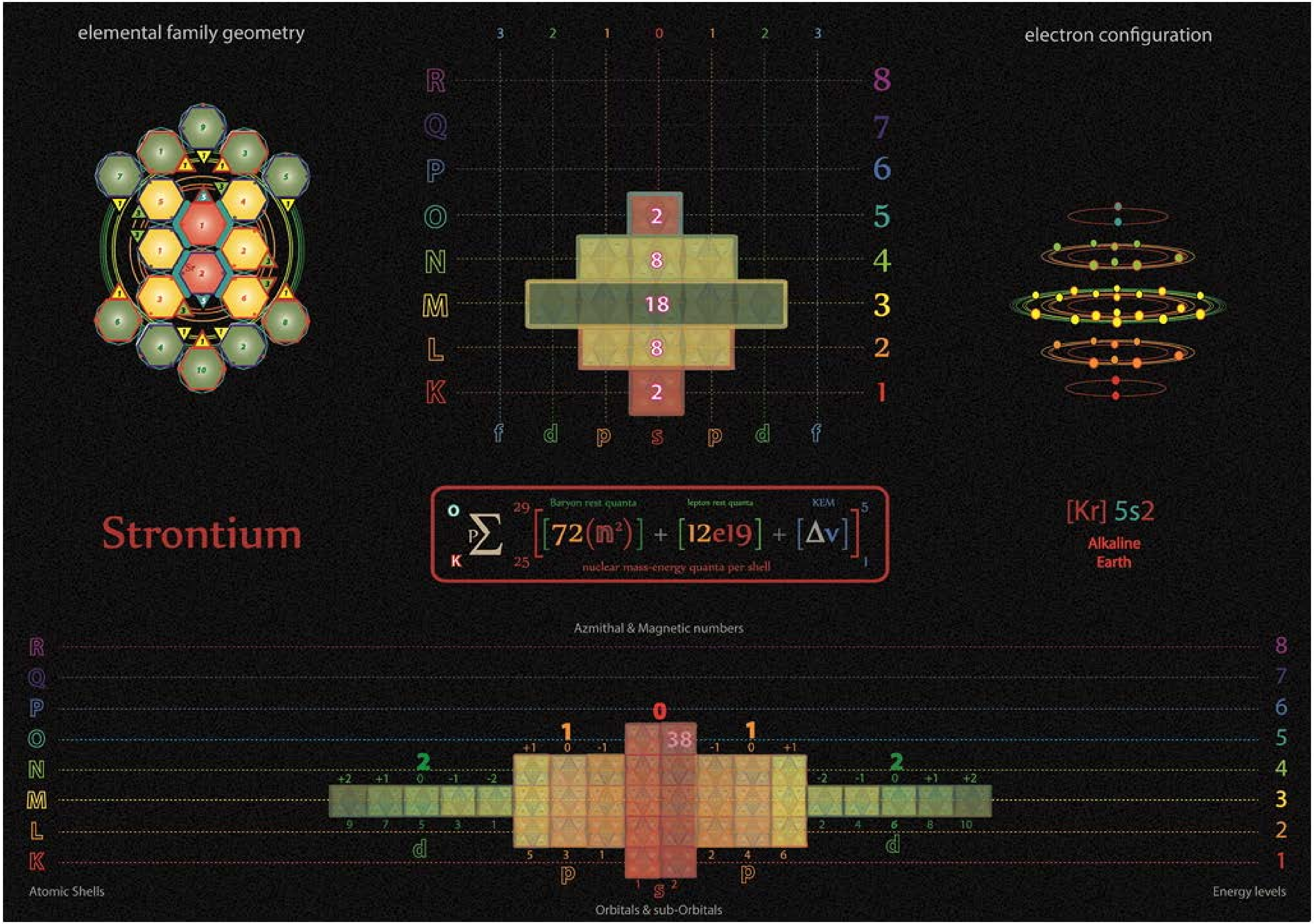
Tetryonics 53.36 - Krypton atomic config

Copyright ABRAHAM [2008] - All rights reserved

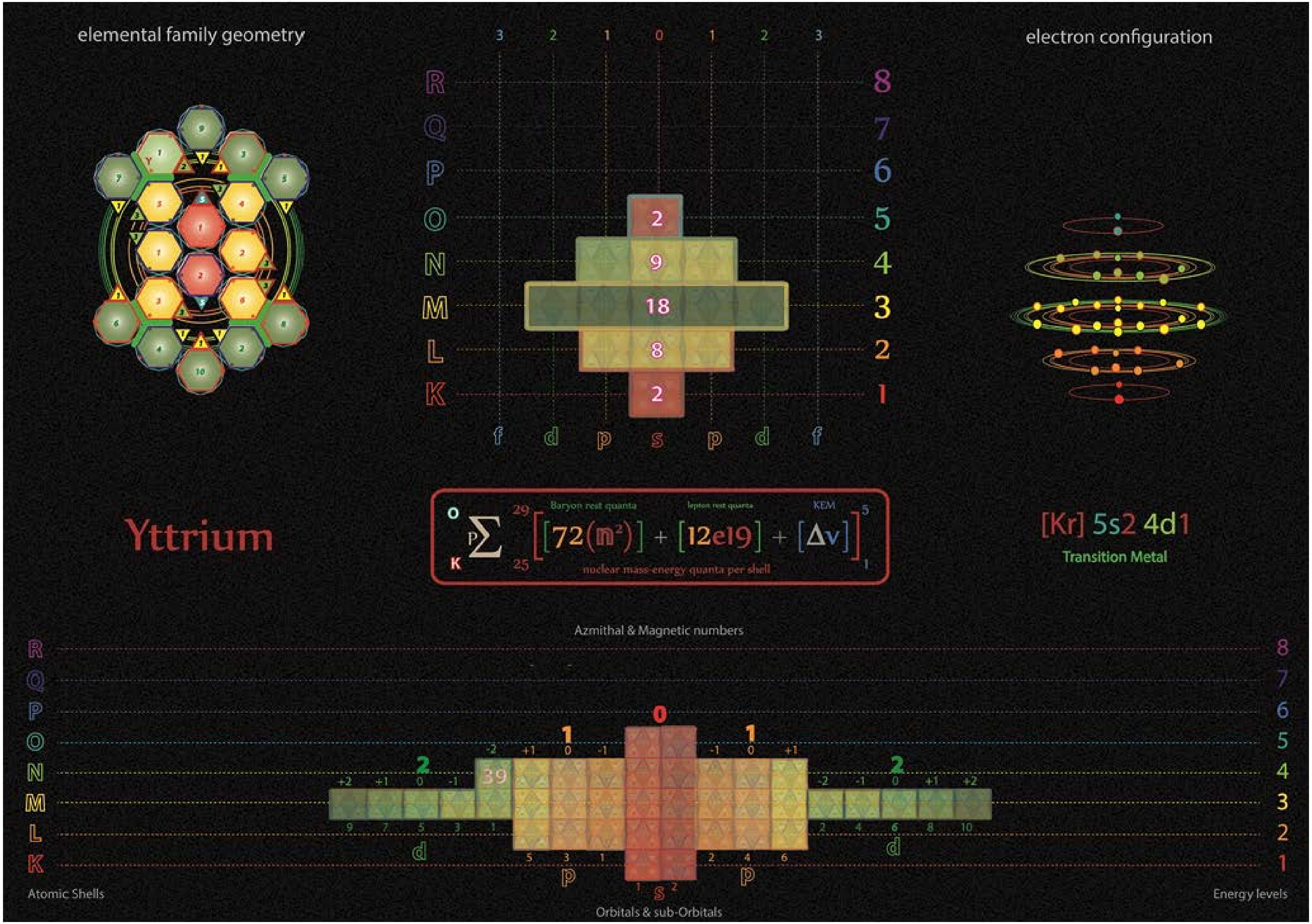


Tetryonics 53.37 - Rubidium atomic config

Copyright ABRAHAM [2008] - All rights reserved

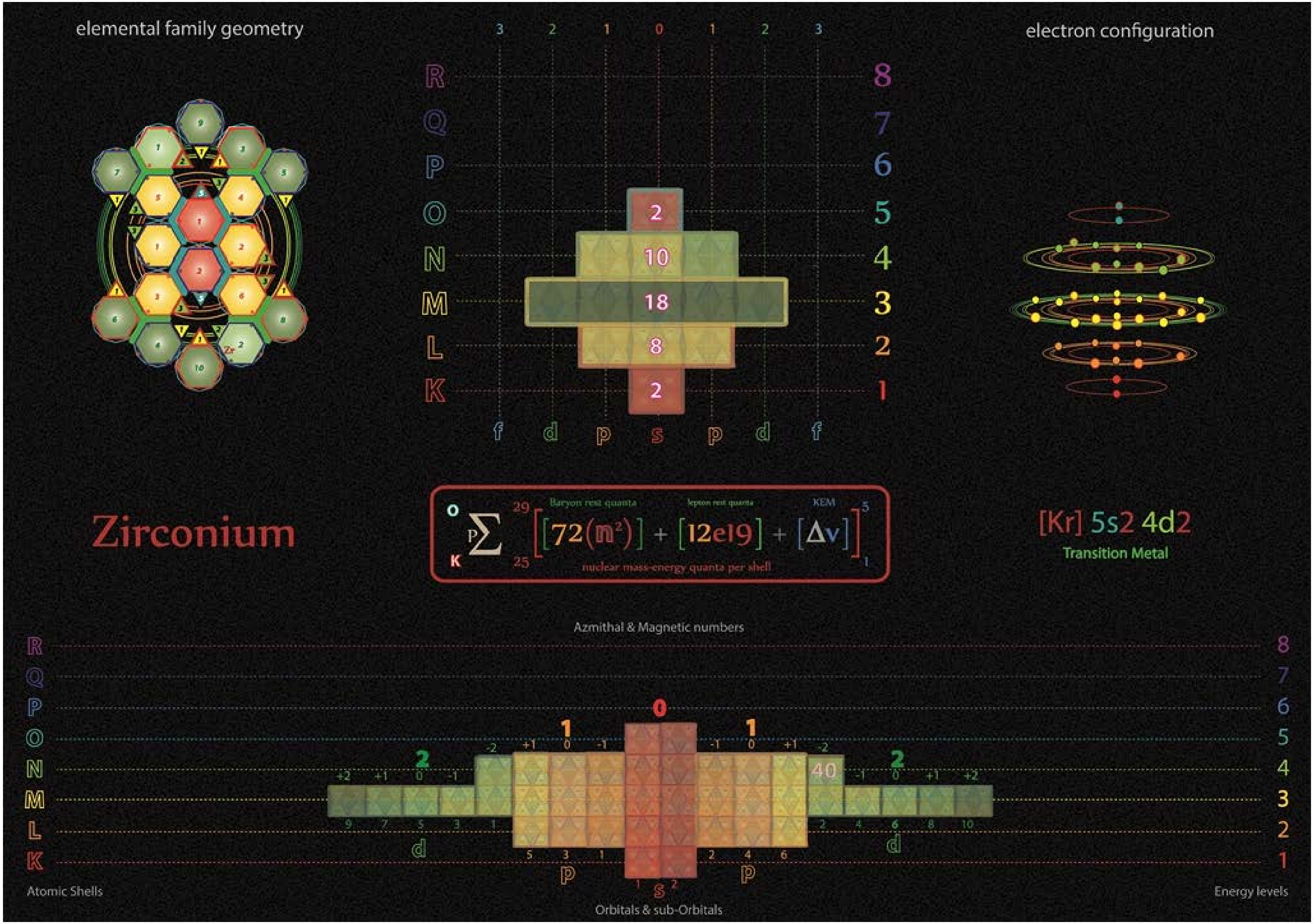


Tetryonics 53.38 - Strontium atomic config



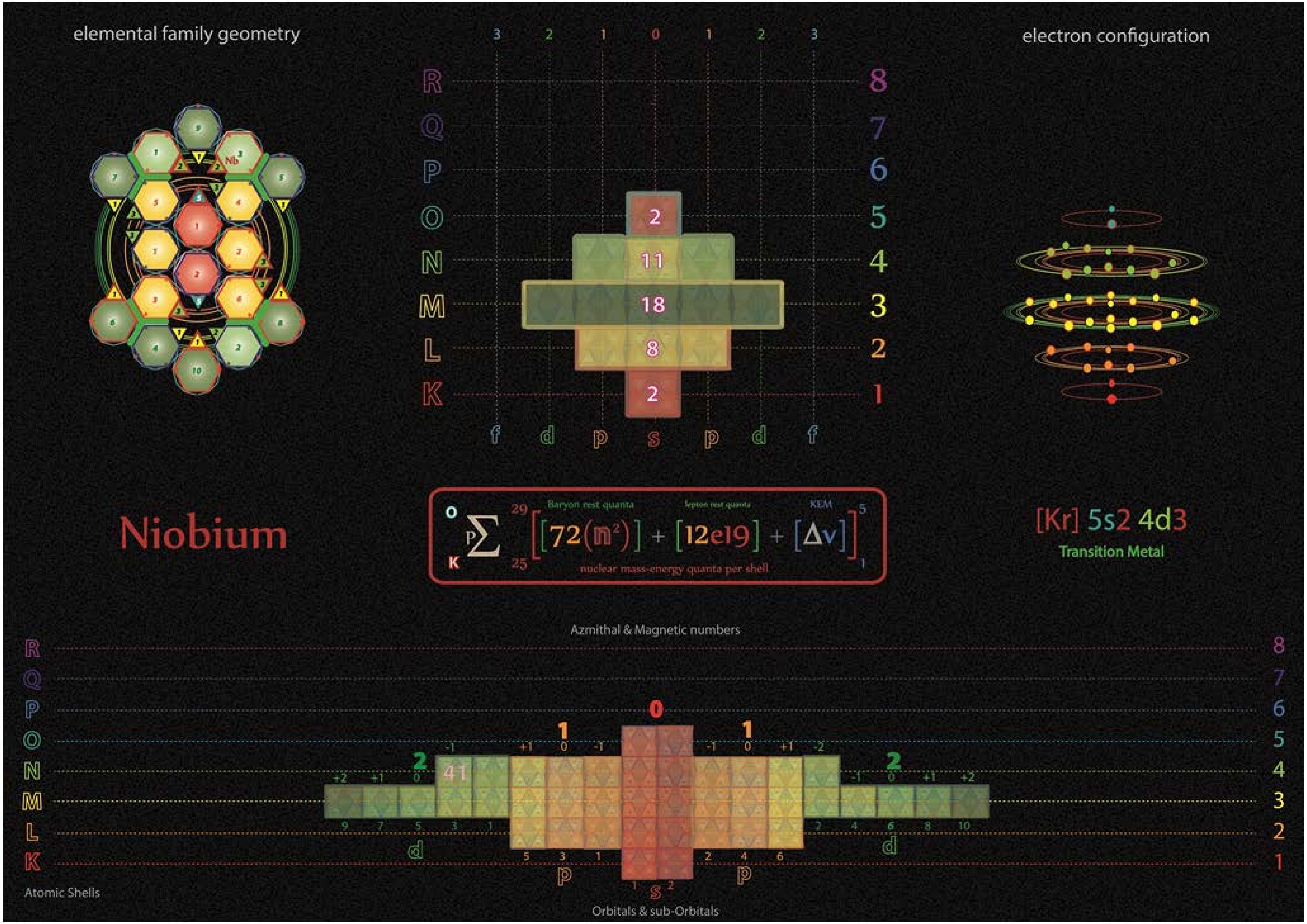
Tetryonics 53.39 - Yttrium atomic config

Copyright ABRAHAM [2008] - All rights reserved

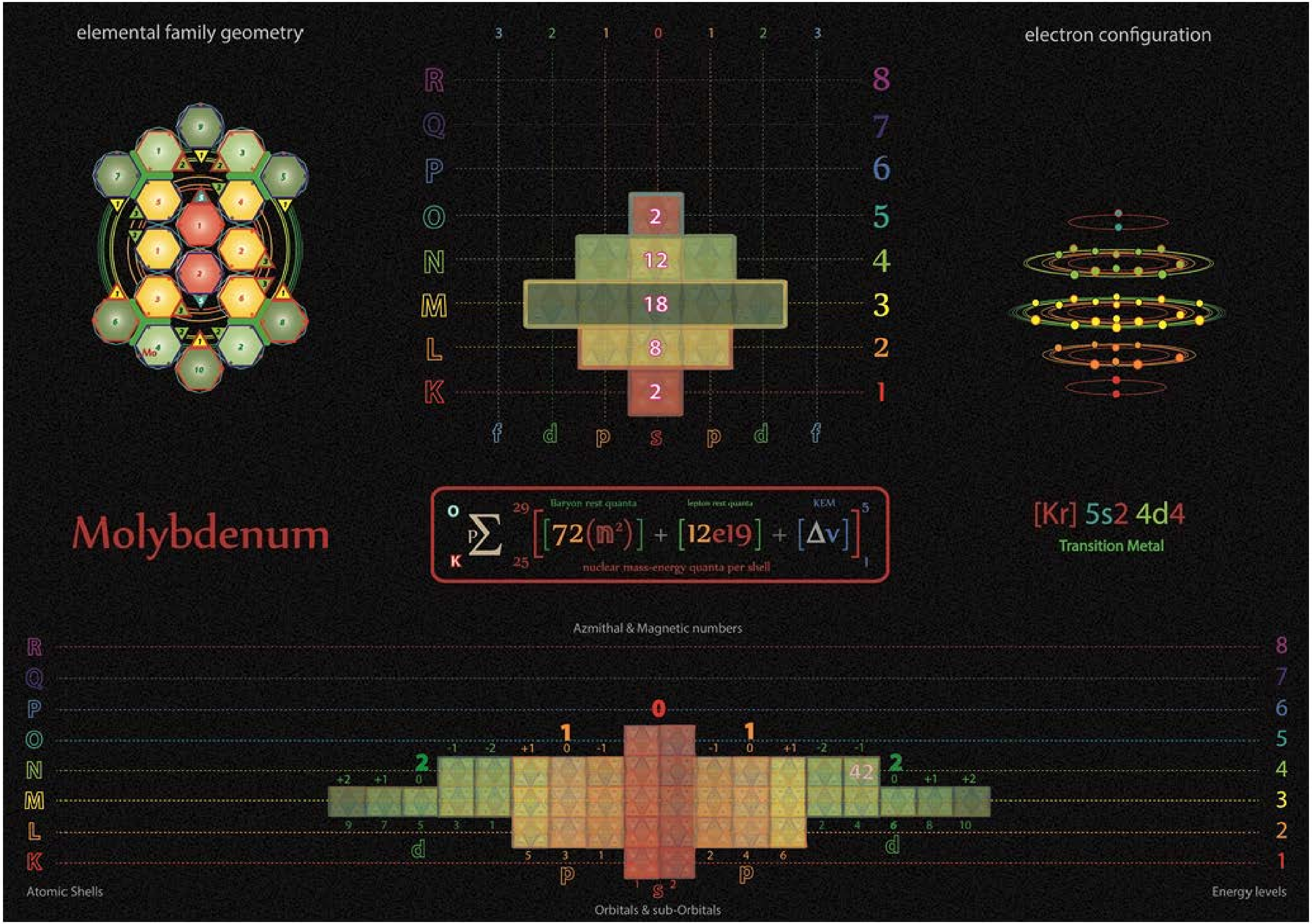


Tetryonics 53.40 - Zirconium atomic config

Copyright ABRAHAM [2008] - All rights reserved

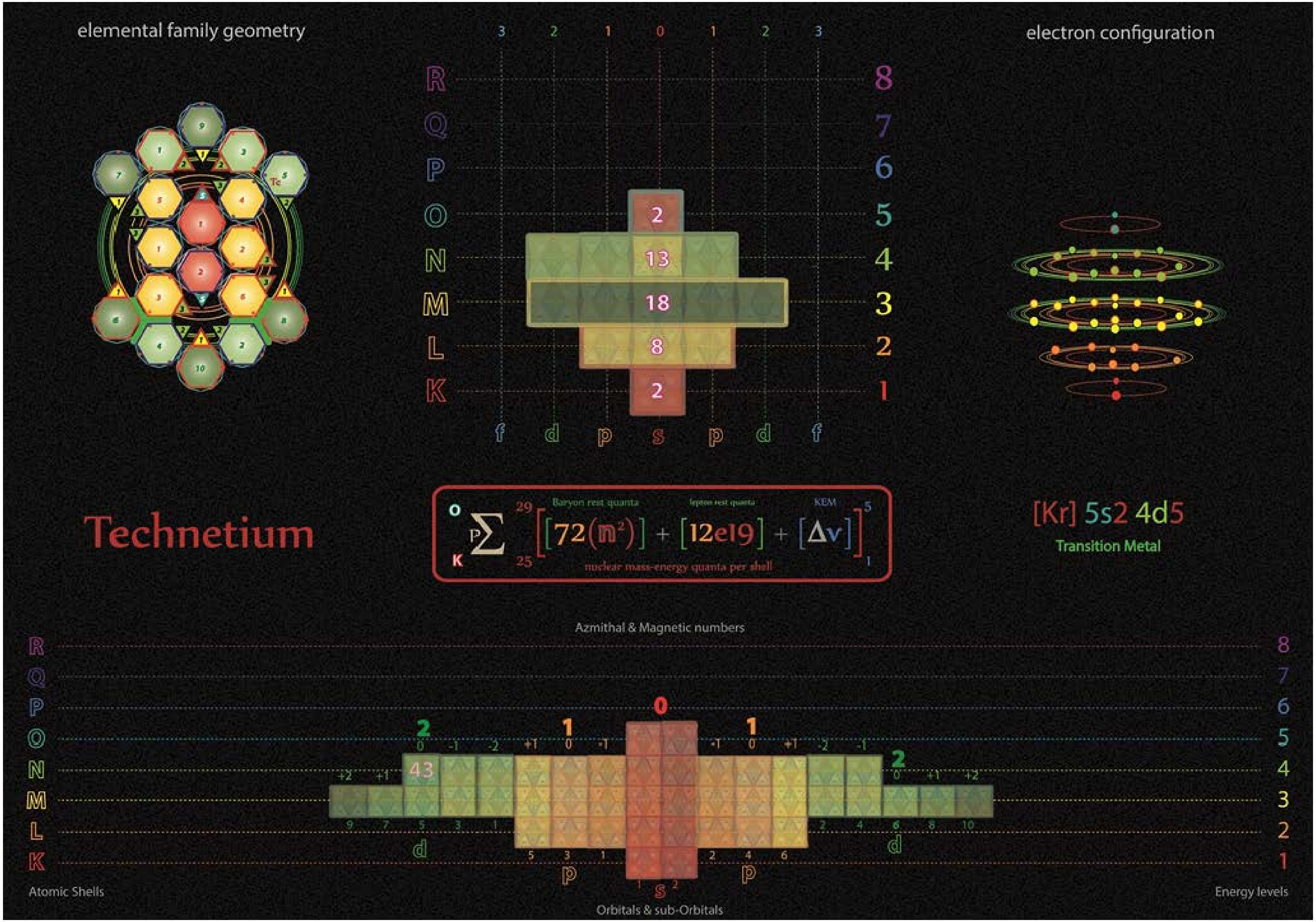


Copyright ABRAHAM [2008] - All rights reserved



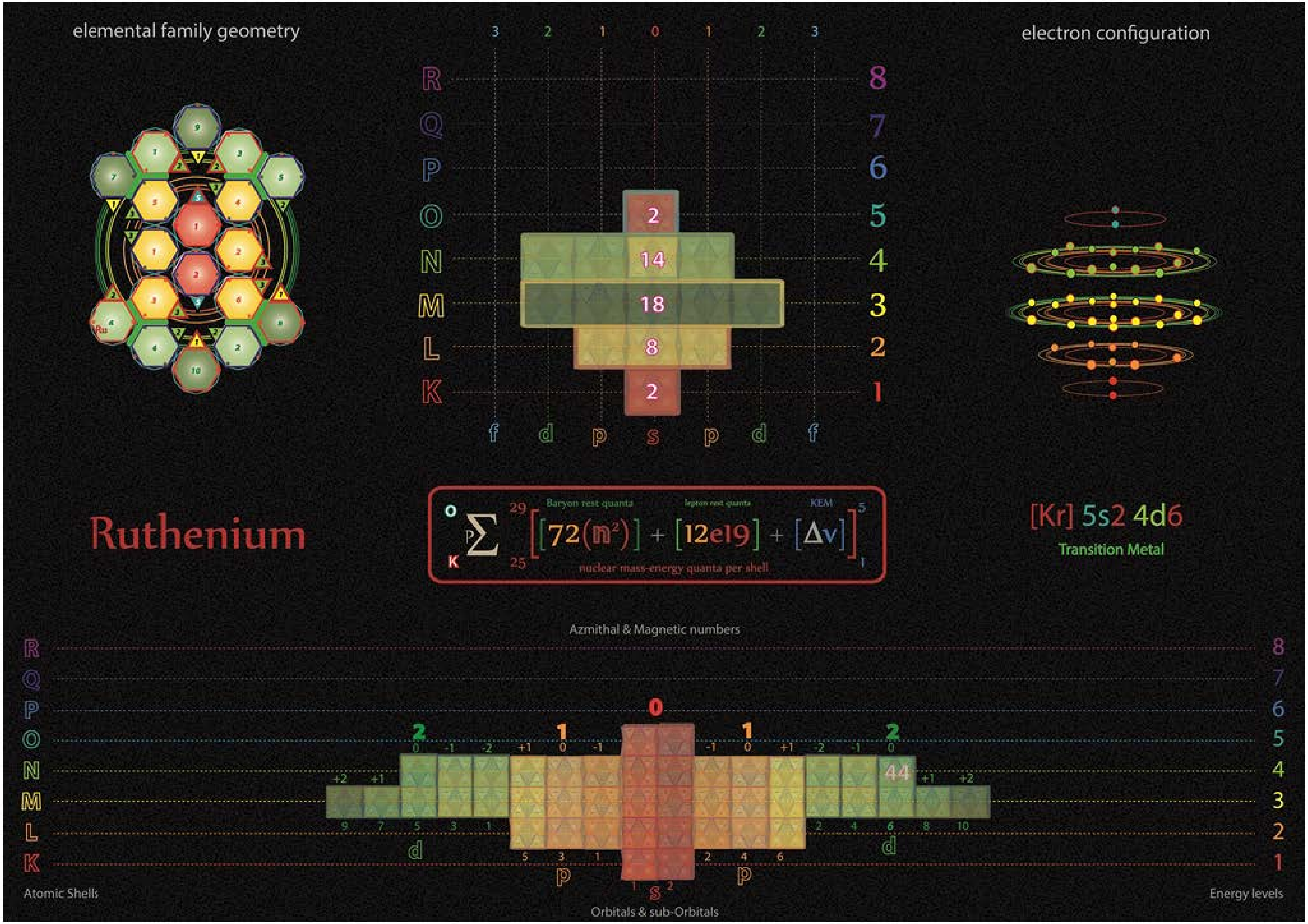
Tetryonics 53.42 - Molybdenum atomic config

Copyright ABRAHAM [2008] - All rights reserved



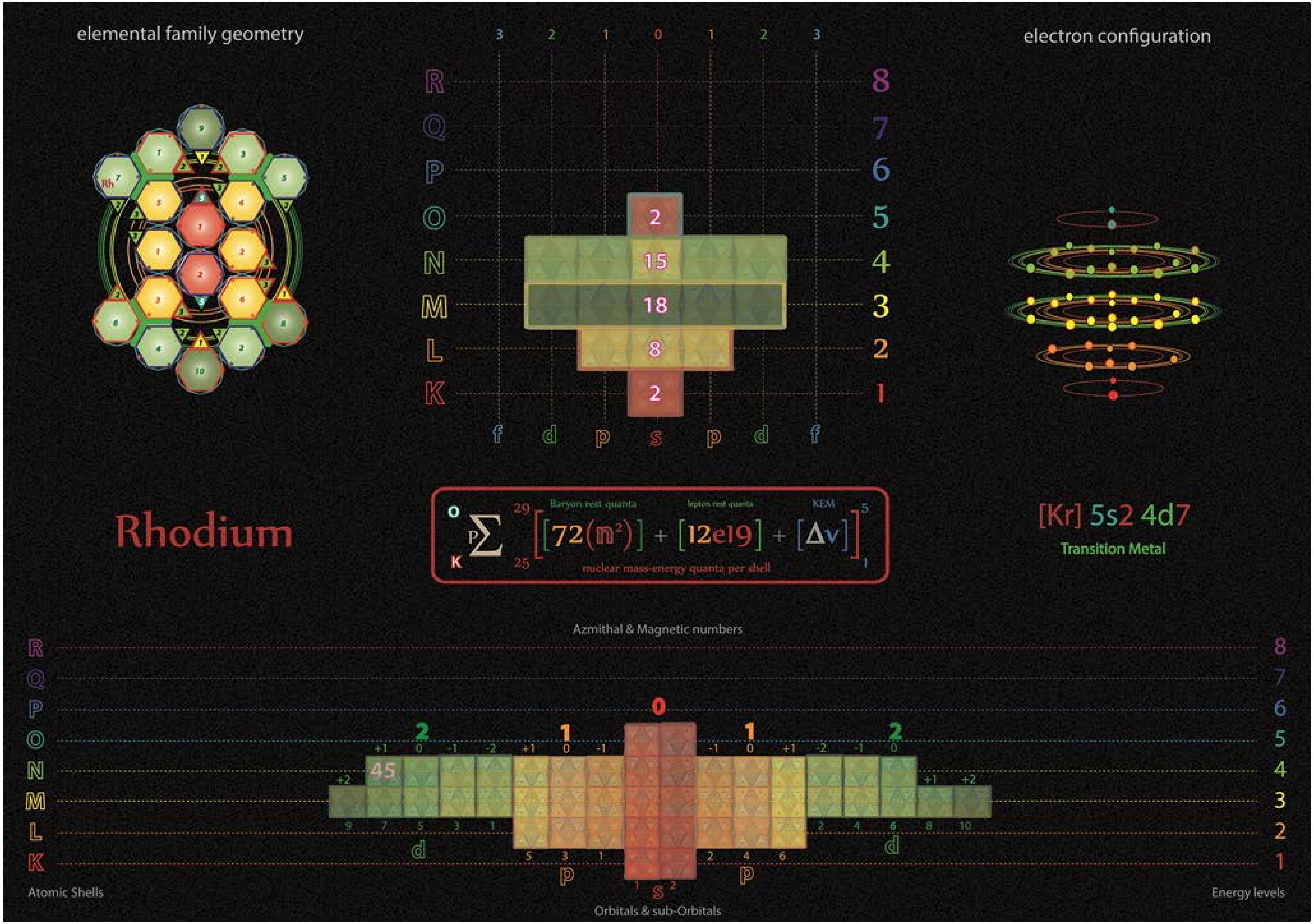
Tetryonics 53.43 - Technetium atomic config

Copyright ABRAHAM [2008] - All rights reserved



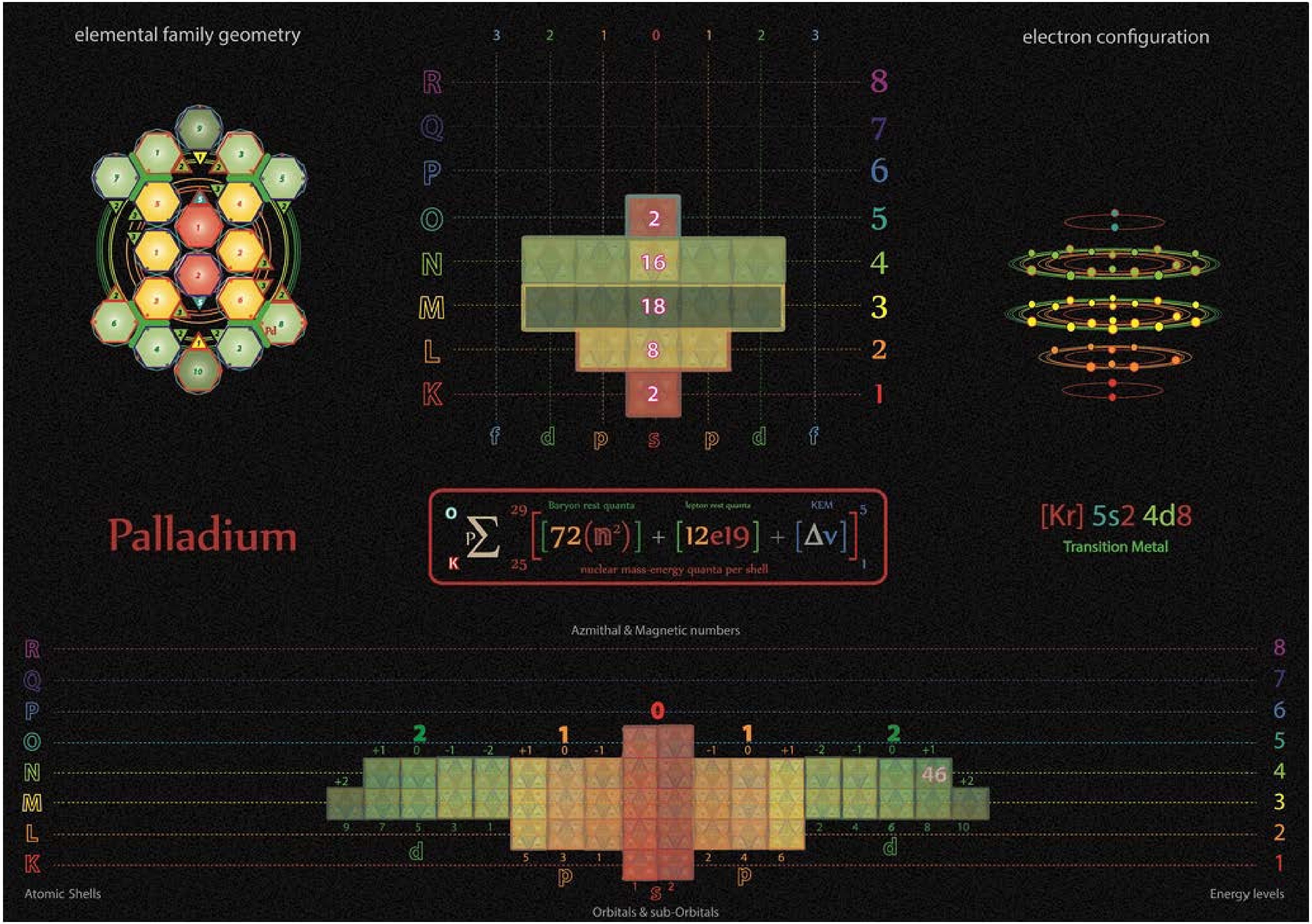
Tetryonics 53.44 - Ruthenium atomic config

Copyright ABRAHAM [2008] - All rights reserved



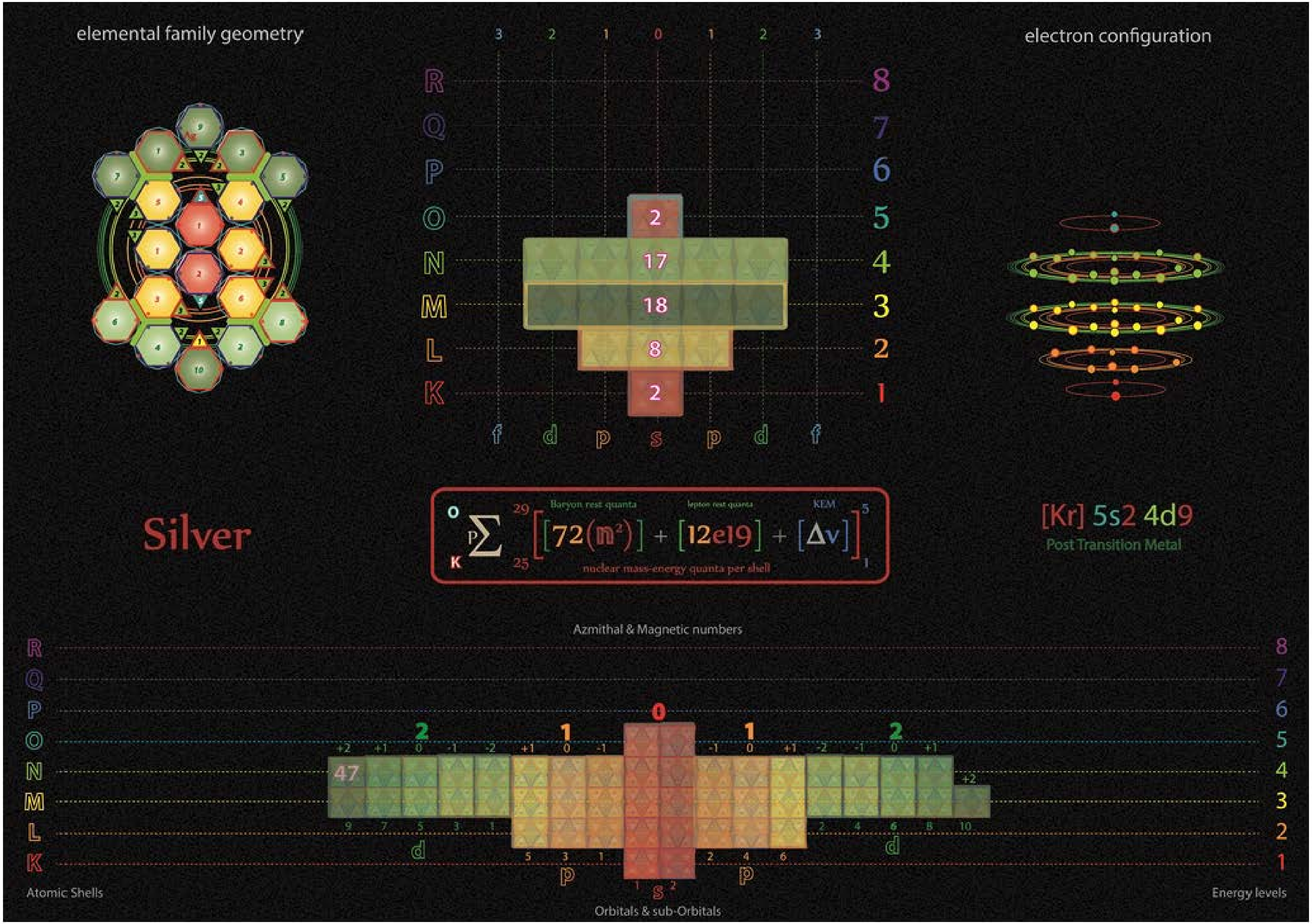
Tetryonics 53.45 - Rhodium atomic config

Copyright ABRAHAM [2008] - All rights reserved



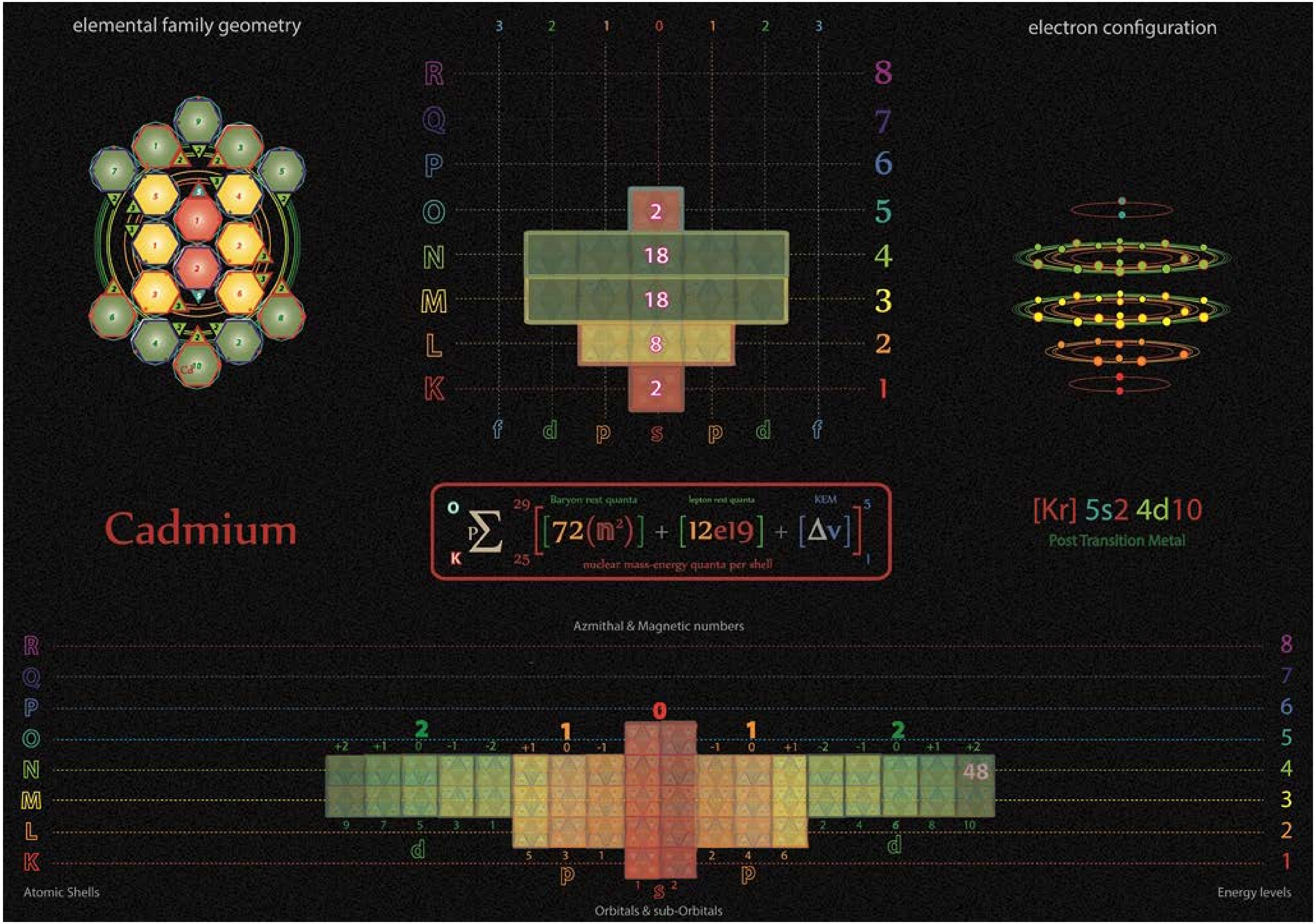
Tetryonics 53.46 - Palladium atomic config

Copyright ABRAHAM [2008] - All rights reserved



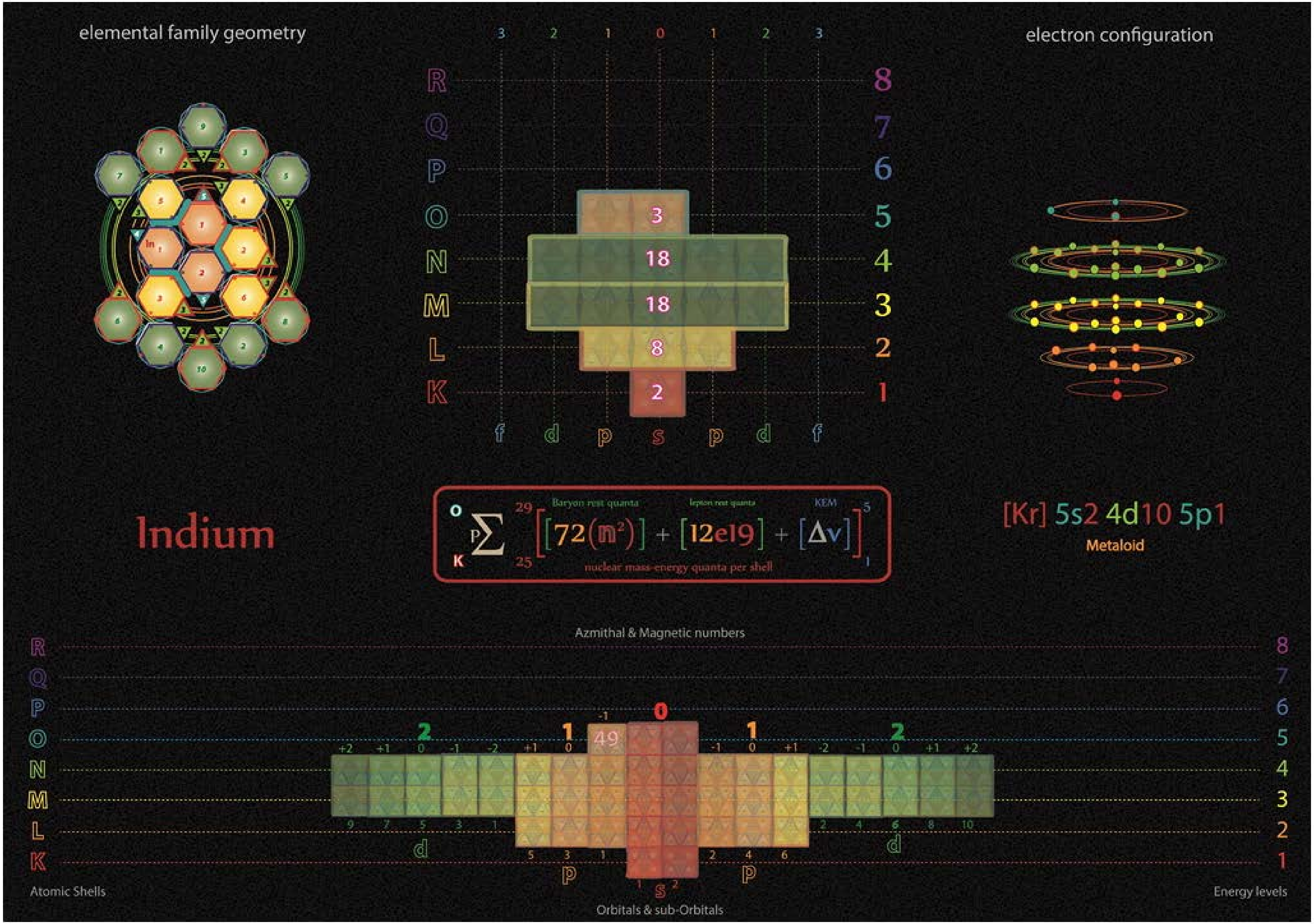
Tetryonics 53.47 - Silver atomic config

Copyright ABRAHAM [2008] - All rights reserved



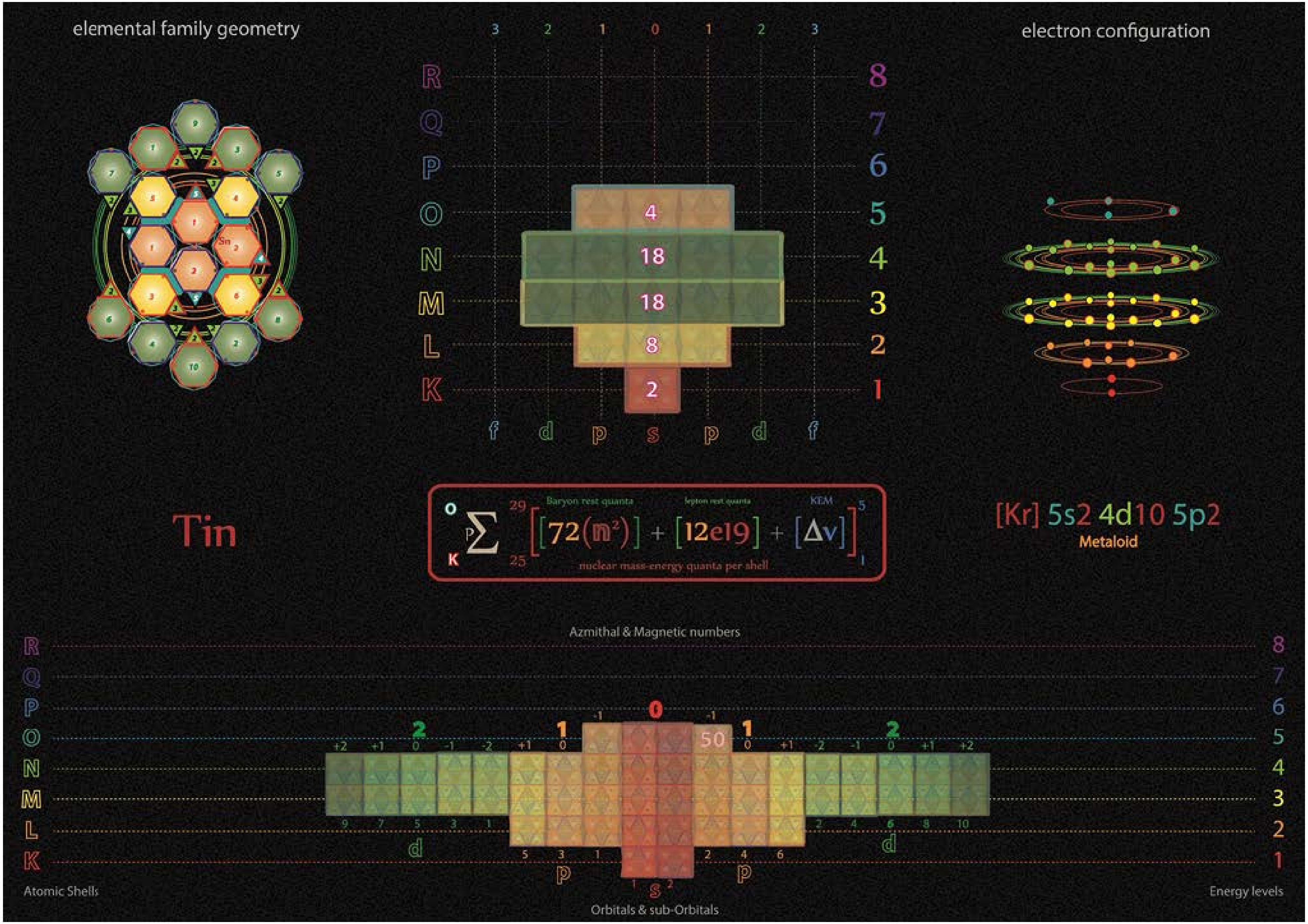
Tetryonics 53.48 - Cadmium atomic config

Copyright ABRAHAM [2008] - All rights reserved



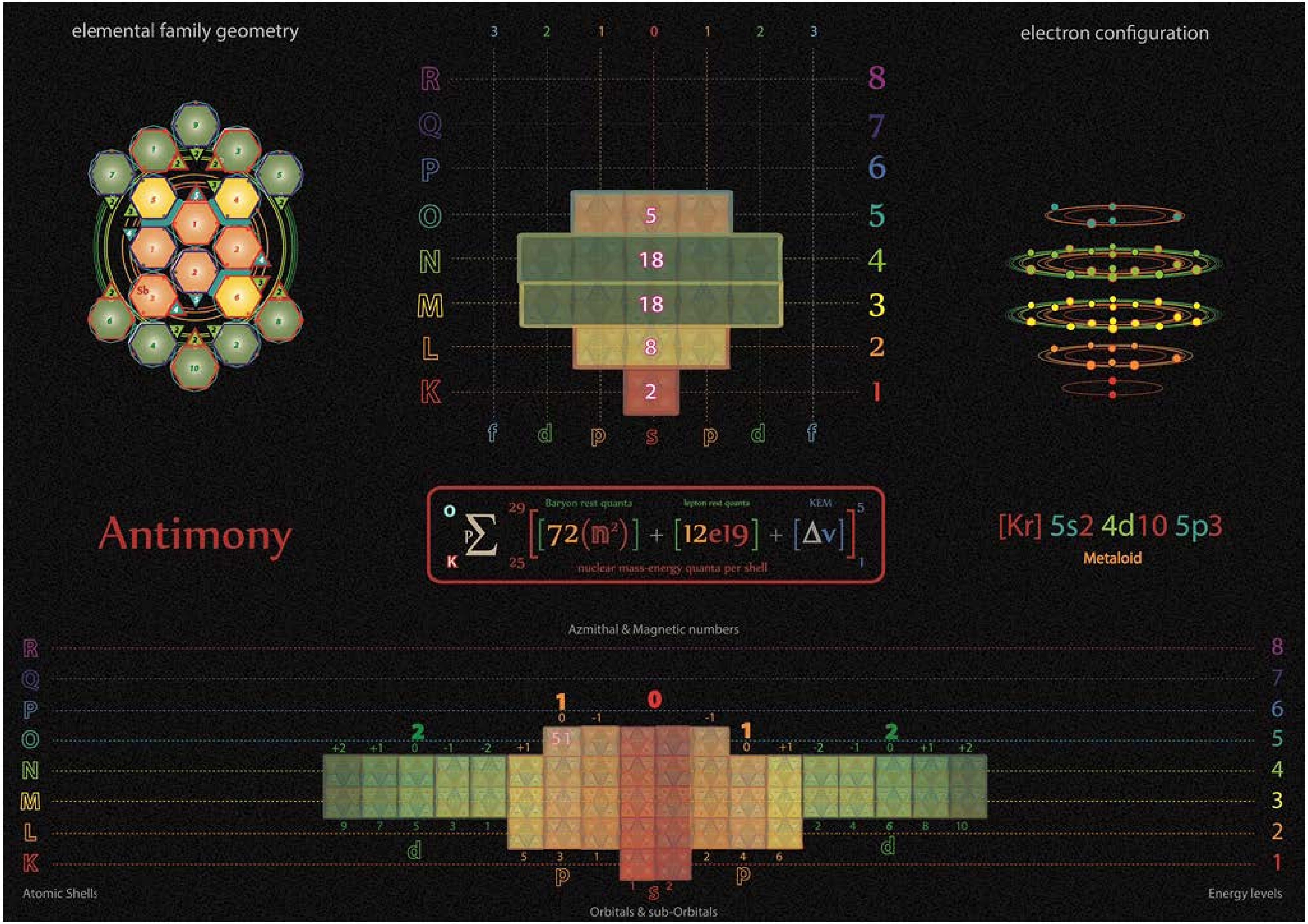
Tetryonics 53.49 - Indium atomic config

Copyright ABRAHAM [2008] - All rights reserved

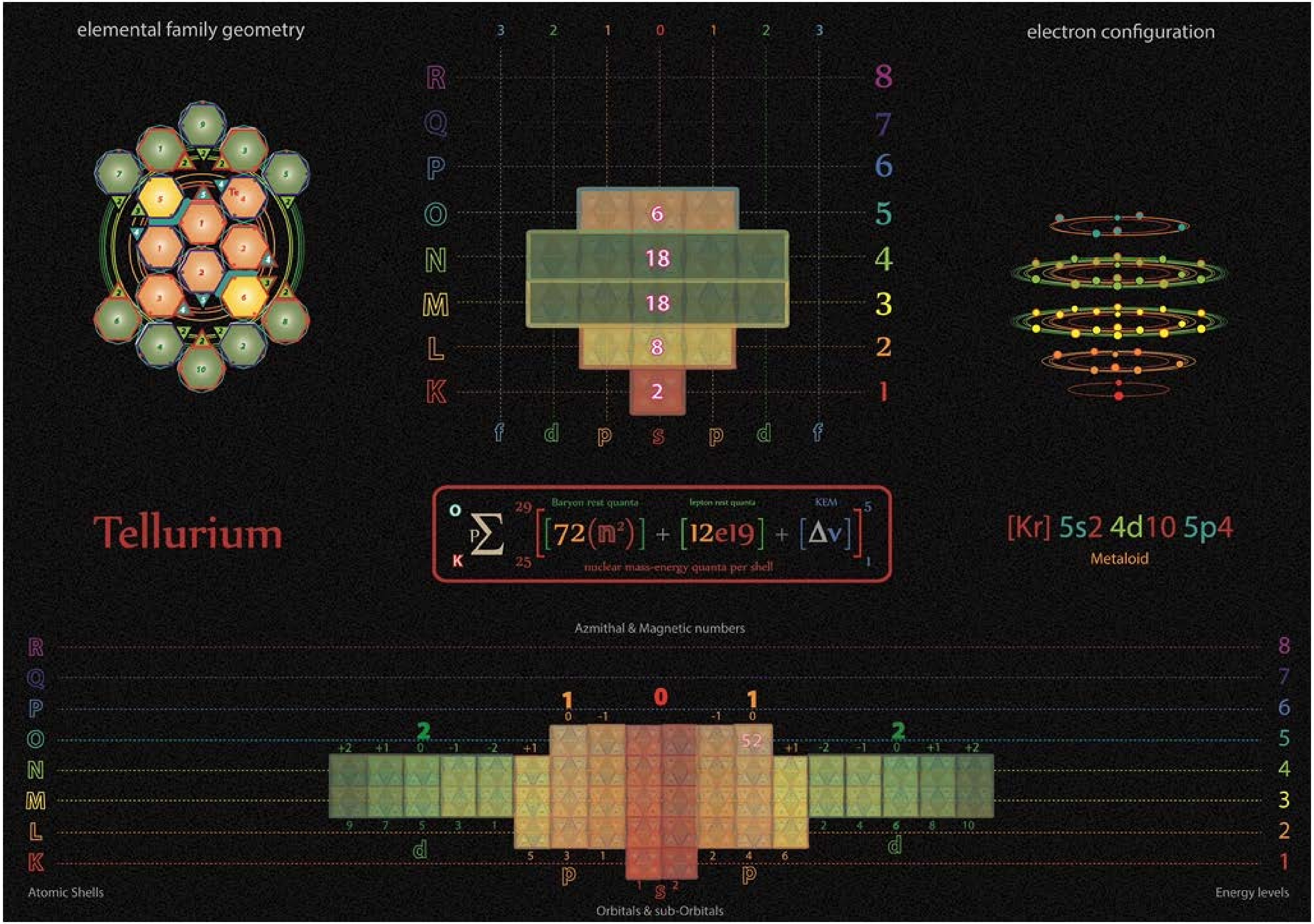


Tetryonics 53.50 - Tin atomic config

Copyright ABRAHAM [2008] - All rights reserved

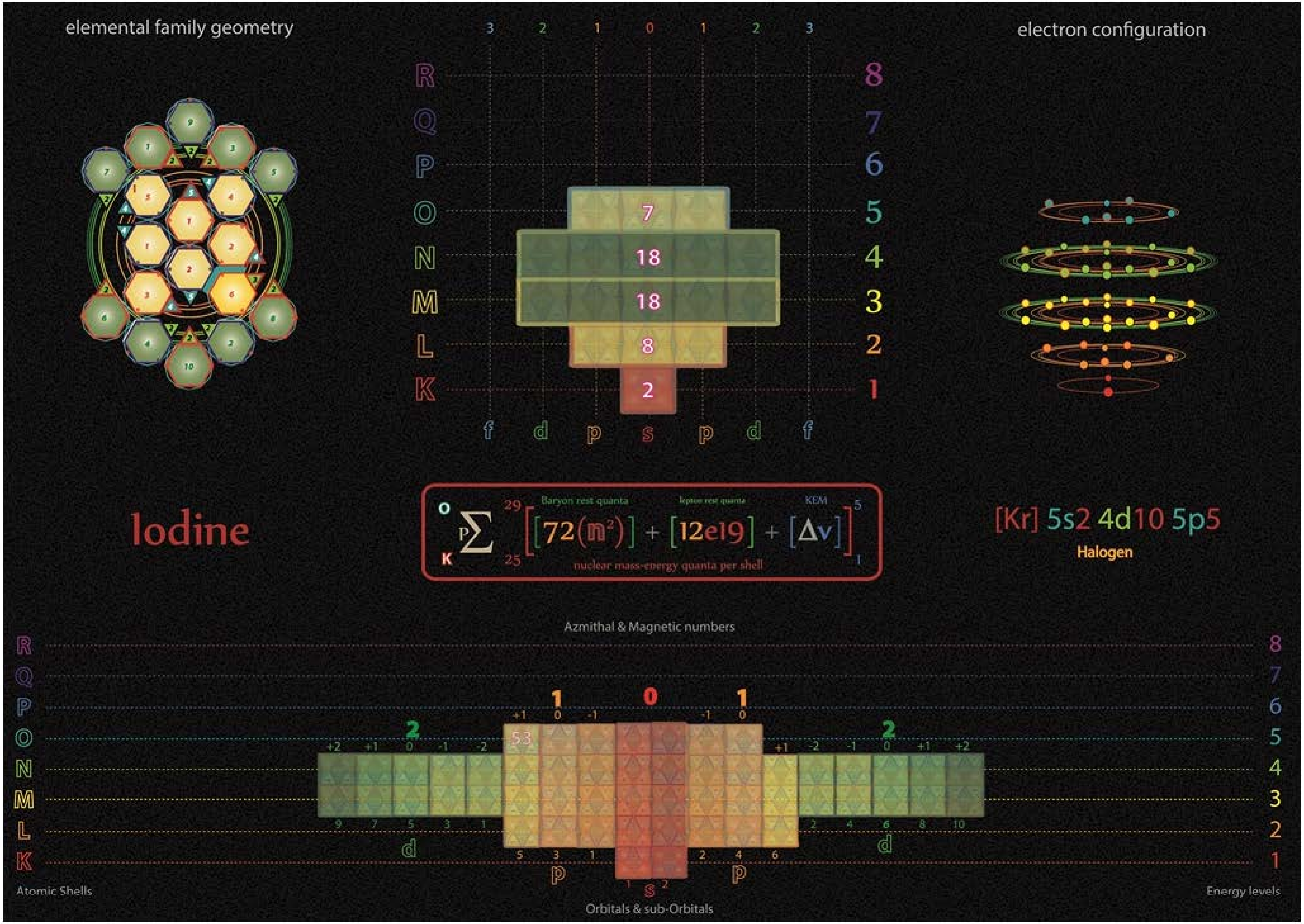


Tetryonics 53.51 - Antimony atomic config

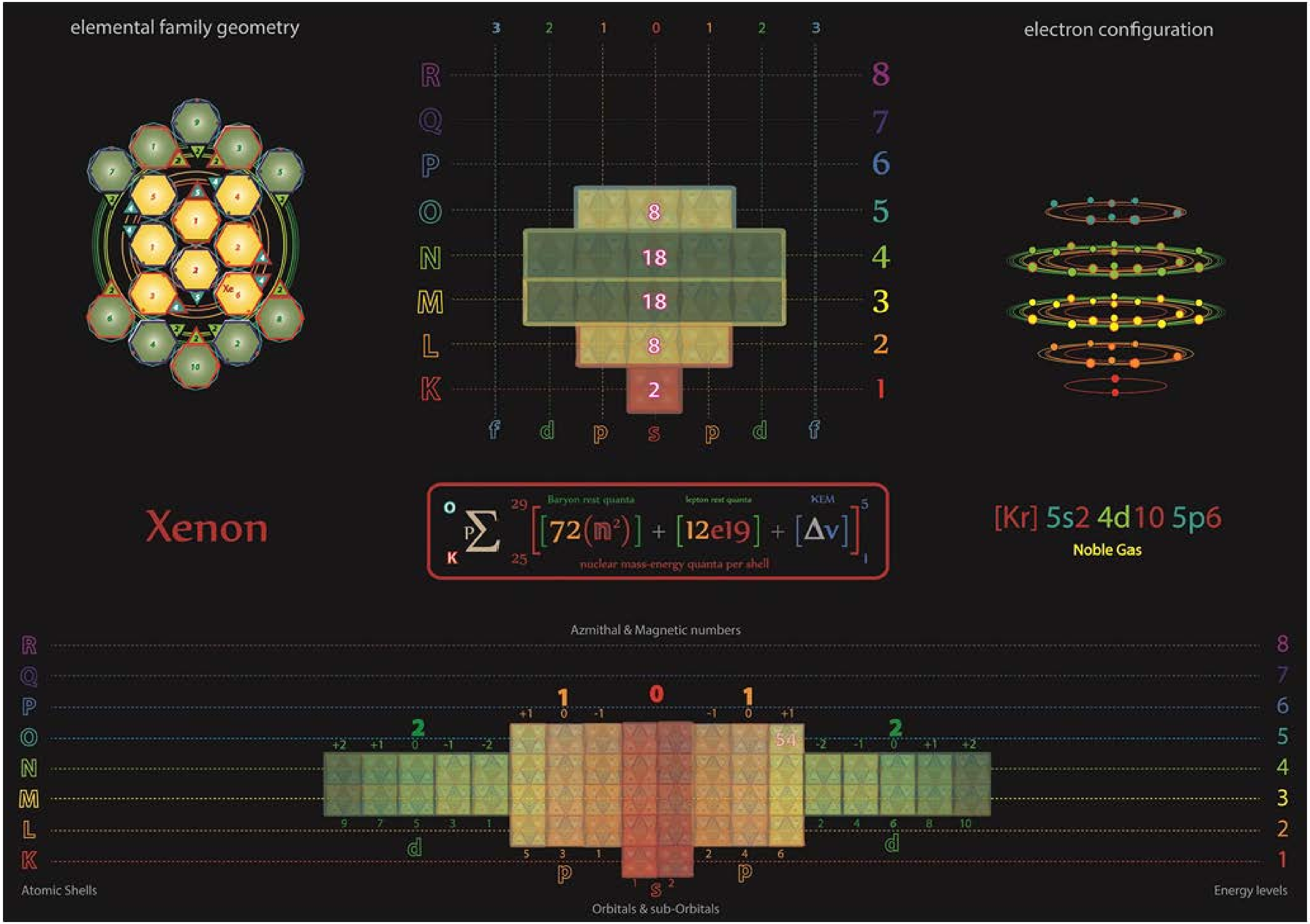


Tetryonics 53.52 - Tellurium atomic config

Copyright ABRAHAM [2008] - All rights reserved

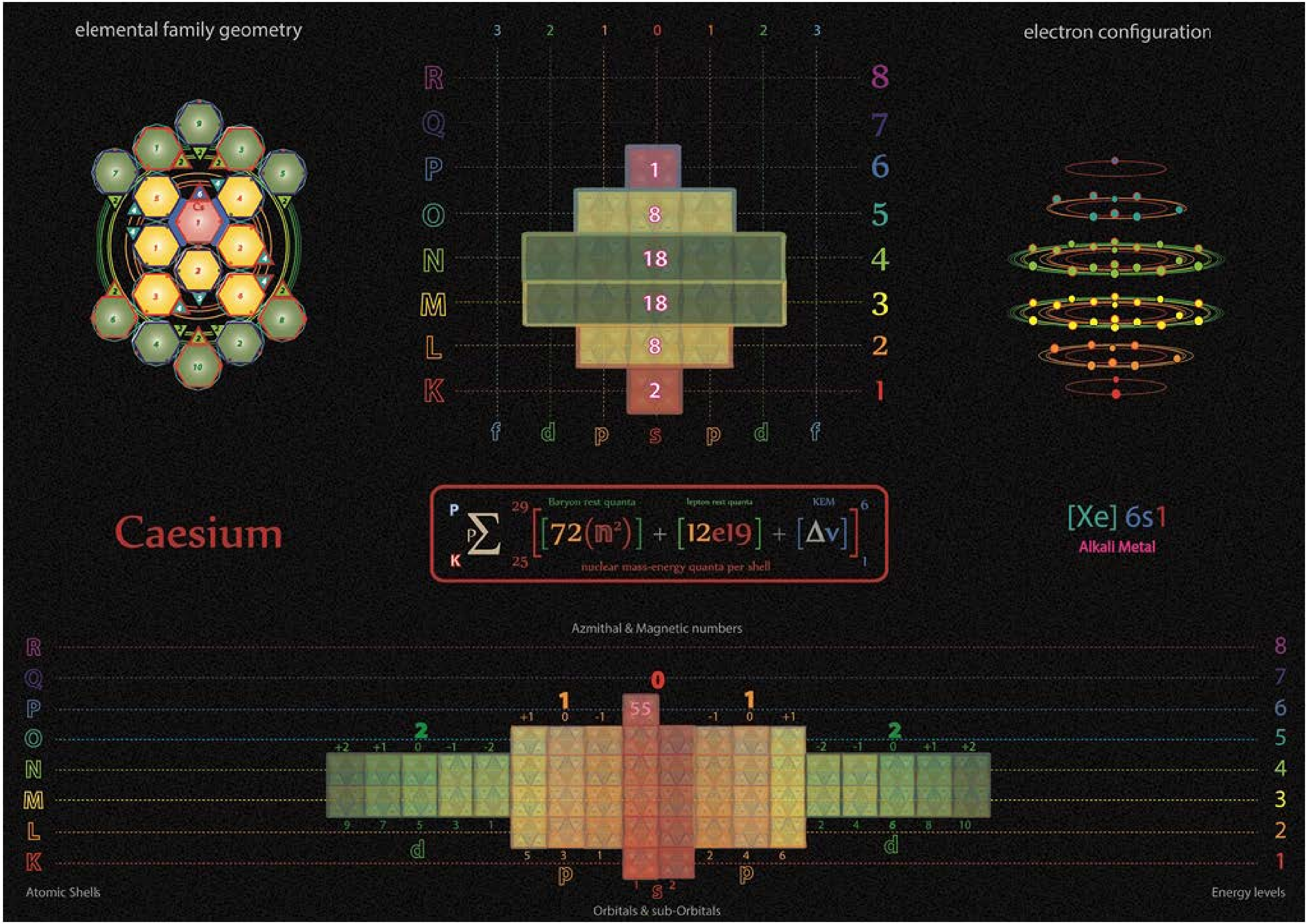


Copyright ABRAHAM [2008] - All rights reserved

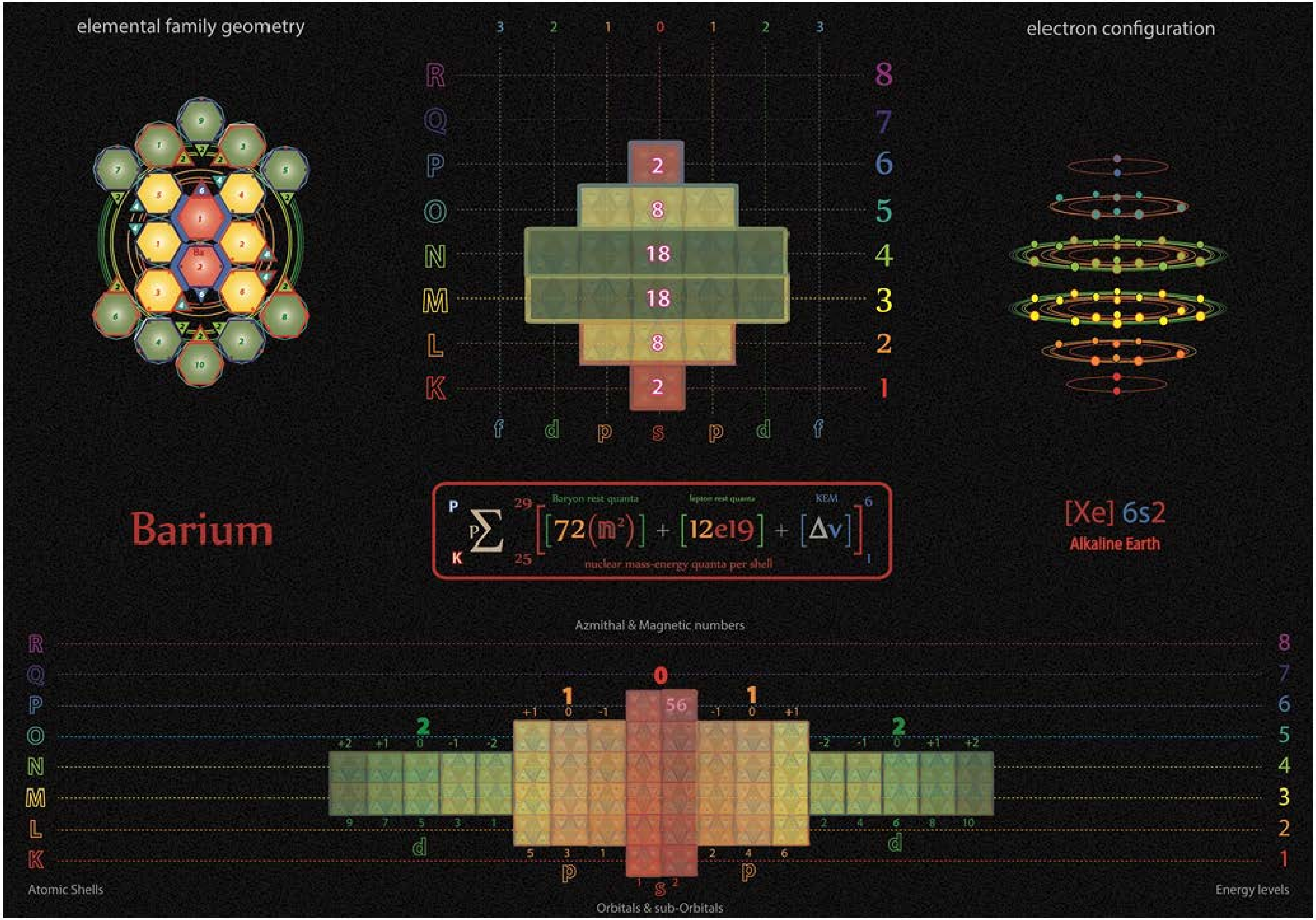


Tetryonics 53.54 - Xenon atomic config

Copyright ABRAHAM [2008] - All rights reserved

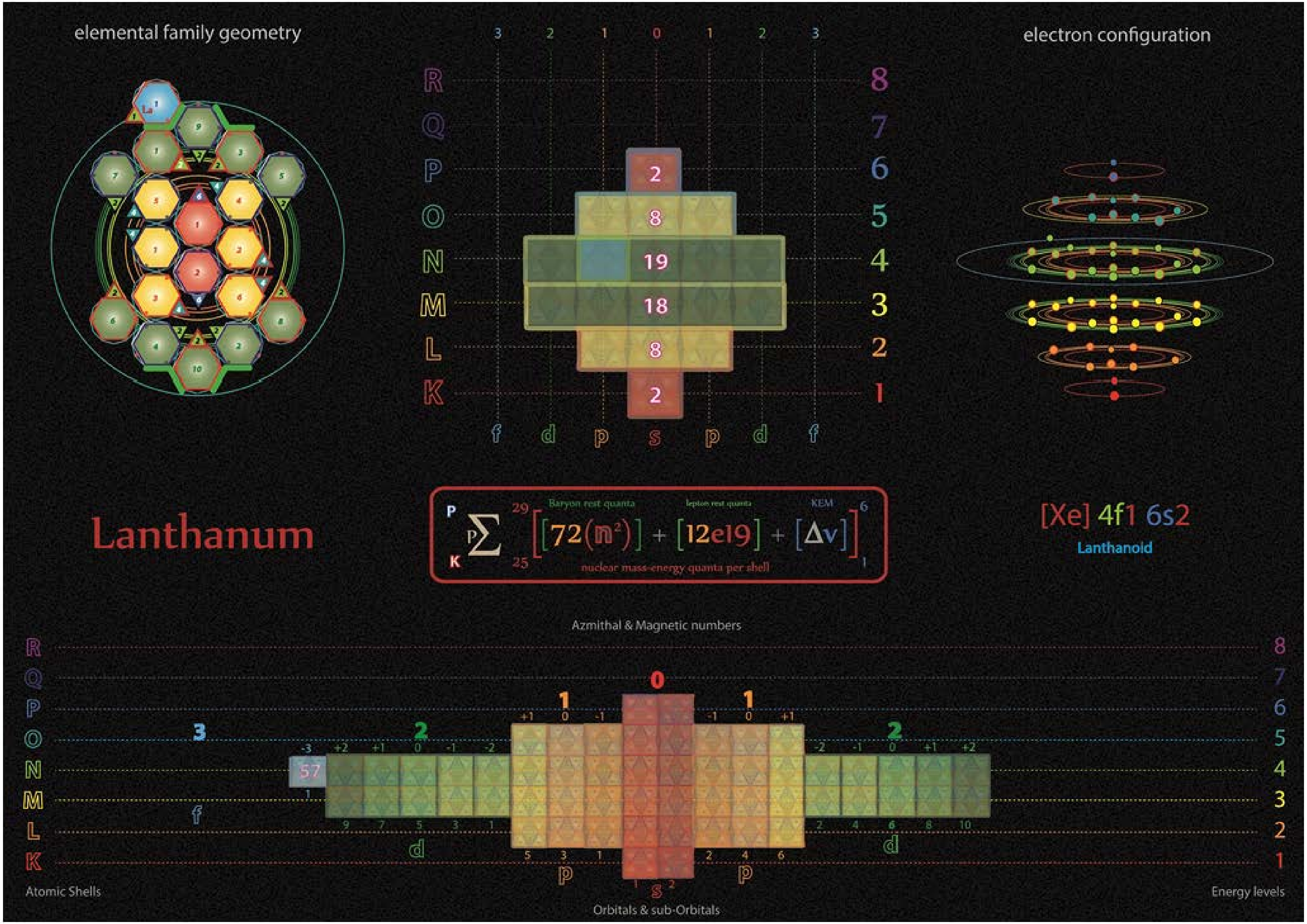


Copyright ABRAHAM [2008] - All rights reserved



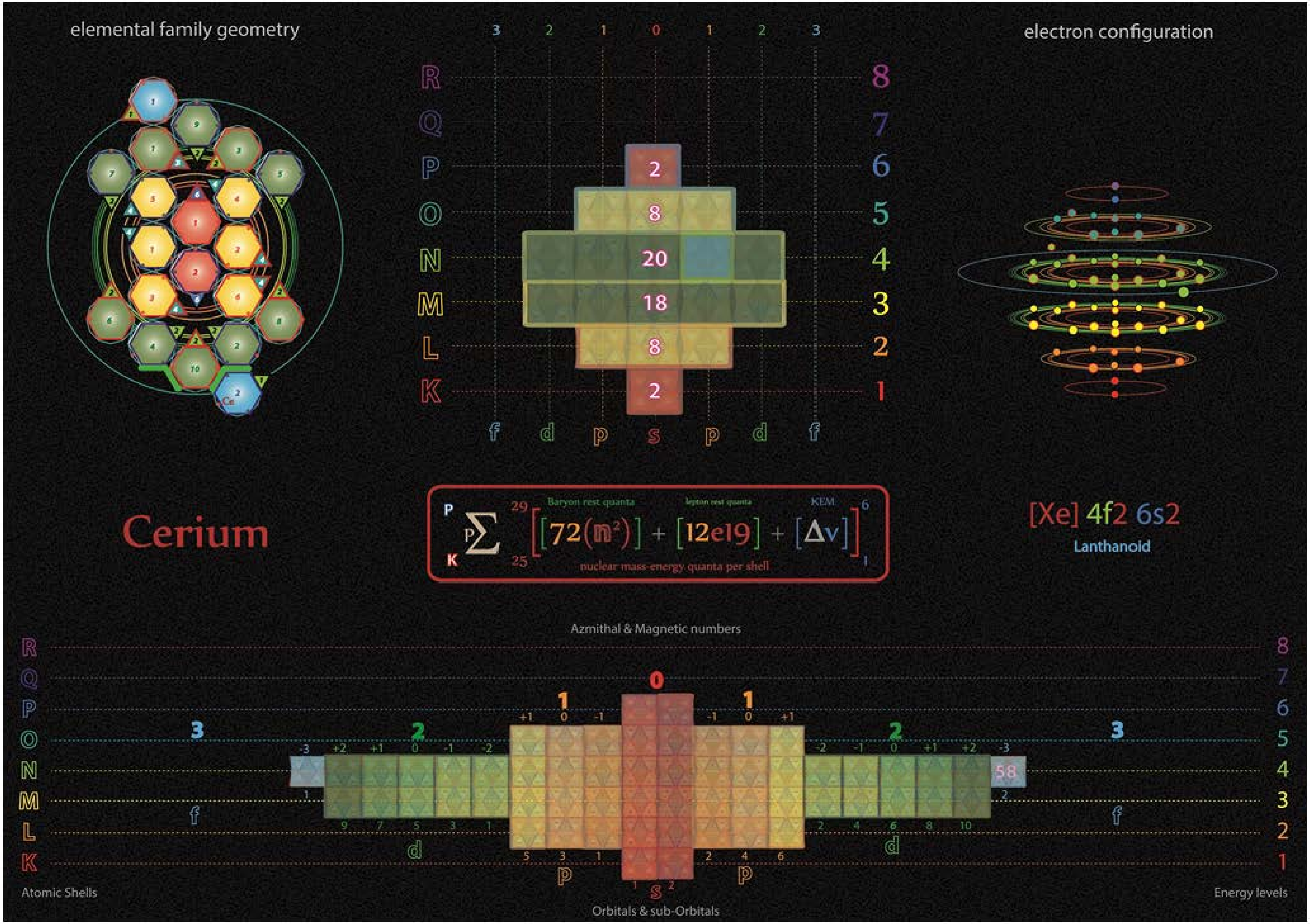
Tetryonics 53.56 - Barium atomic config

Copyright ABRAHAM [2008] - All rights reserved



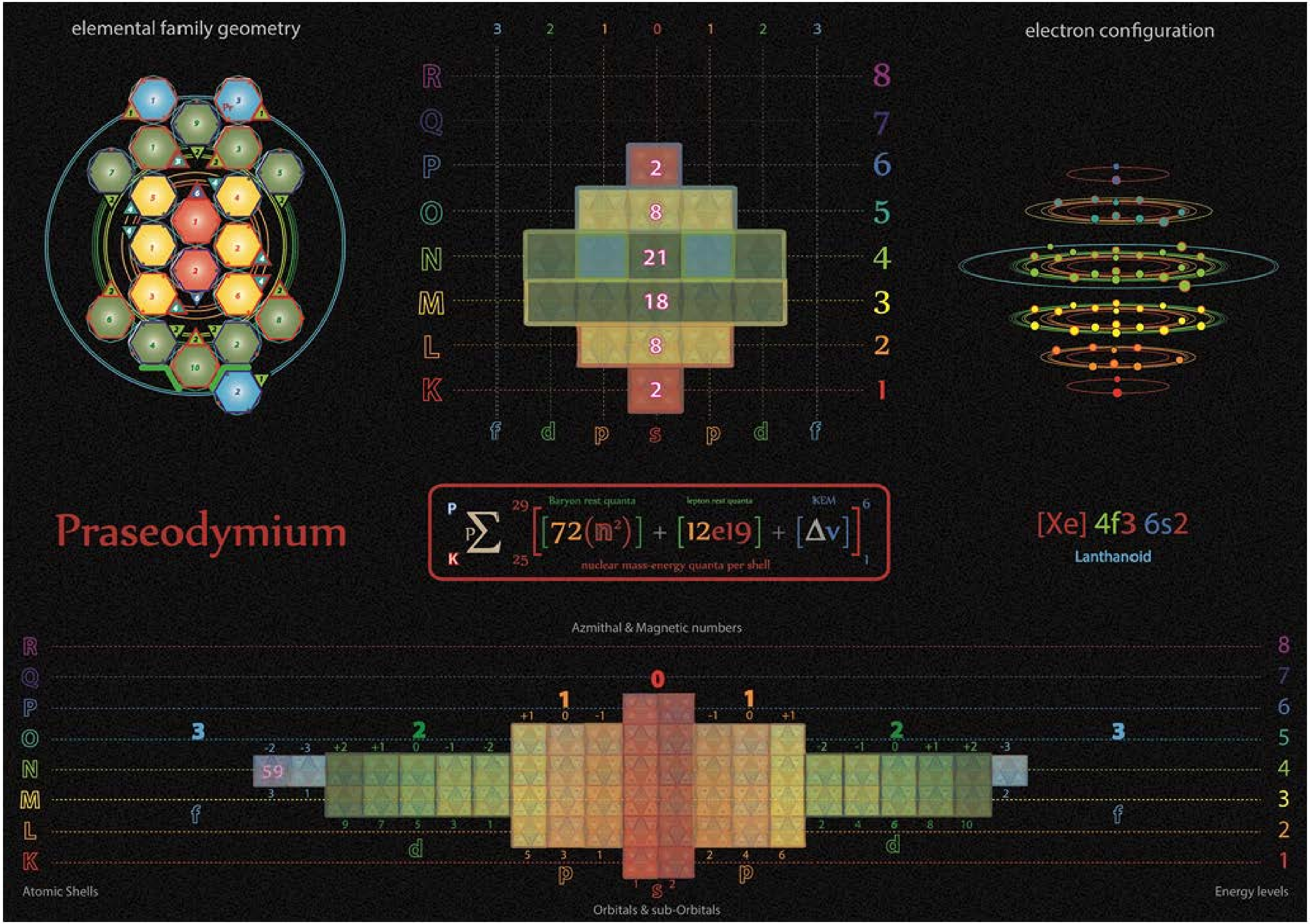
Tetryonics 53.57 - Lanthanum atomic config

Copyright ABRAHAM [2008] - All rights reserved



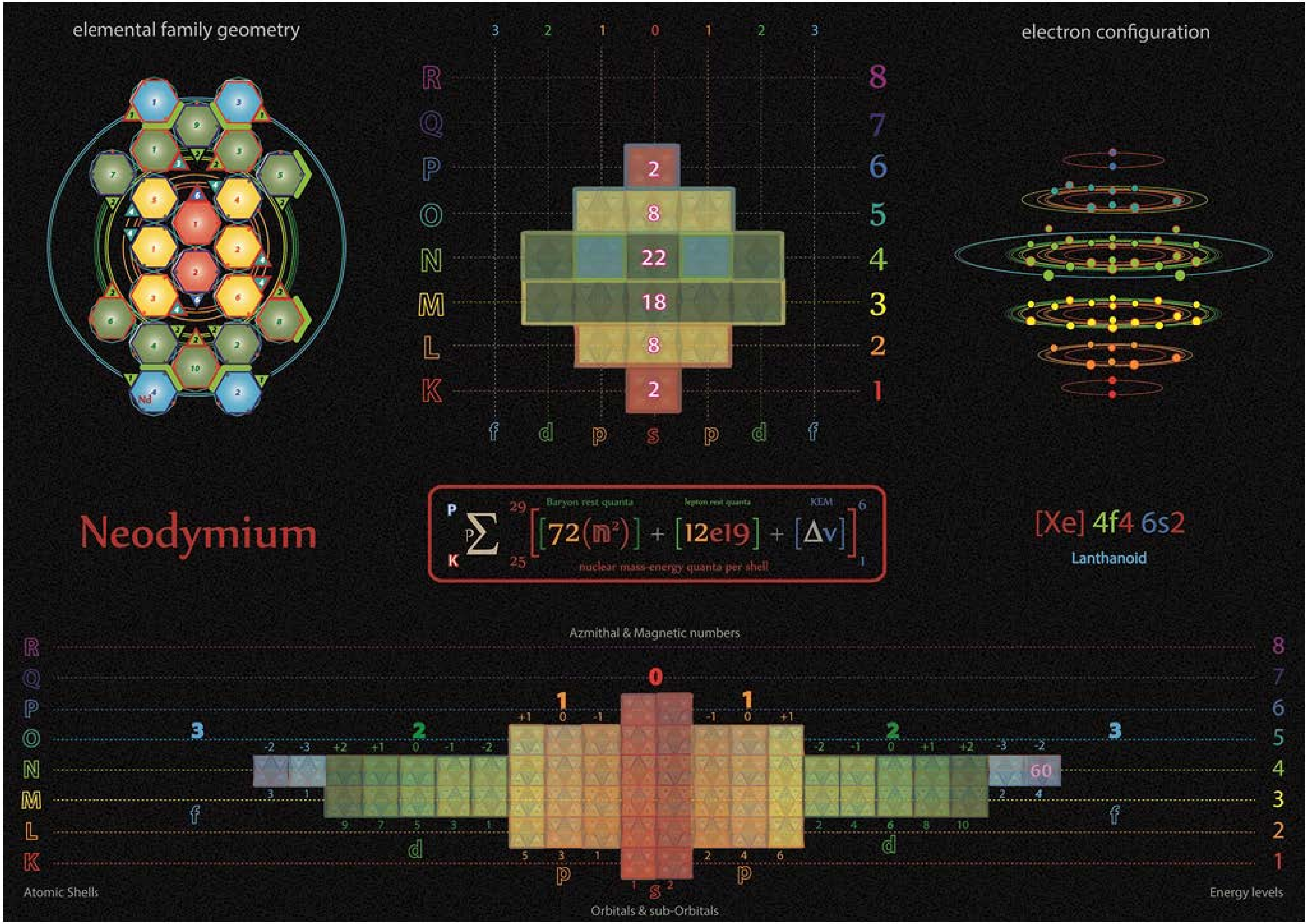
Tetryonics 53.58 - Cerium atomic config

Copyright ABRAHAM [2008] - All rights reserved



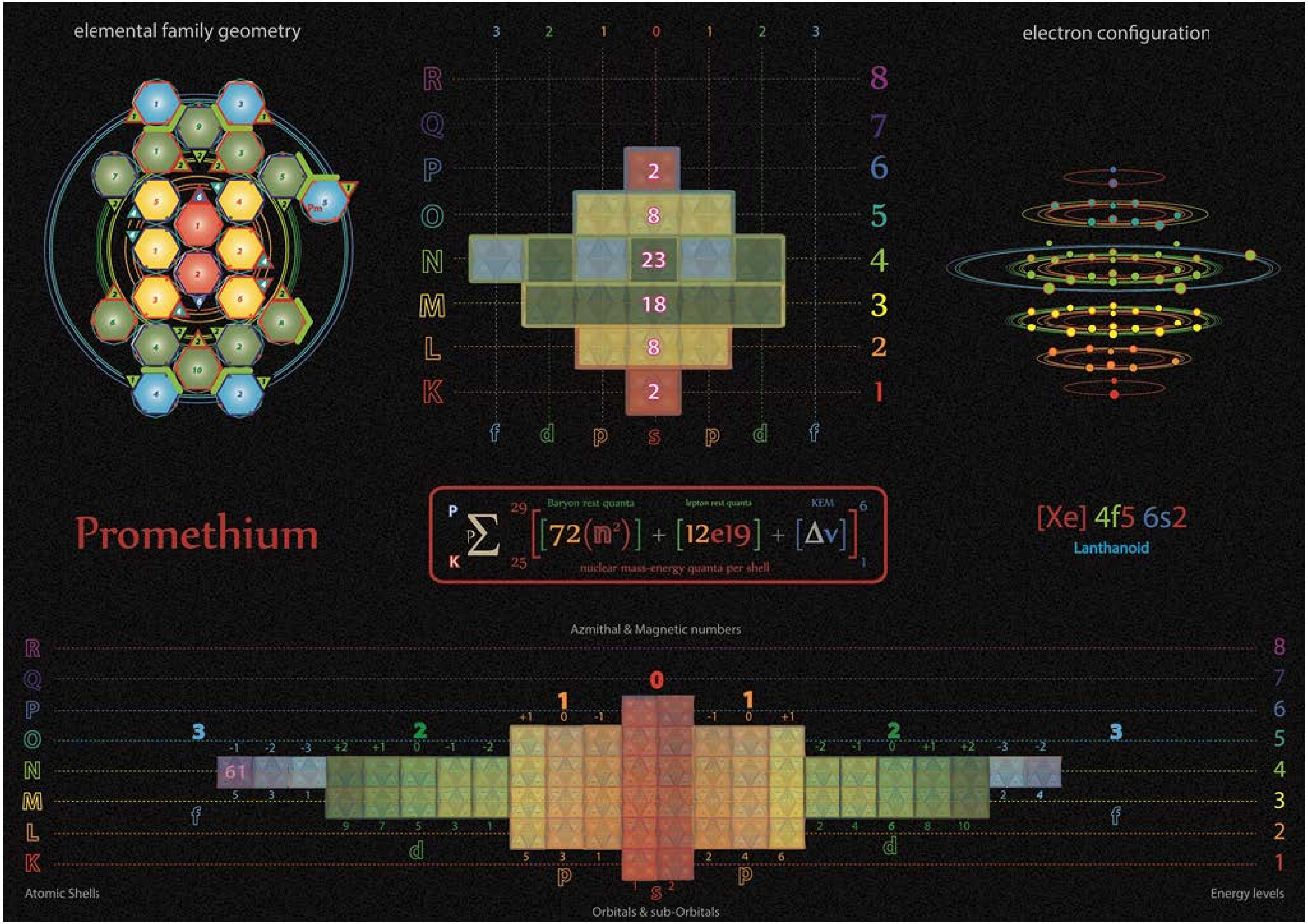
Tetryonics 53.59 - Praseodymium atomic config

Copyright ABRAHAM [2008] - All rights reserved



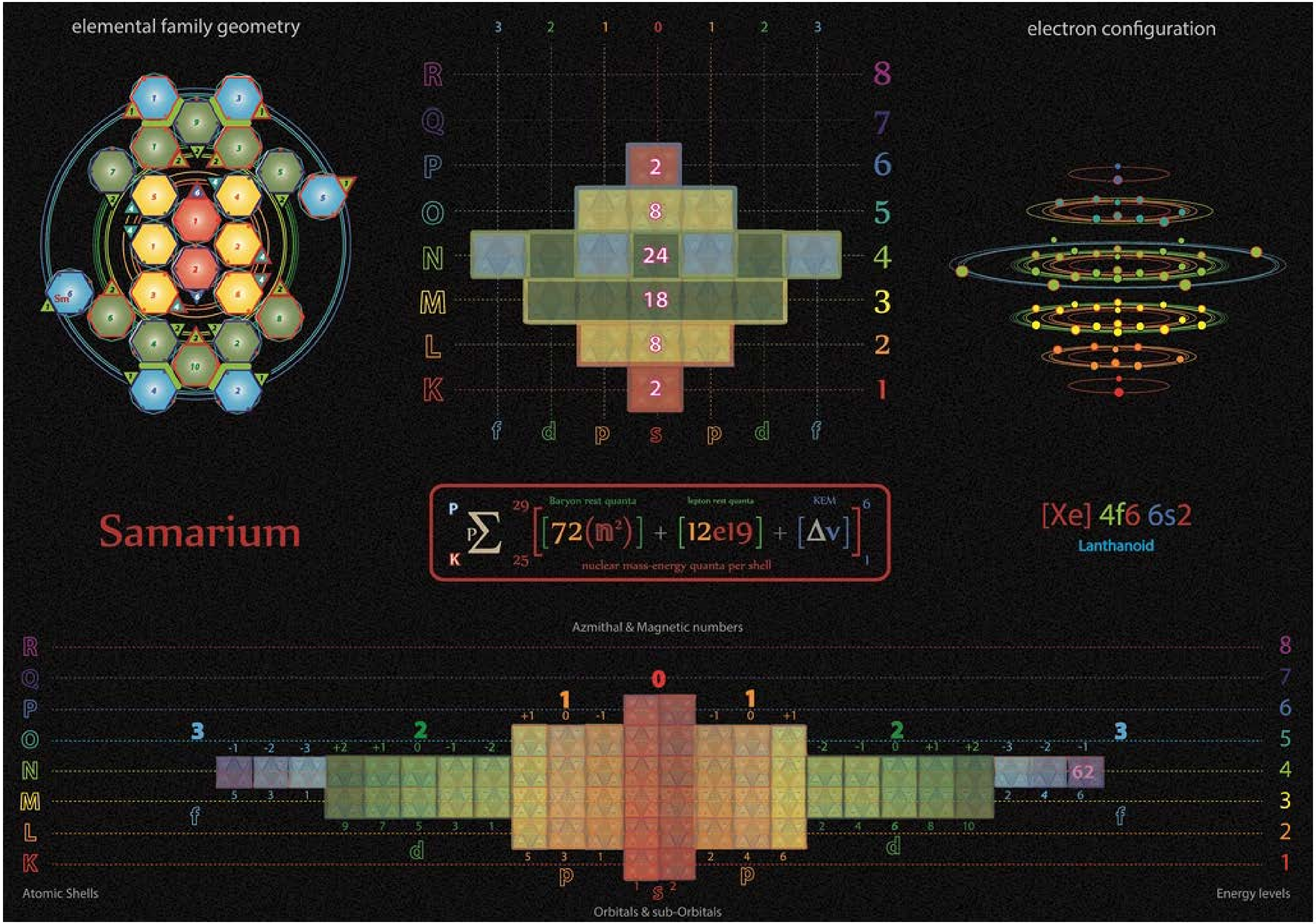
Tetryonics 53.60 - Neodymium atomic config

Copyright ABRAHAM [2008] - All rights reserved



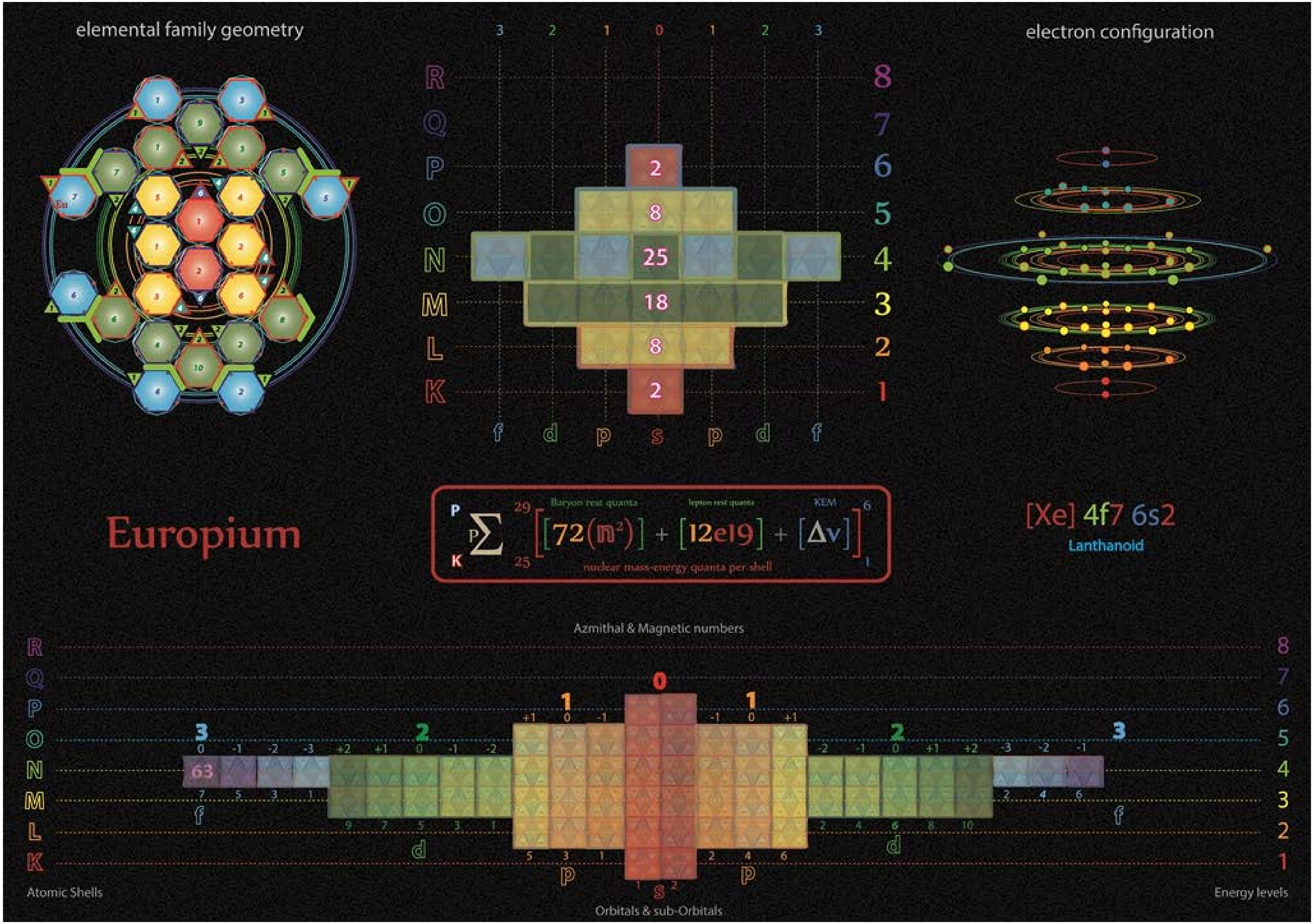
Tetryonics 53.61 - Promethium atomic config

Copyright ABRAHAM [2008] - All rights reserved



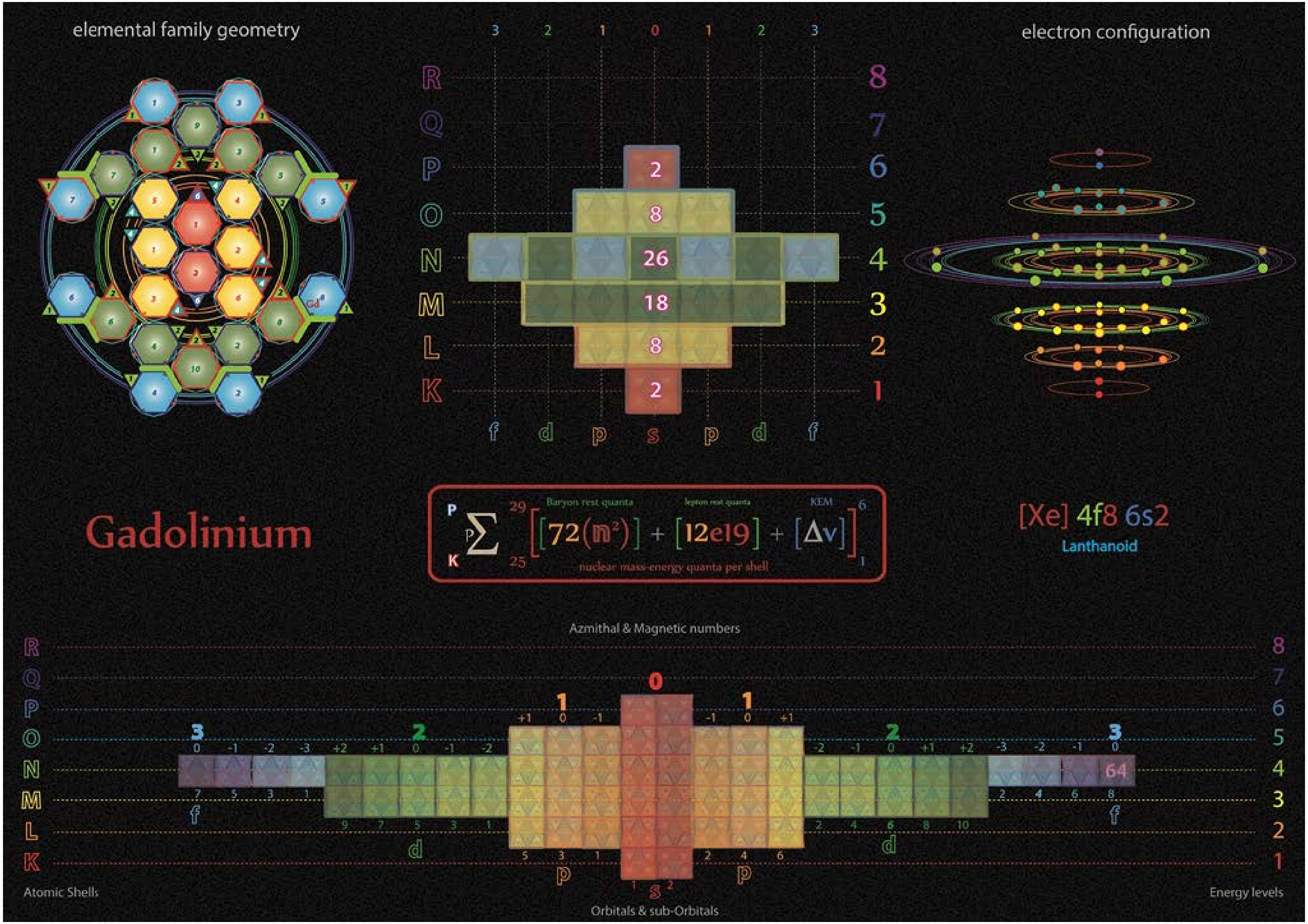
$$\sum_{K}^{P}\,{}^{29}_{25}\left[72(\mathrm{m}^2)\right]+\left[12e19\right]+\left[\Delta v\right]^{6}_{1}$$

Copyright ABRAHAM [2008] - All rights reserved

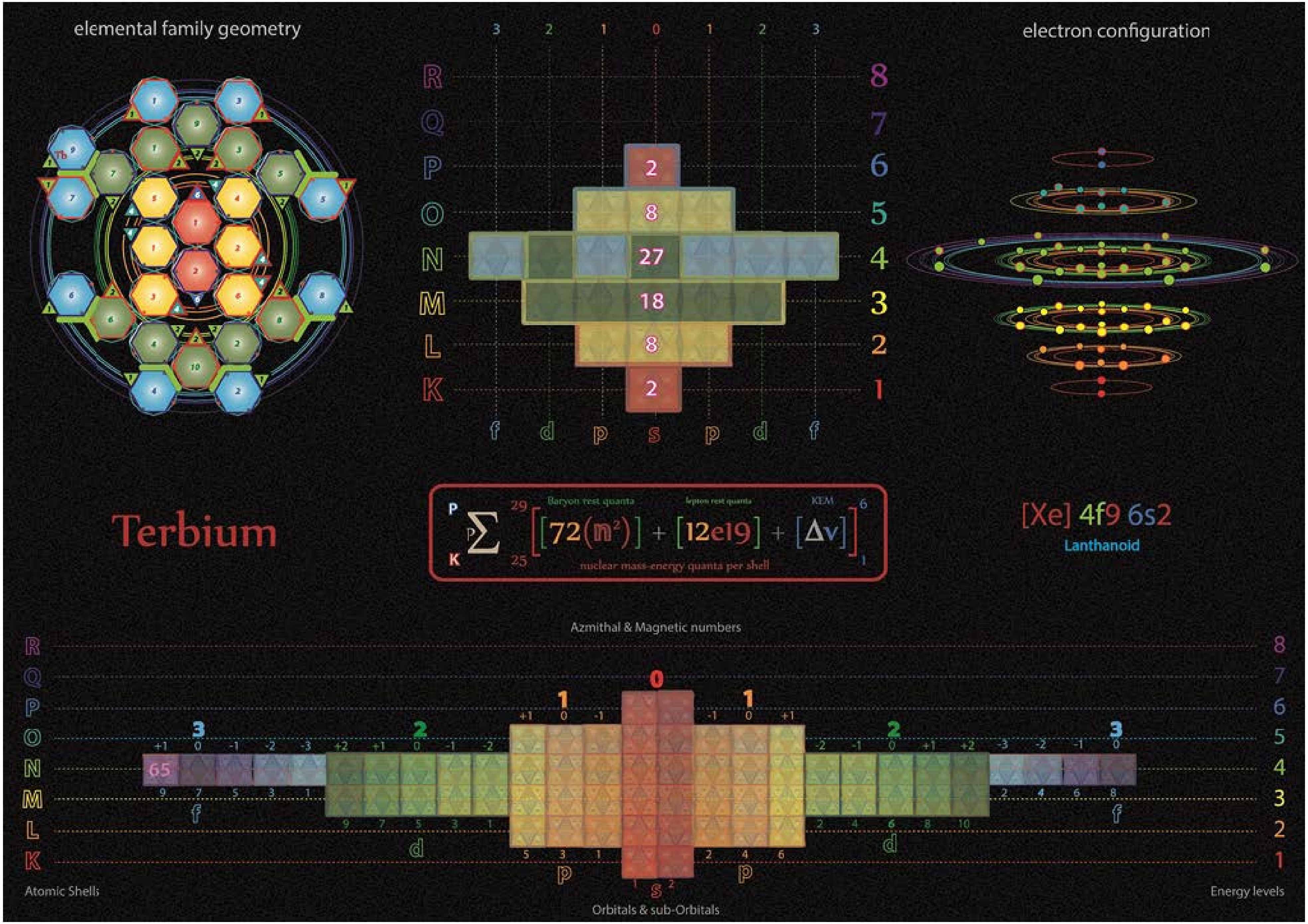


Tetryonics 53.63 - Europium atomic config

Copyright ABRAHAM [2008] - All rights reserved

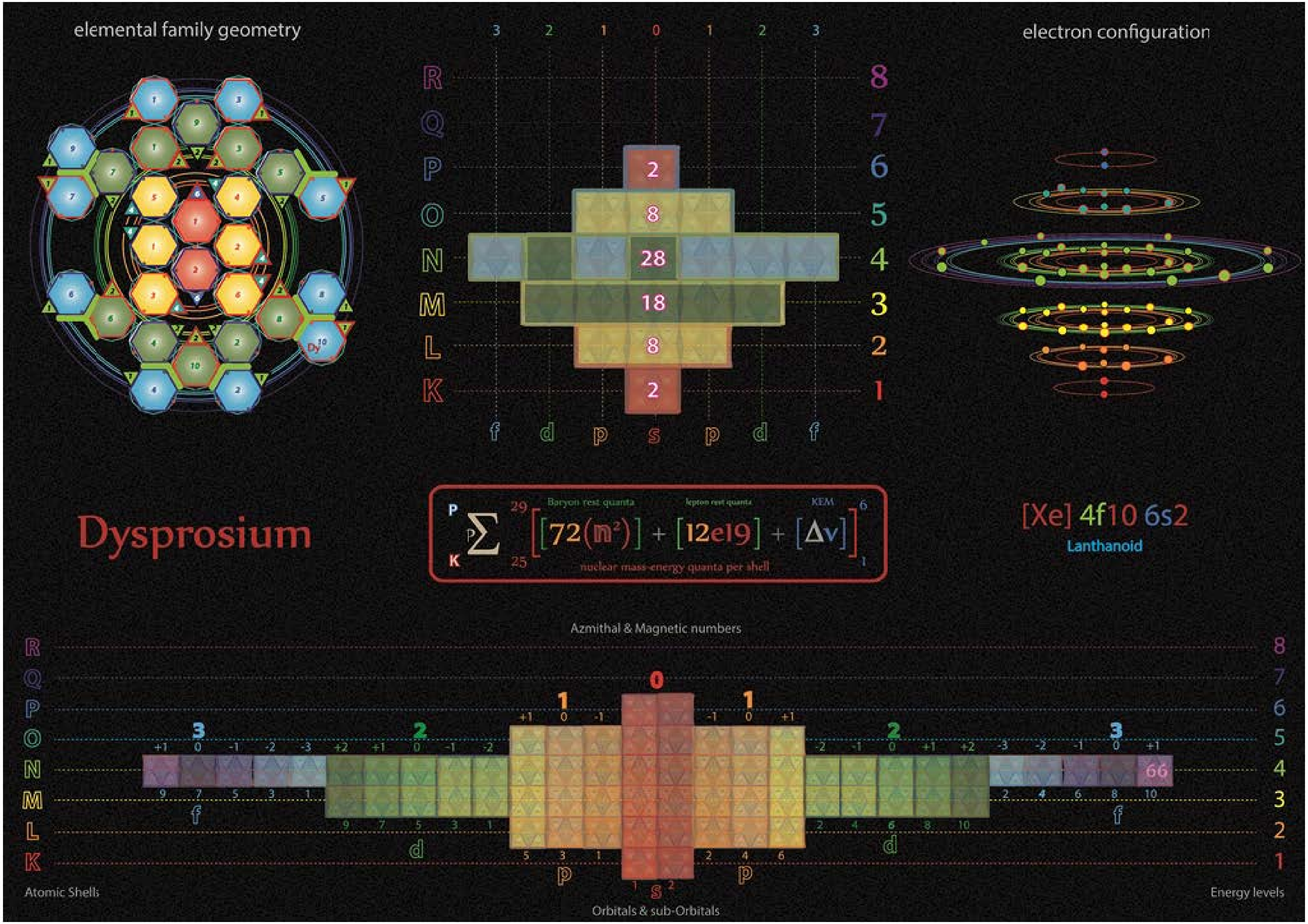


Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 53.65 - Terbium atomic config

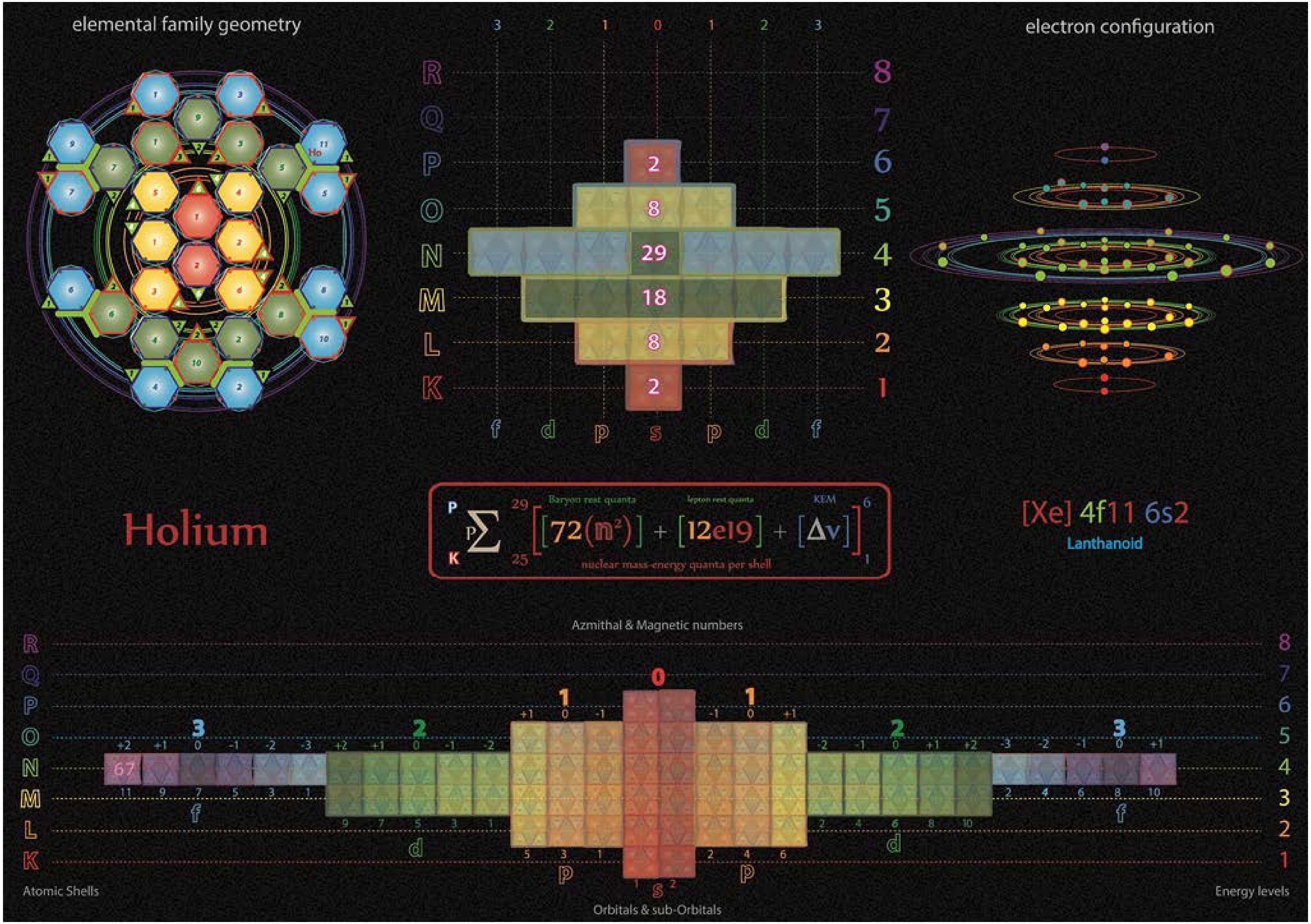
Copyright ABRAHAM [2008] - All rights reserved



$$\sum_{K}^{P} {}^{29}_{25}\left[[72(m^2)] + [12e19] + [\Delta v] \right]^{6}_{1}$$

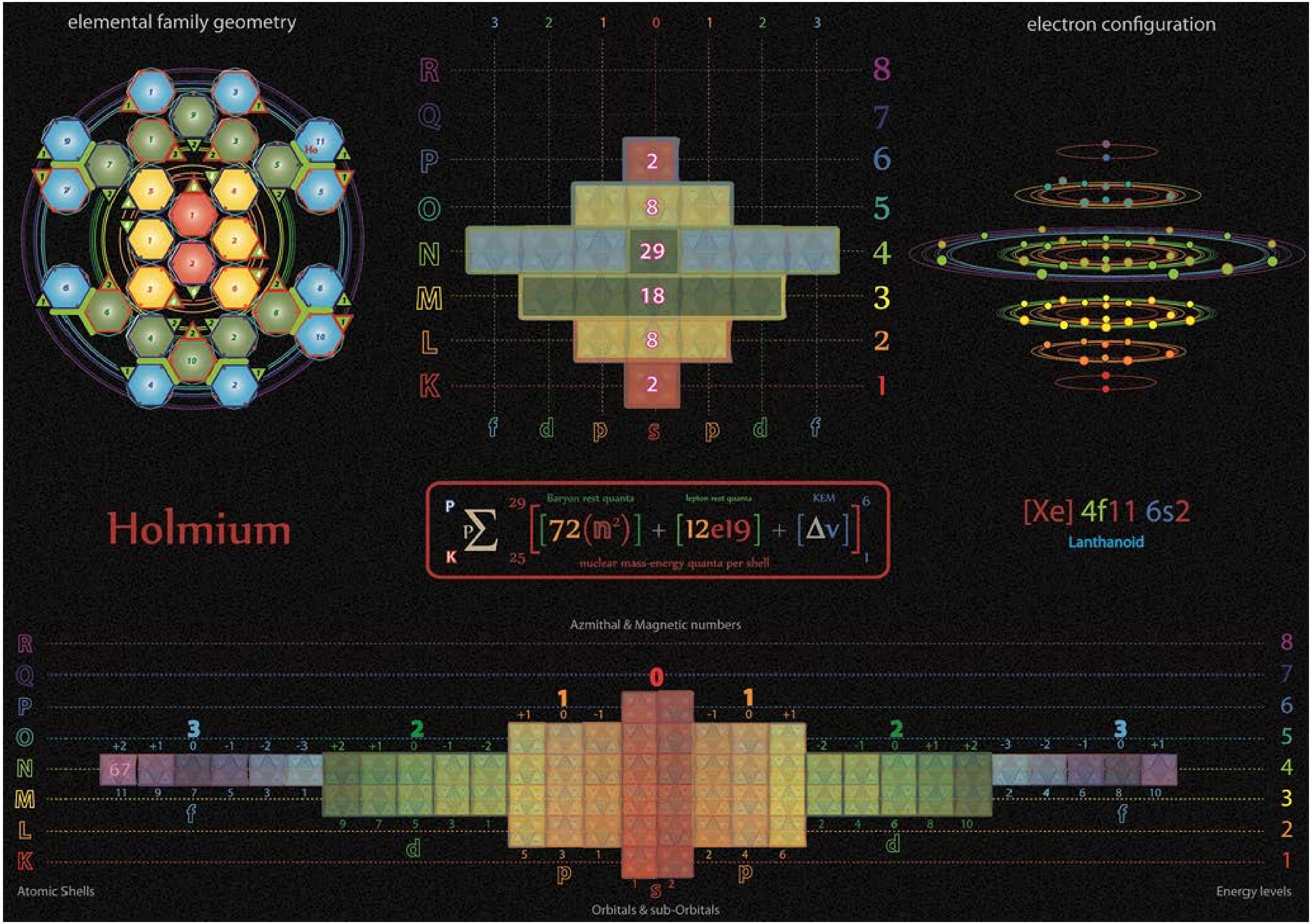
Tetryonics 53.66 - Dysprosium atomic config

Copyright ABRAHAM [2008] - All rights reserved



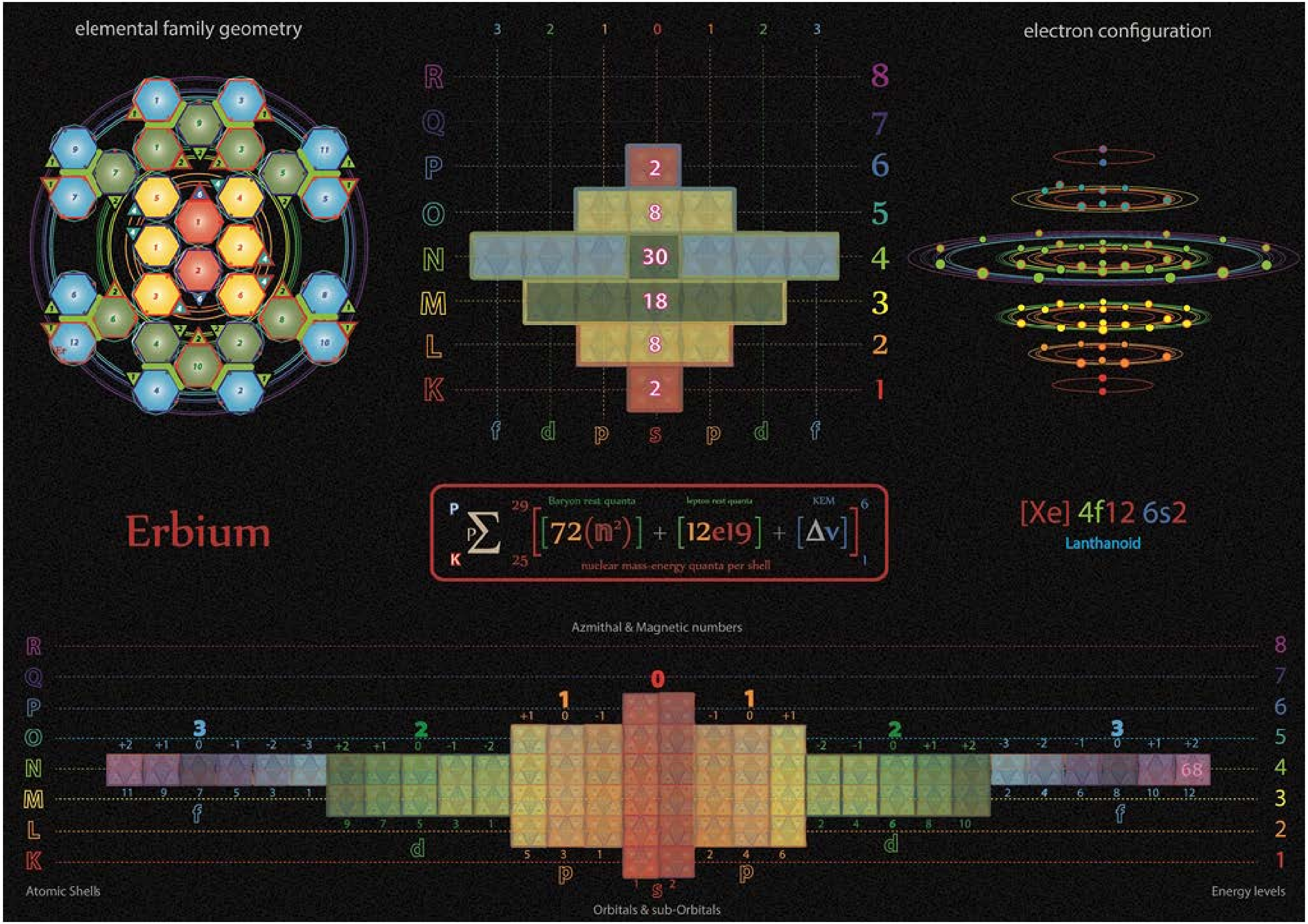
Tetryonics 53.67 - Holium atomic config

Copyright ABRAHAM [2008] - All rights reserved



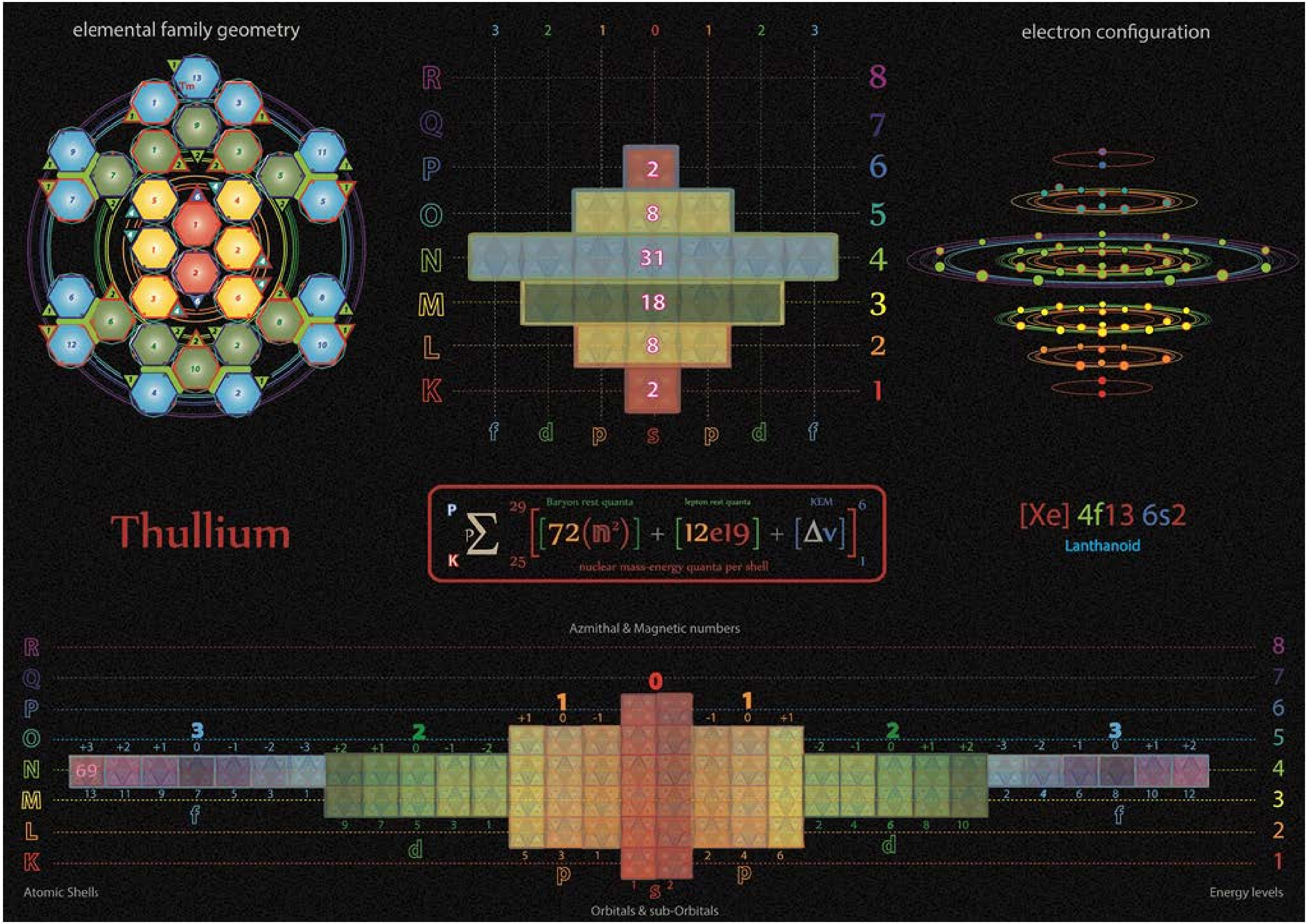
Tetryonics 53.67 - Holmium atomic config

Copyright ABRAHAM [2008] - All rights reserved

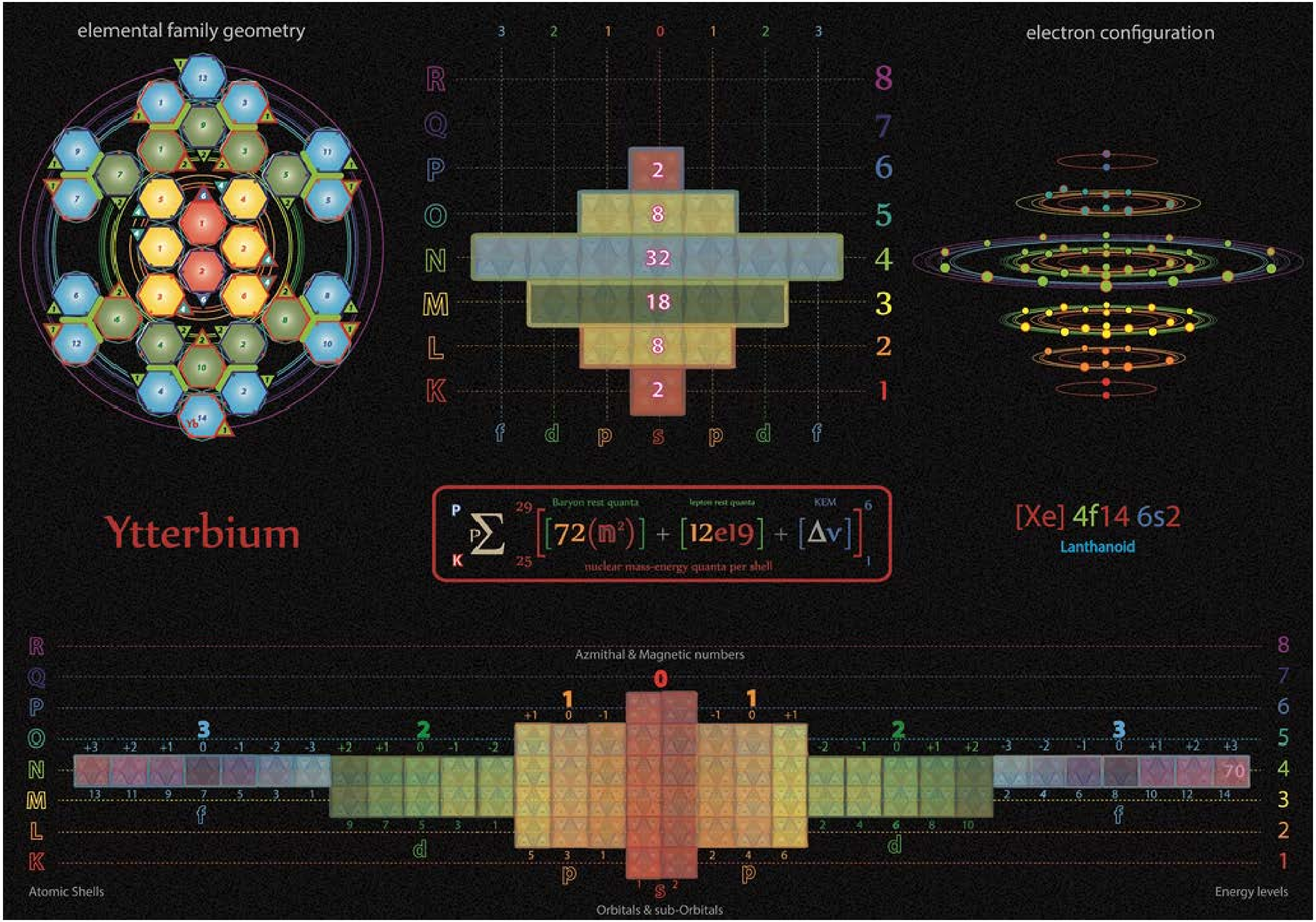


Tetryonics 53.68 - Erbium atomic config

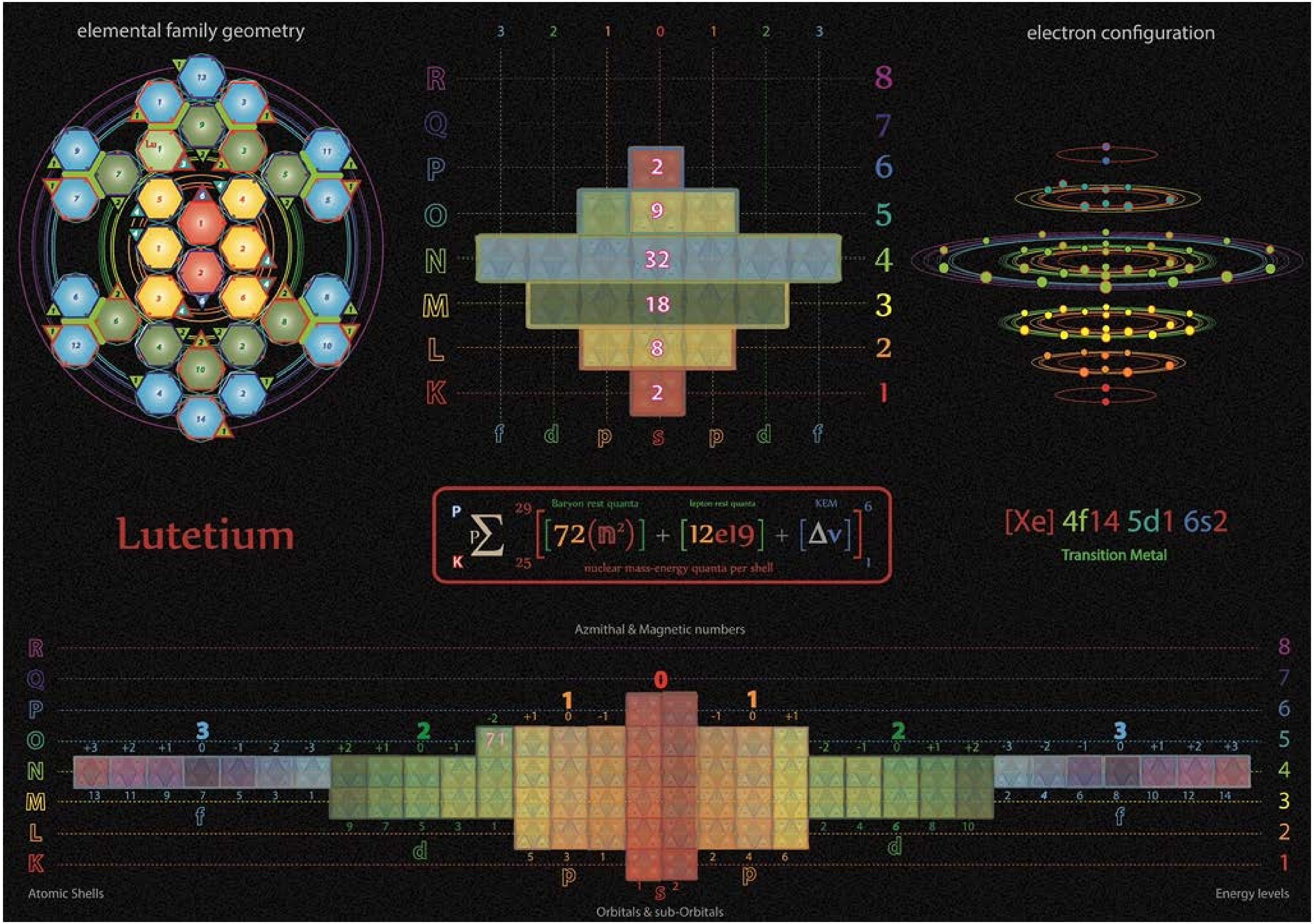
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

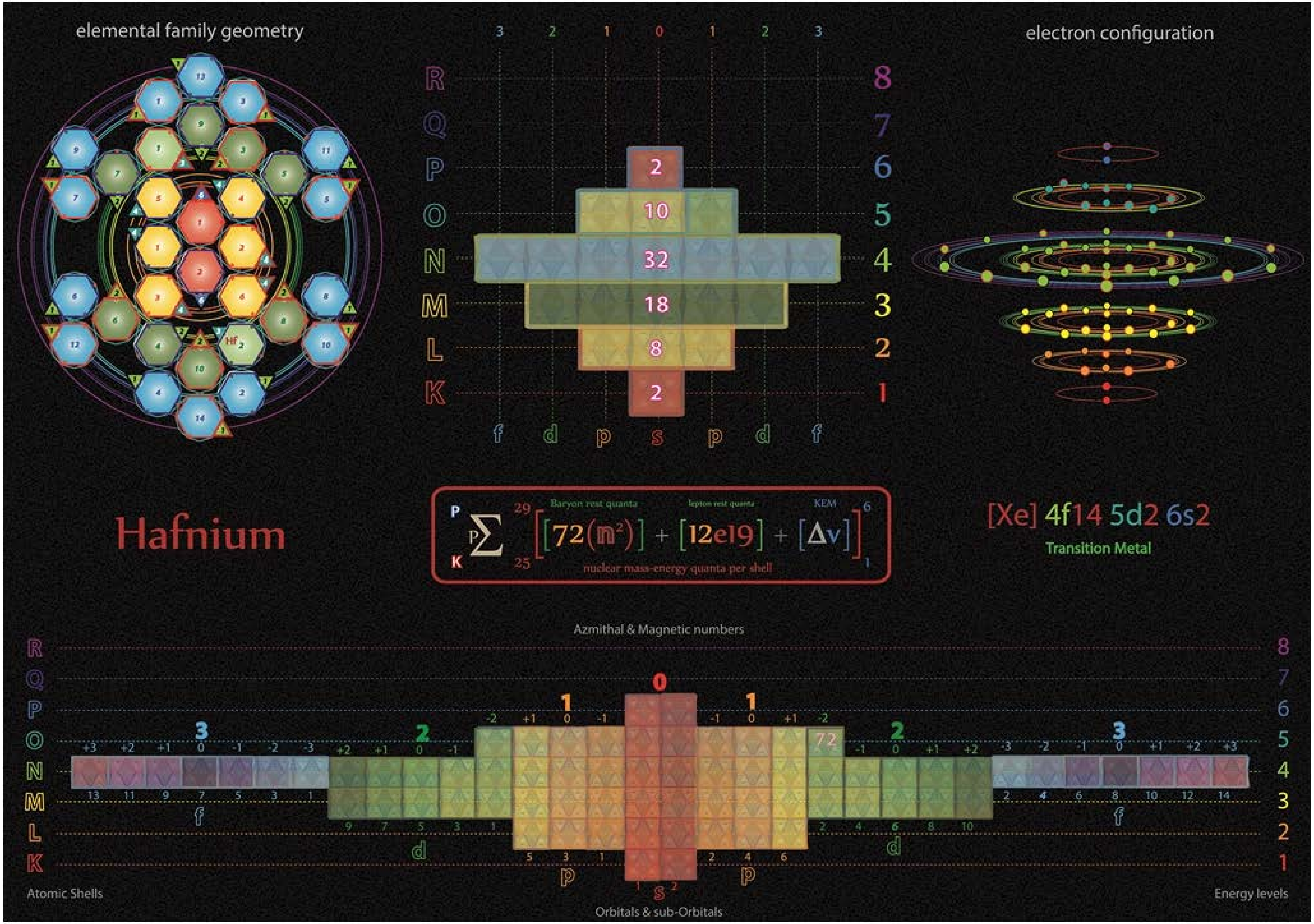


Tetryonics 53.70 - Ytterbium atomic config



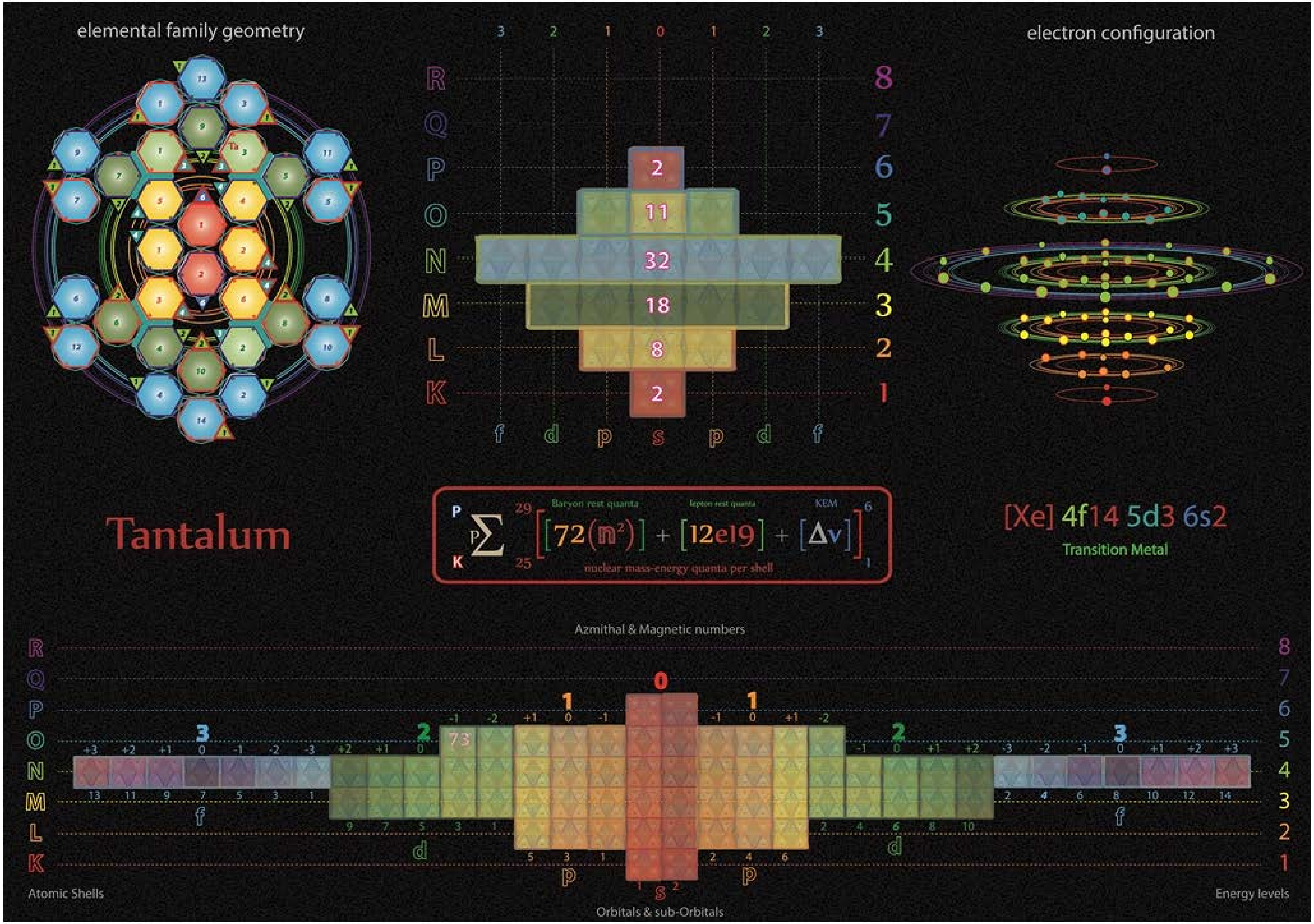
Tetryonics 53.71 - Lutetium atomic config

Copyright ABRAHAM [2008] - All rights reserved

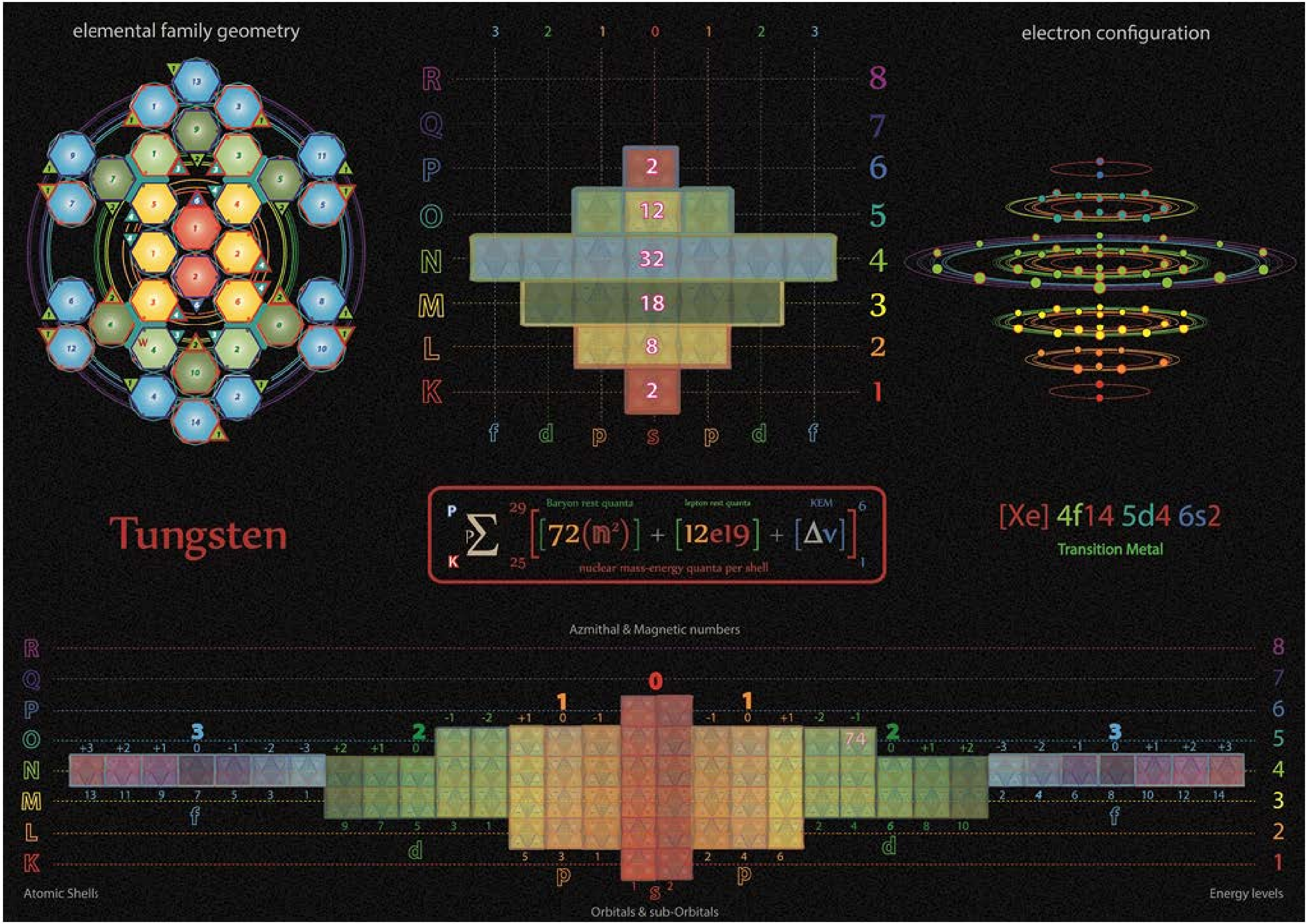


Tetryonics 53.72 - Hafnium atomic config

Copyright ABRAHAM [2008] - All rights reserved

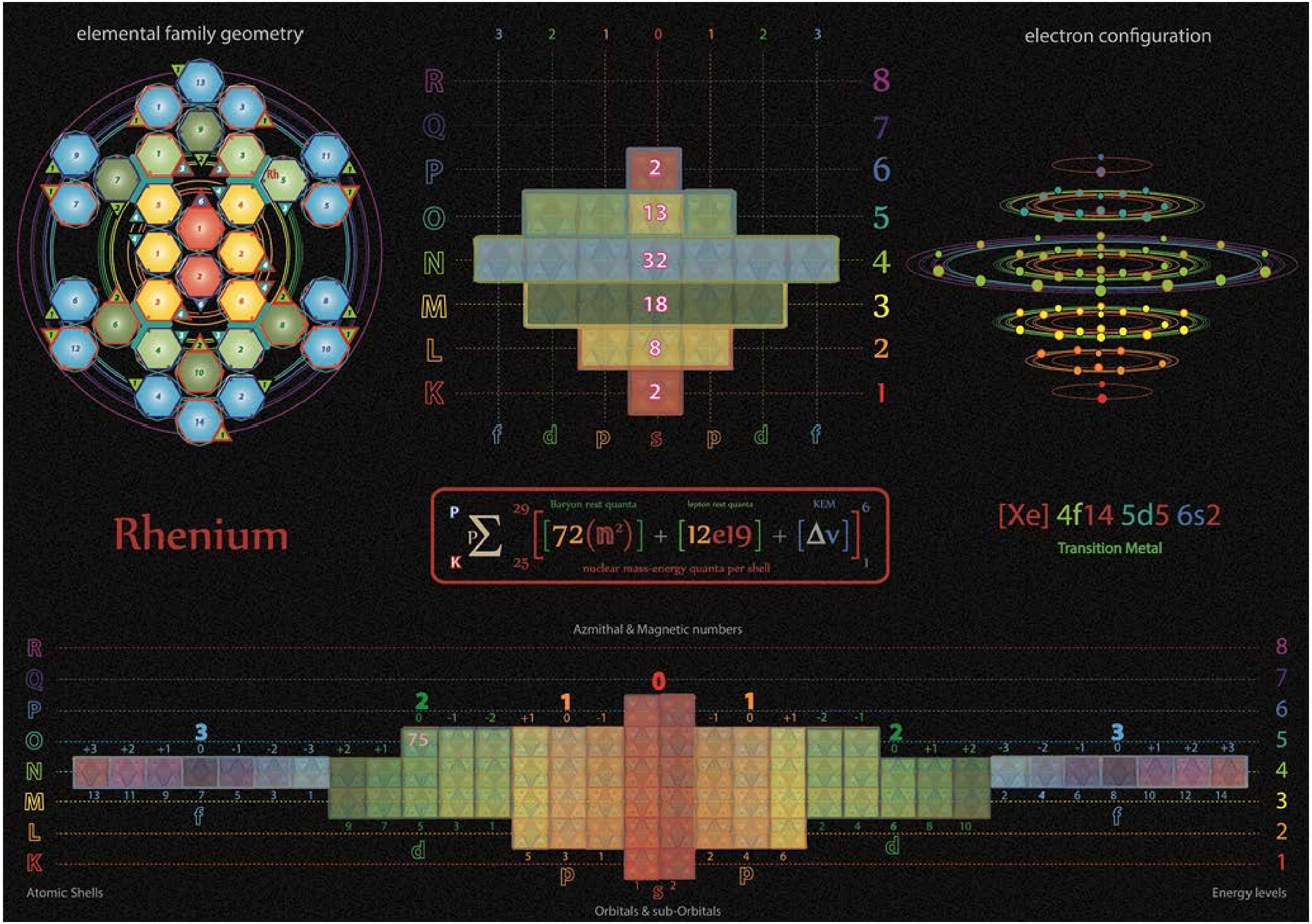


Tetryonics 53.73 - Tantalum atomic config



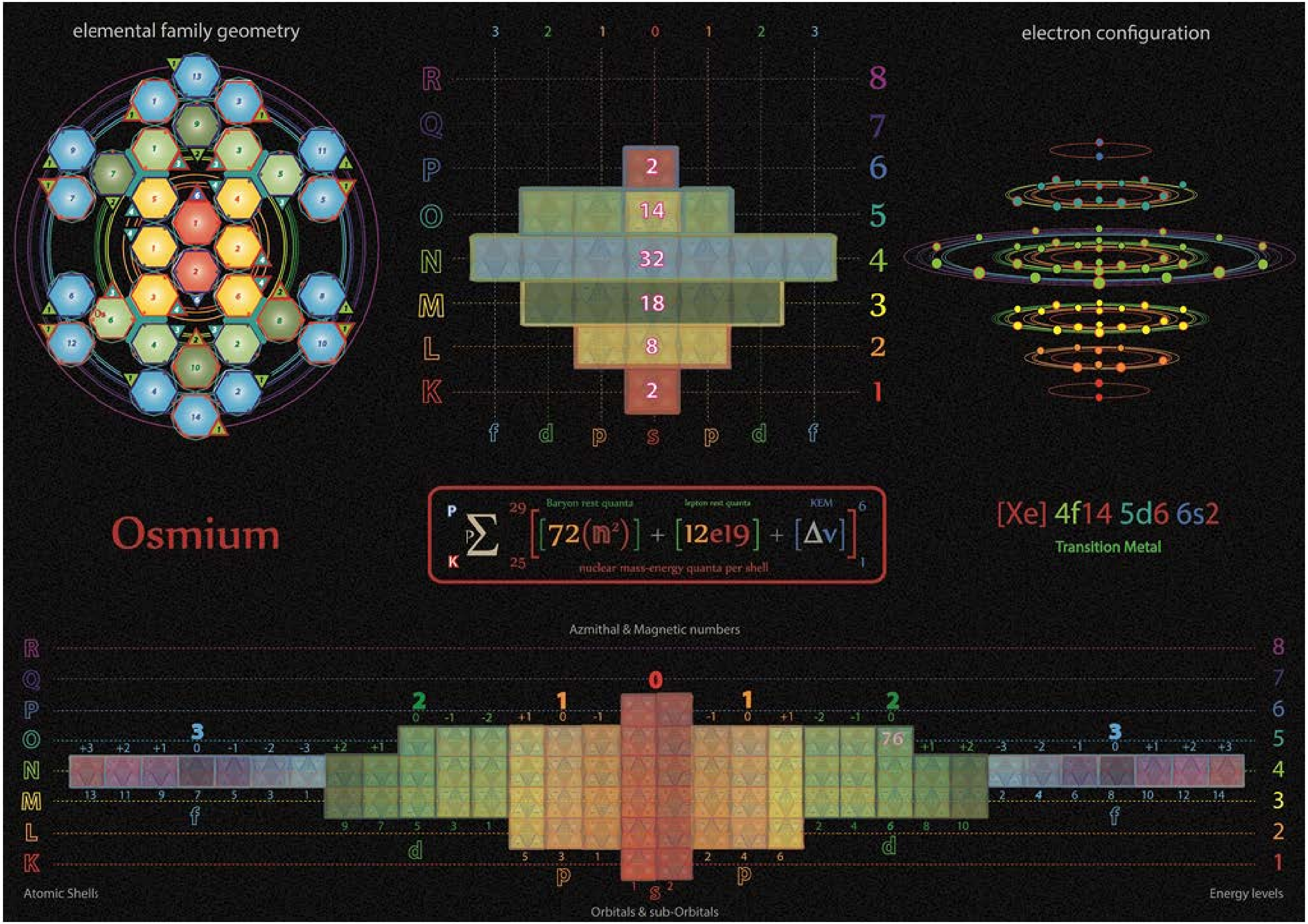
elemental family geometry
electron configuration
Tungsten
Baryon rest quanta
lepton rest quanta
KEM
[72(m²)] + [12e19] + [Δv]
nuclear mass-energy quanta per shell
[Xe] 4f14 5d4 6s2
Transition Metal
Azmithal & Magnetic numbers
Atomic Shells
Energy levels
Orbitals & sub-Orbitals

Copyright ABRAHAM [2008] - All rights reserved

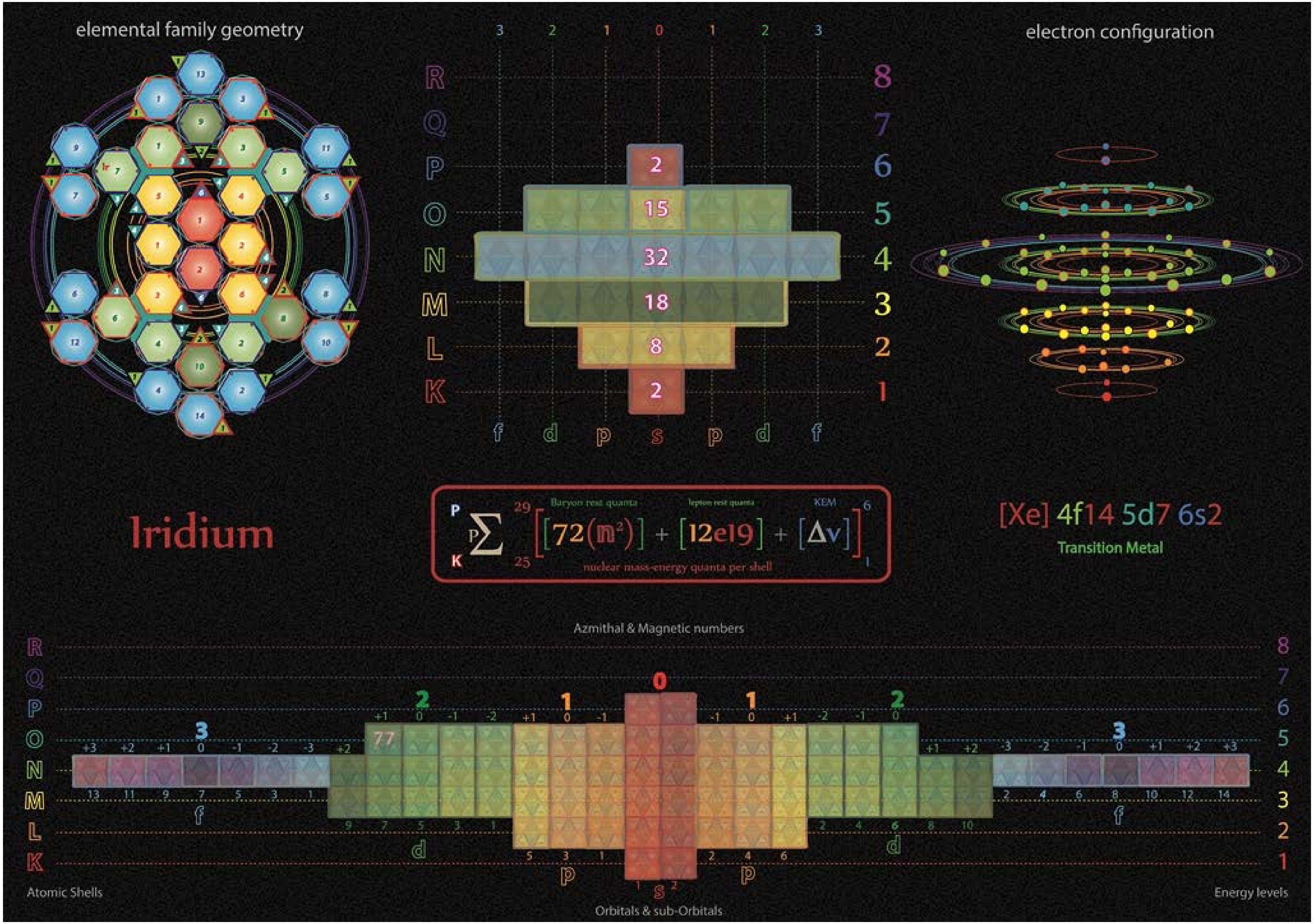


Tetryonics 53.75 - Rhenium atomic config

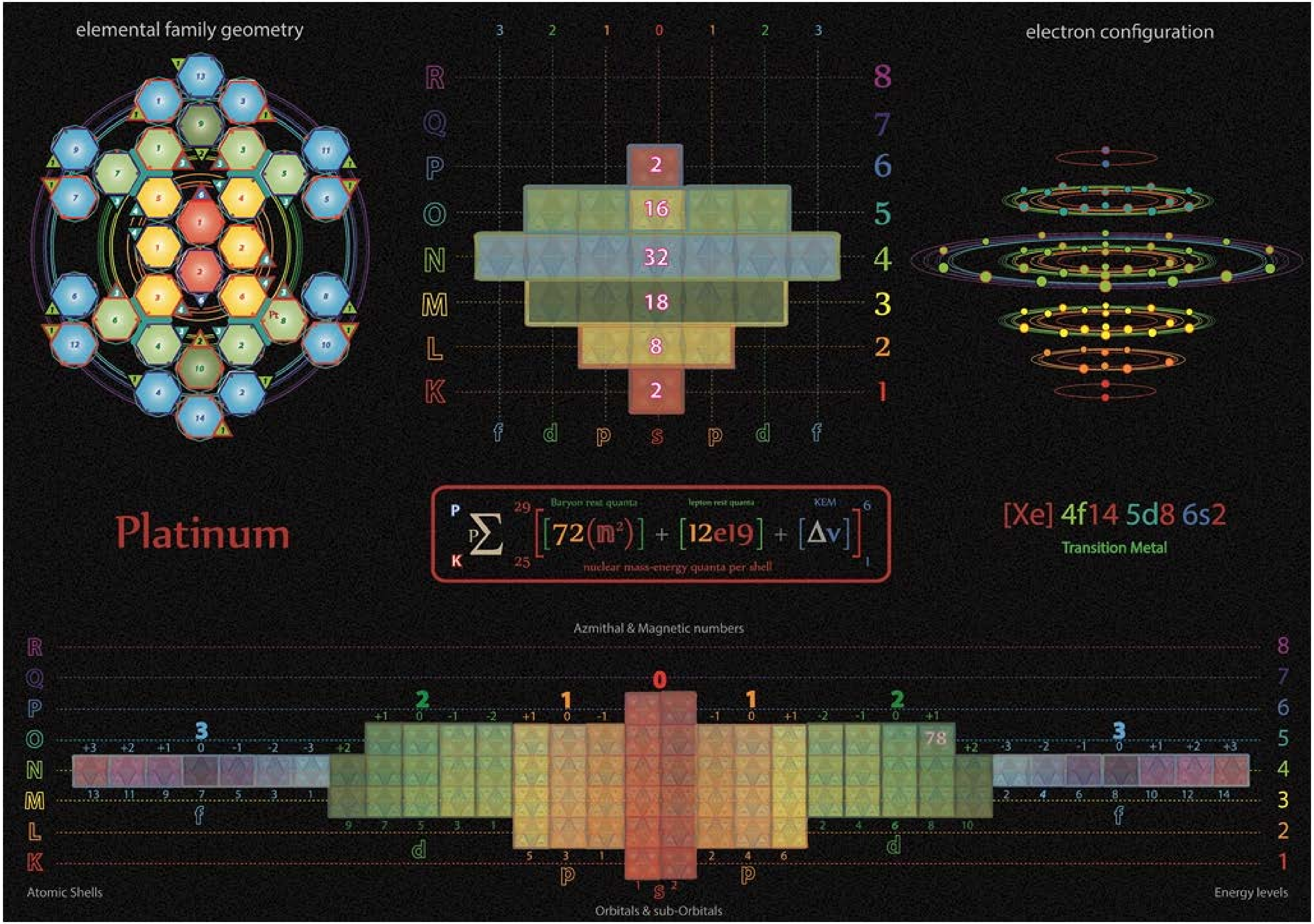
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

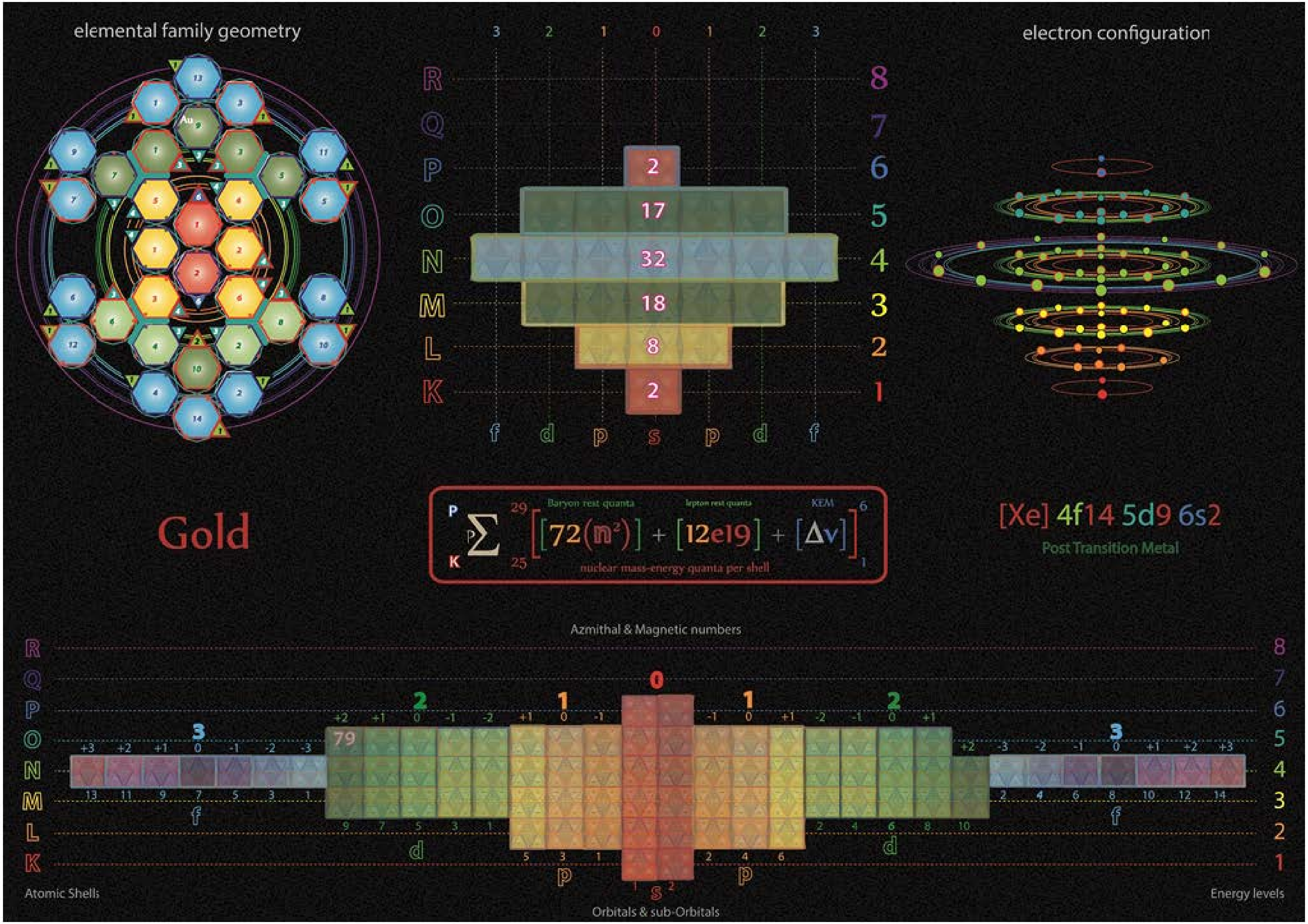


Copyright ABRAHAM [2008] - All rights reserved



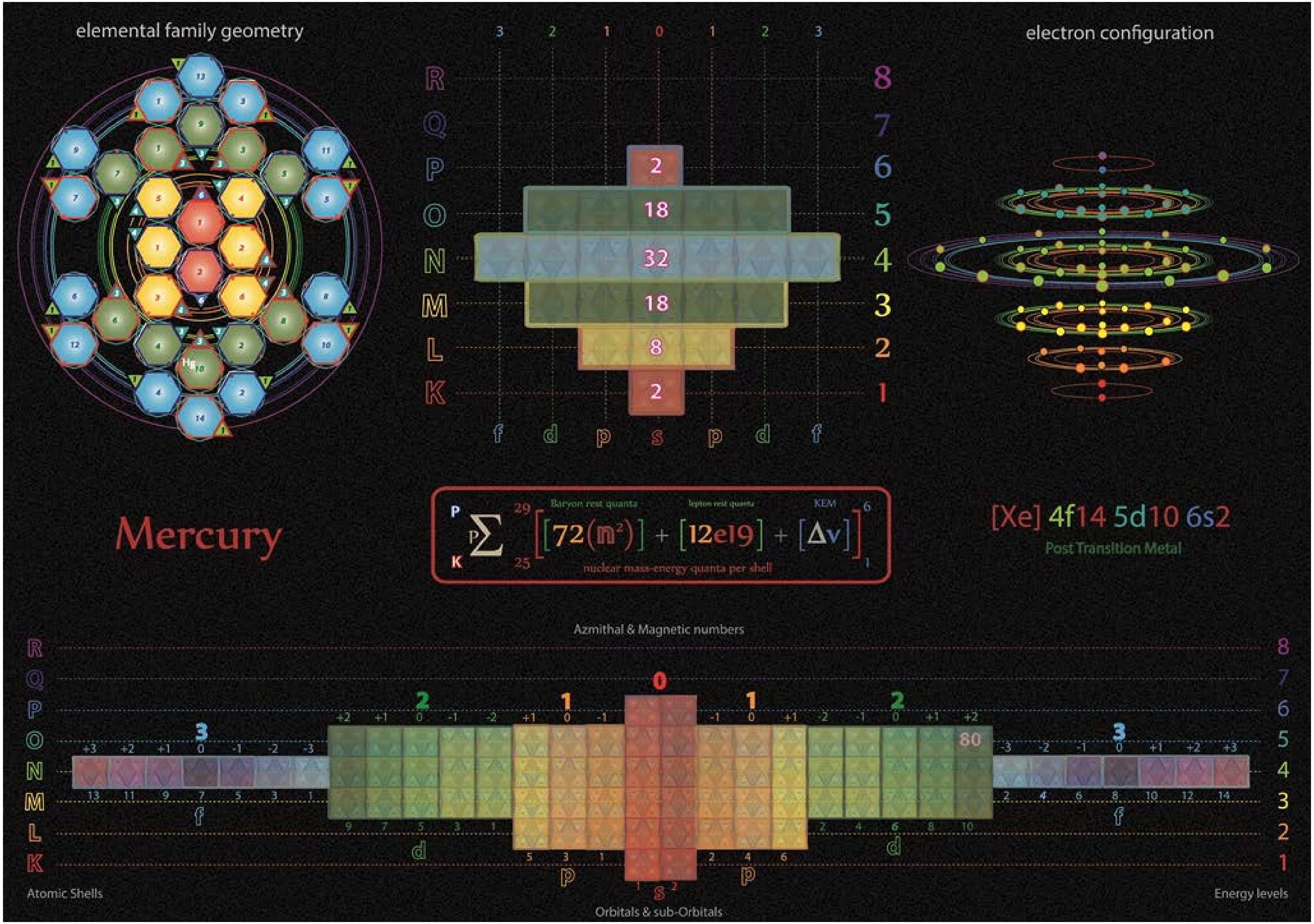
Tetryonics 53.78 - Platinum atomic config

Copyright ABRAHAM [2008] - All rights reserved



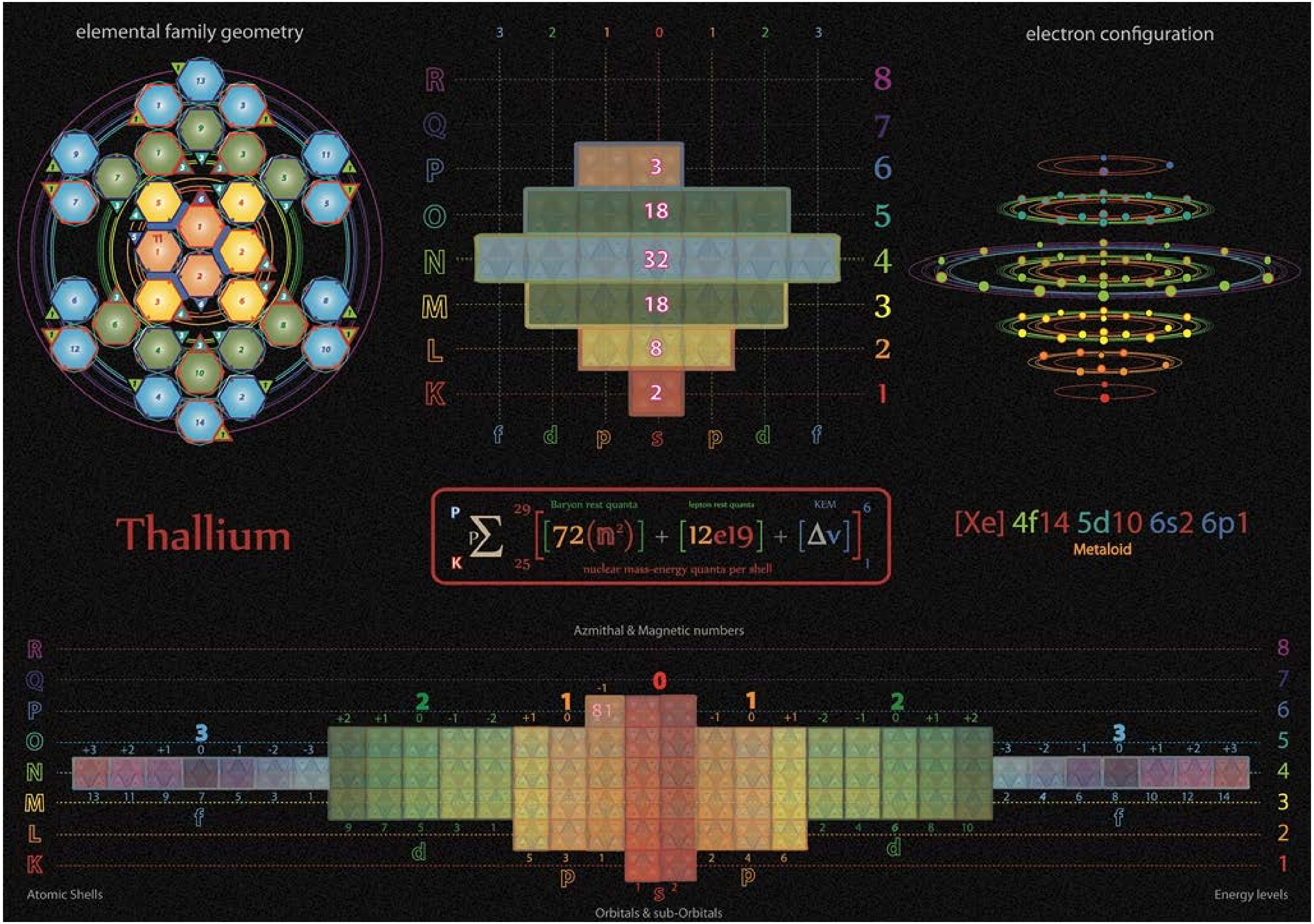
Tetryonics 53.79 - Gold atomic config

Copyright ABRAHAM [2008] - All rights reserved



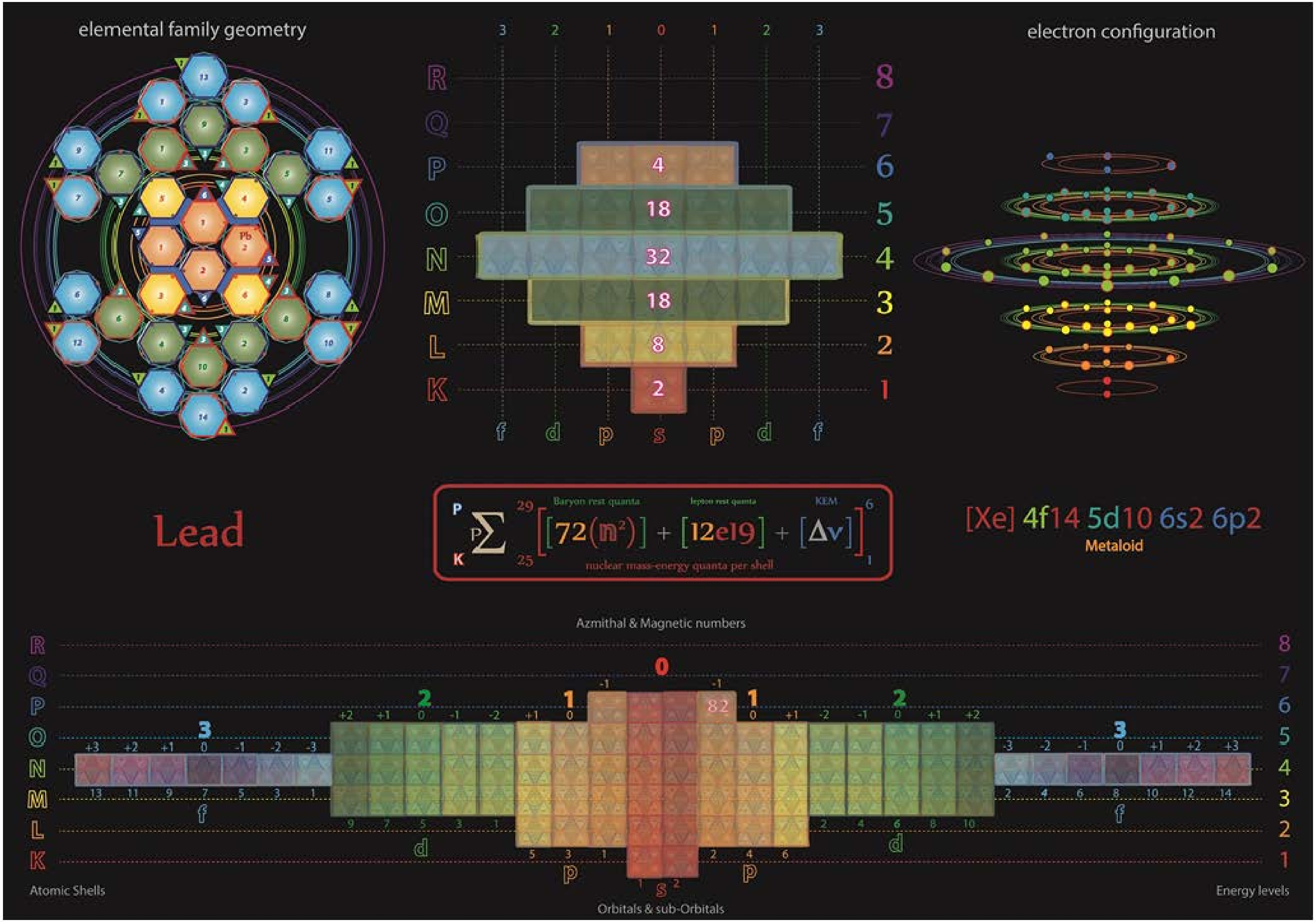
Tetryonics 53.80 - Mercury atomic config

Copyright ABRAHAM [2008] - All rights reserved



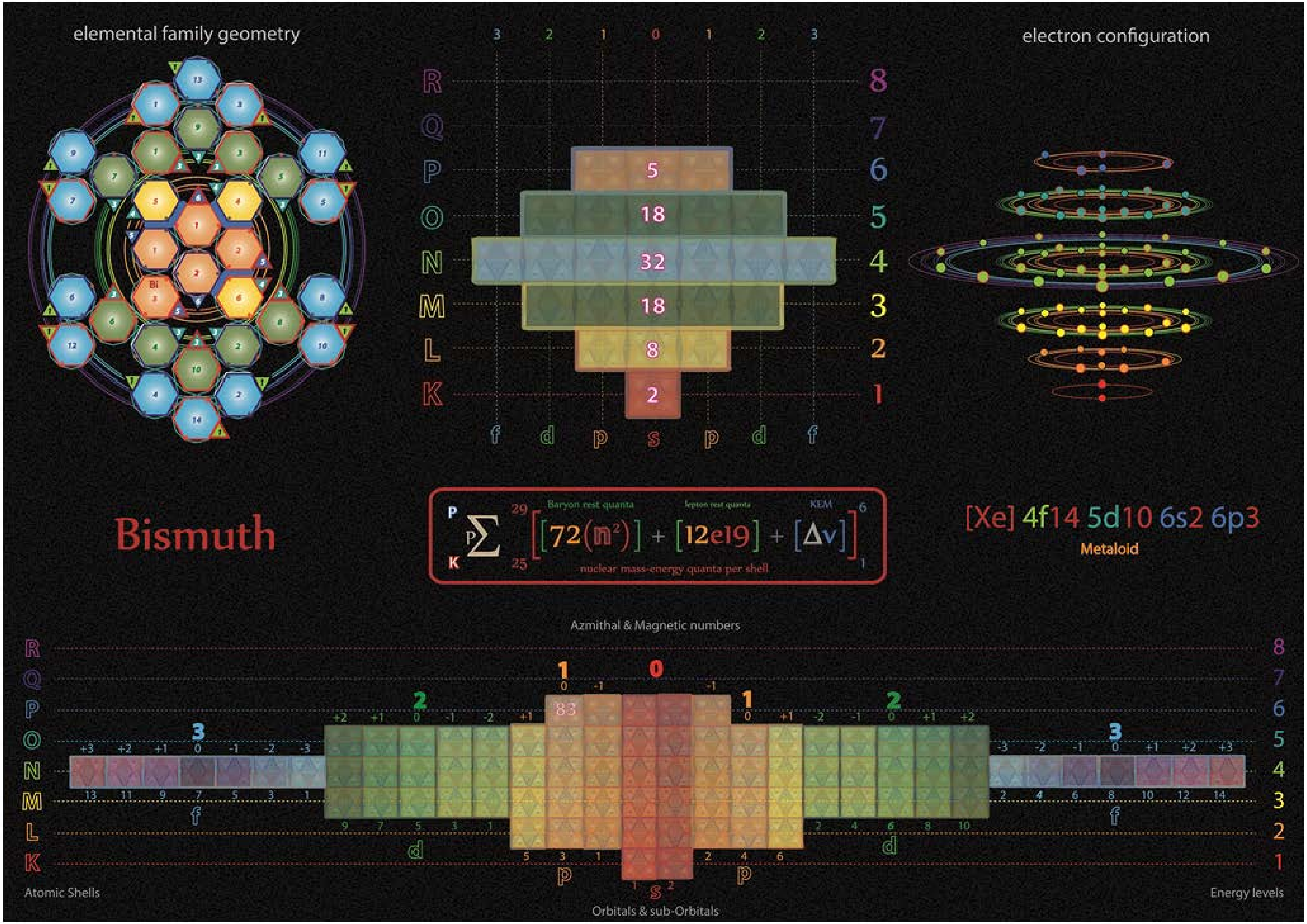
Tetryonics 53.81 - Thallium atomic config

Copyright ABRAHAM [2008] - All rights reserved

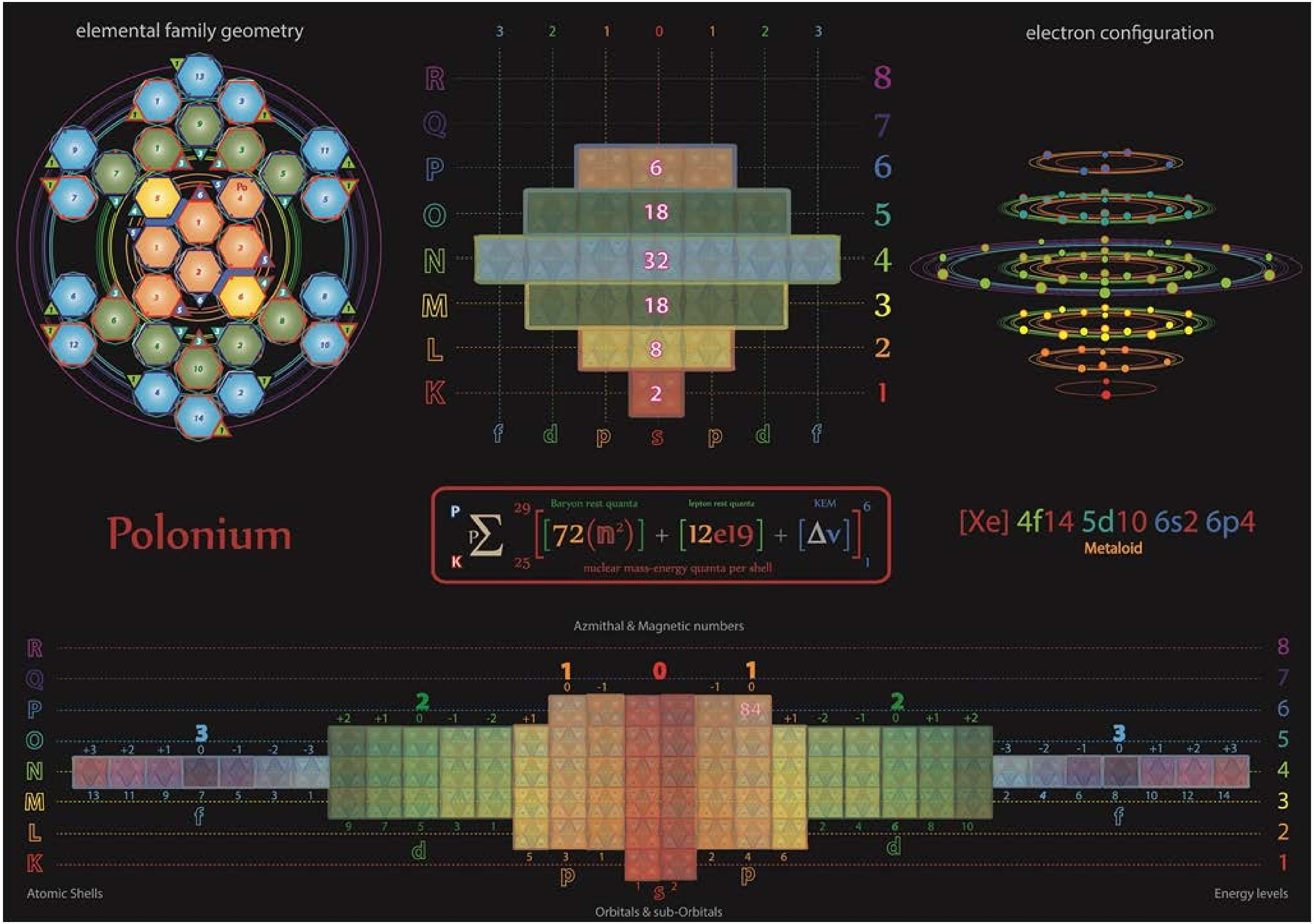


Tetryonics 53.82 - Lead atomic config

Copyright ABRAHAM [2008] - All rights reserved

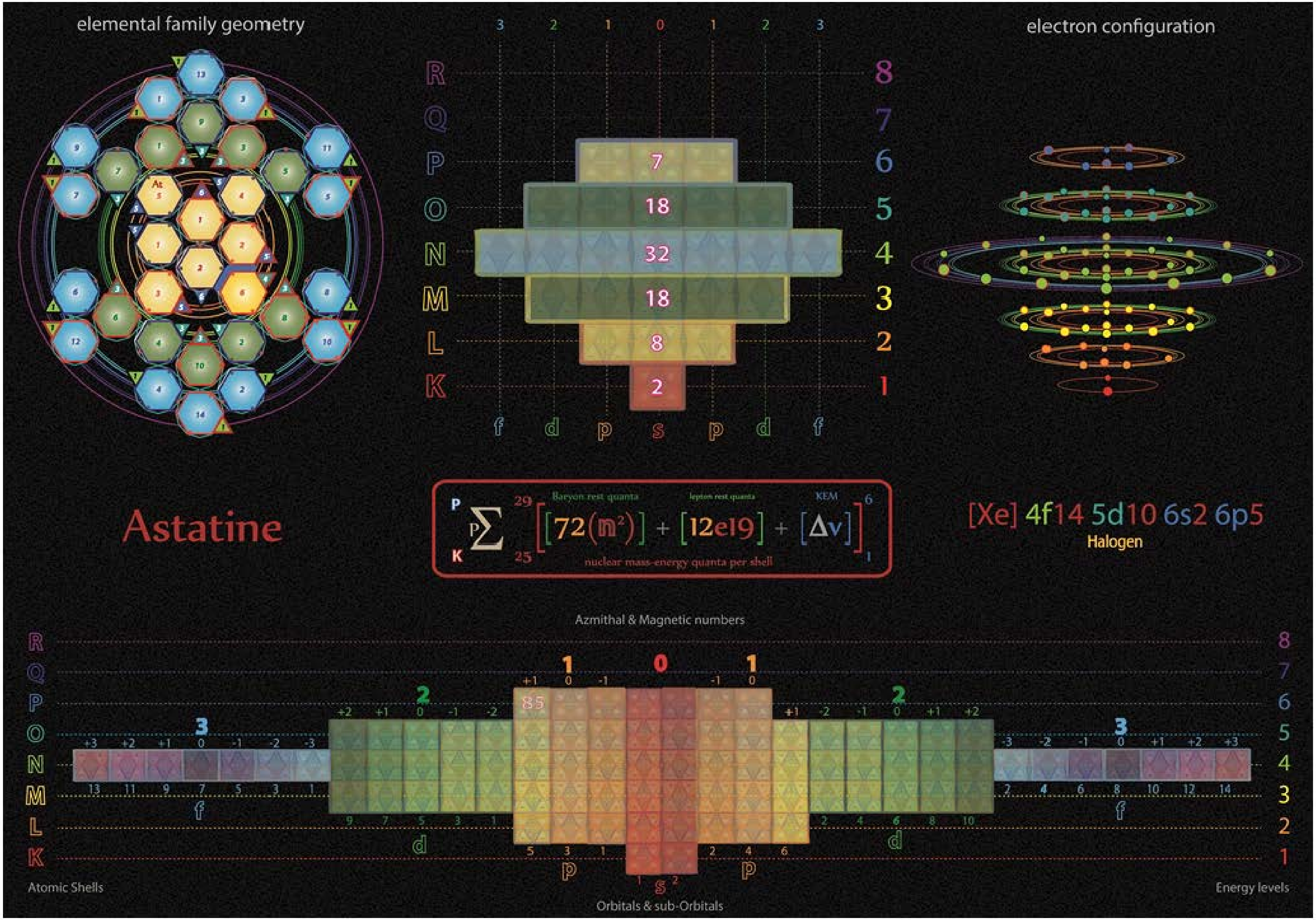


Tetryonics 53.83 - Bismuth atomic config



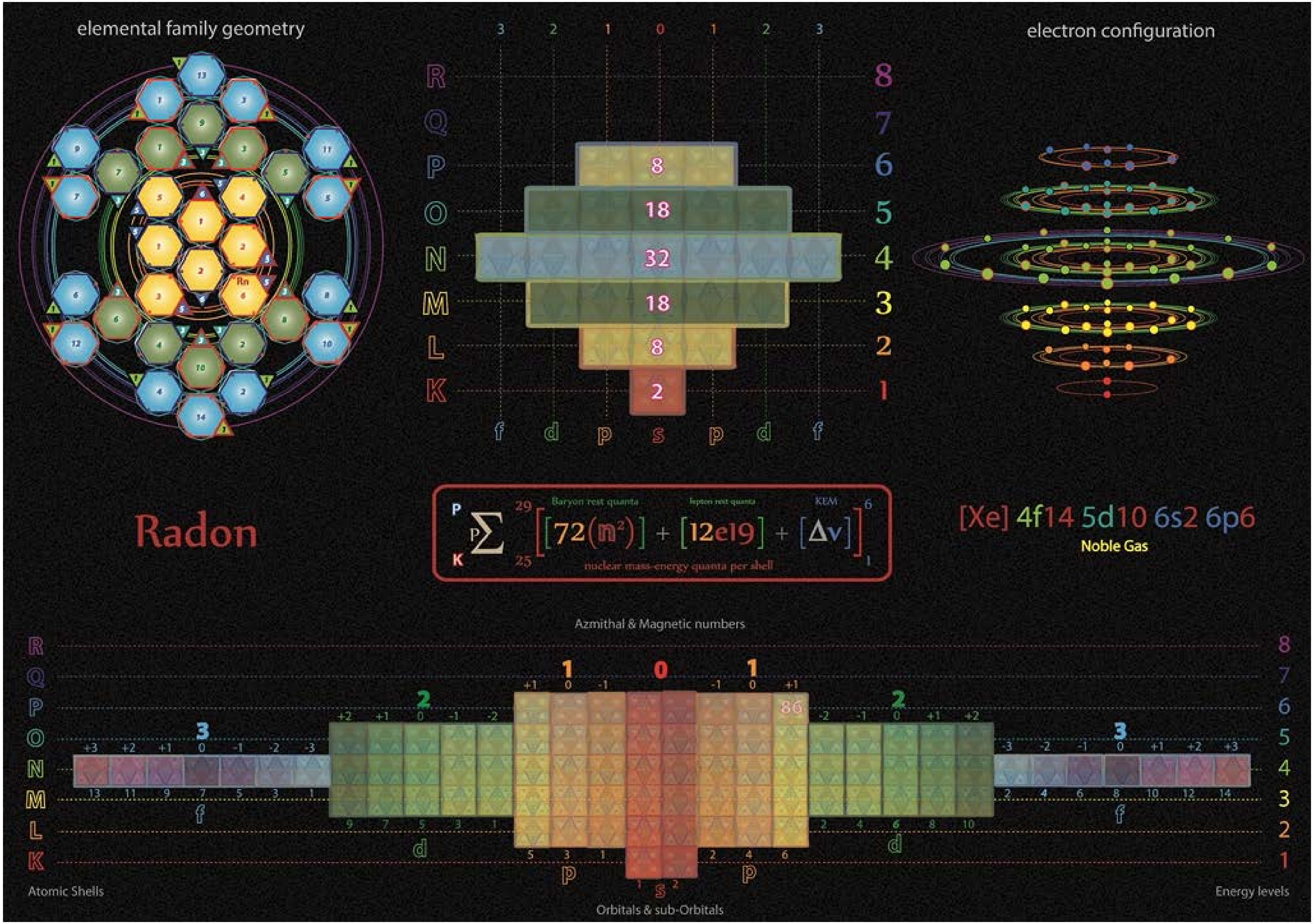
Tetryonics 53.84 - Polonium atomic config

Copyright ABRAHAM [2008] - All rights reserved



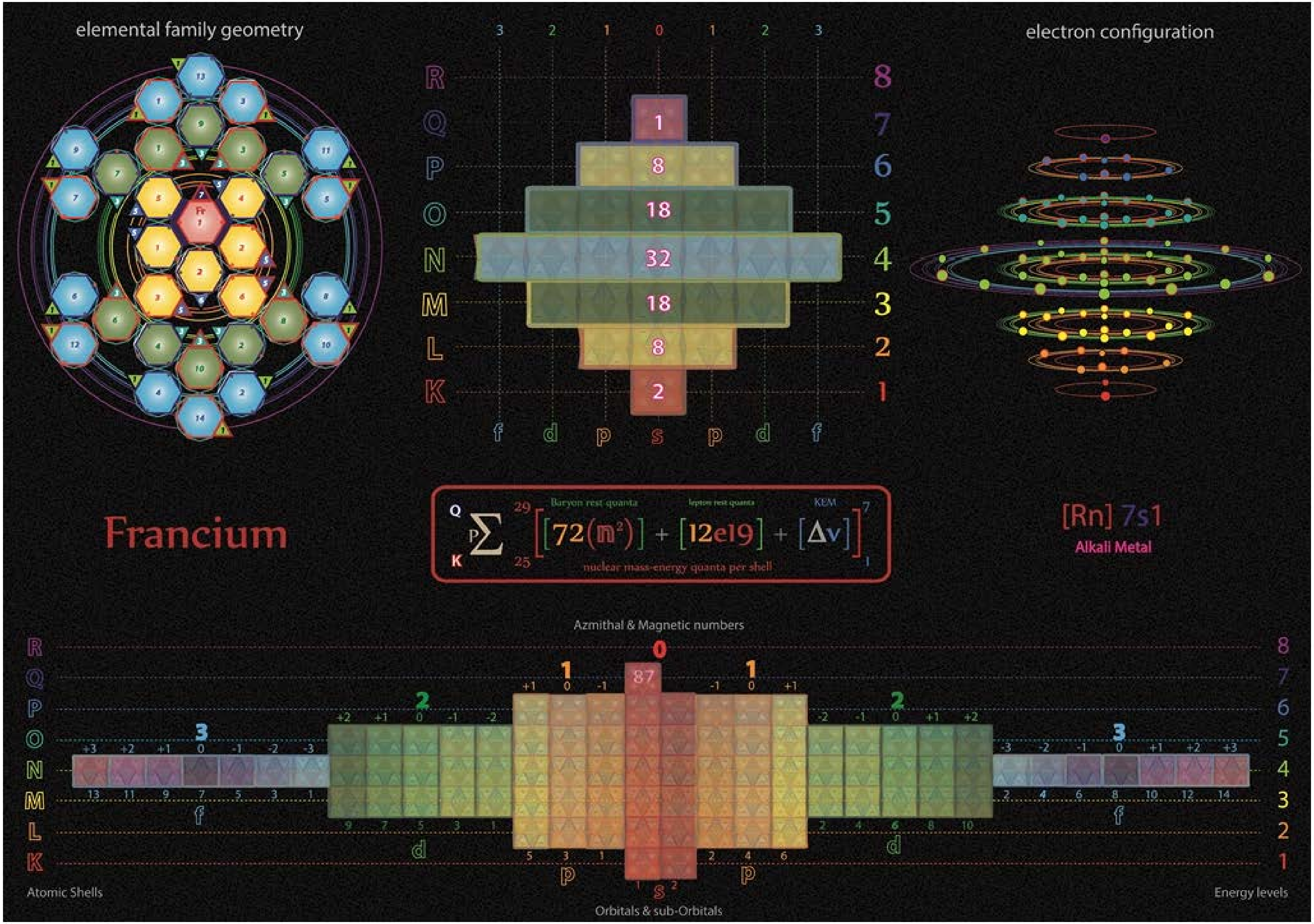
Tetryonics 53.85 - Astatine atomic config

Copyright ABRAHAM [2008] - All rights reserved



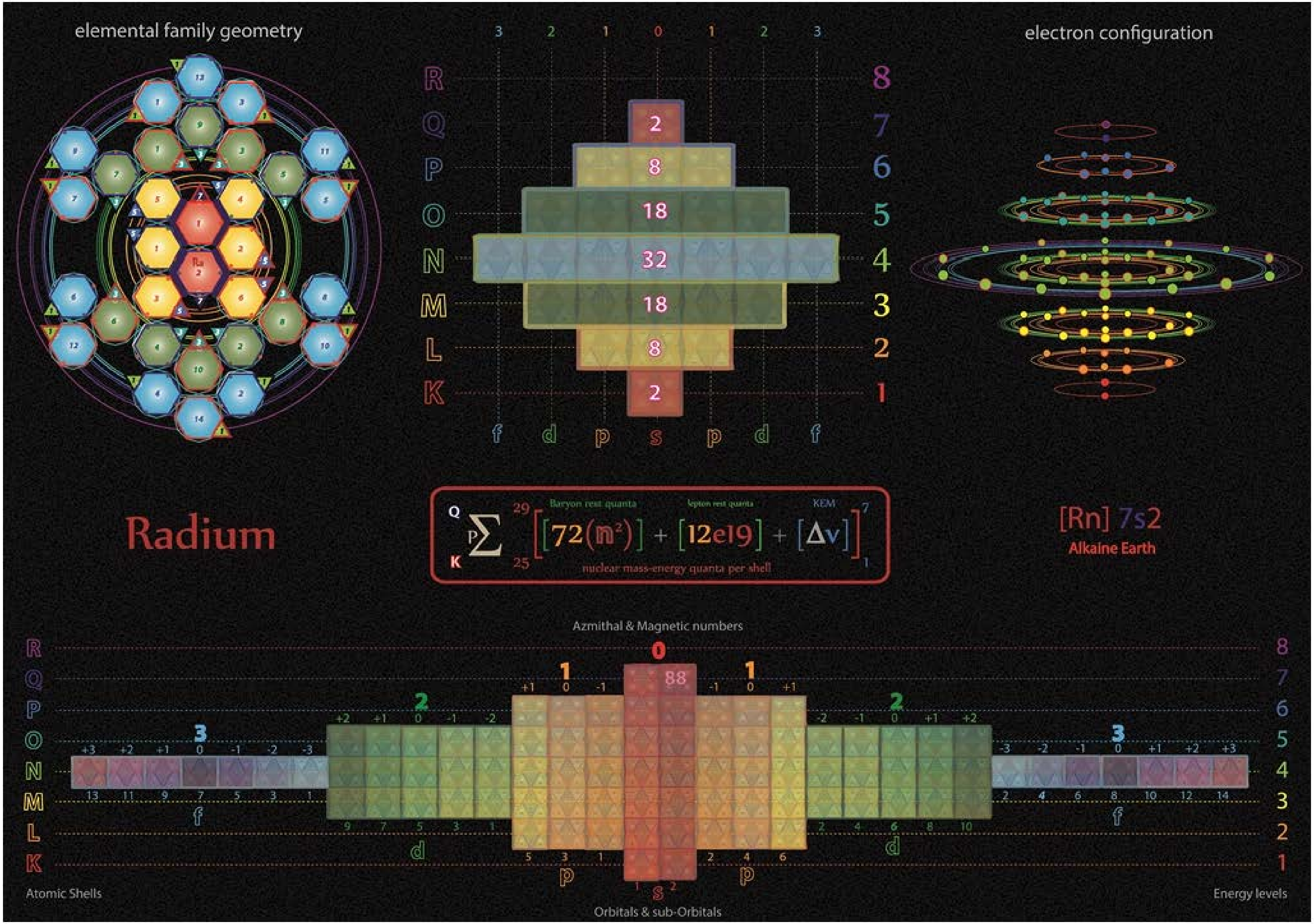
Tetryonics 53.86 - Radon atomic config

Copyright ABRAHAM [2008] - All rights reserved



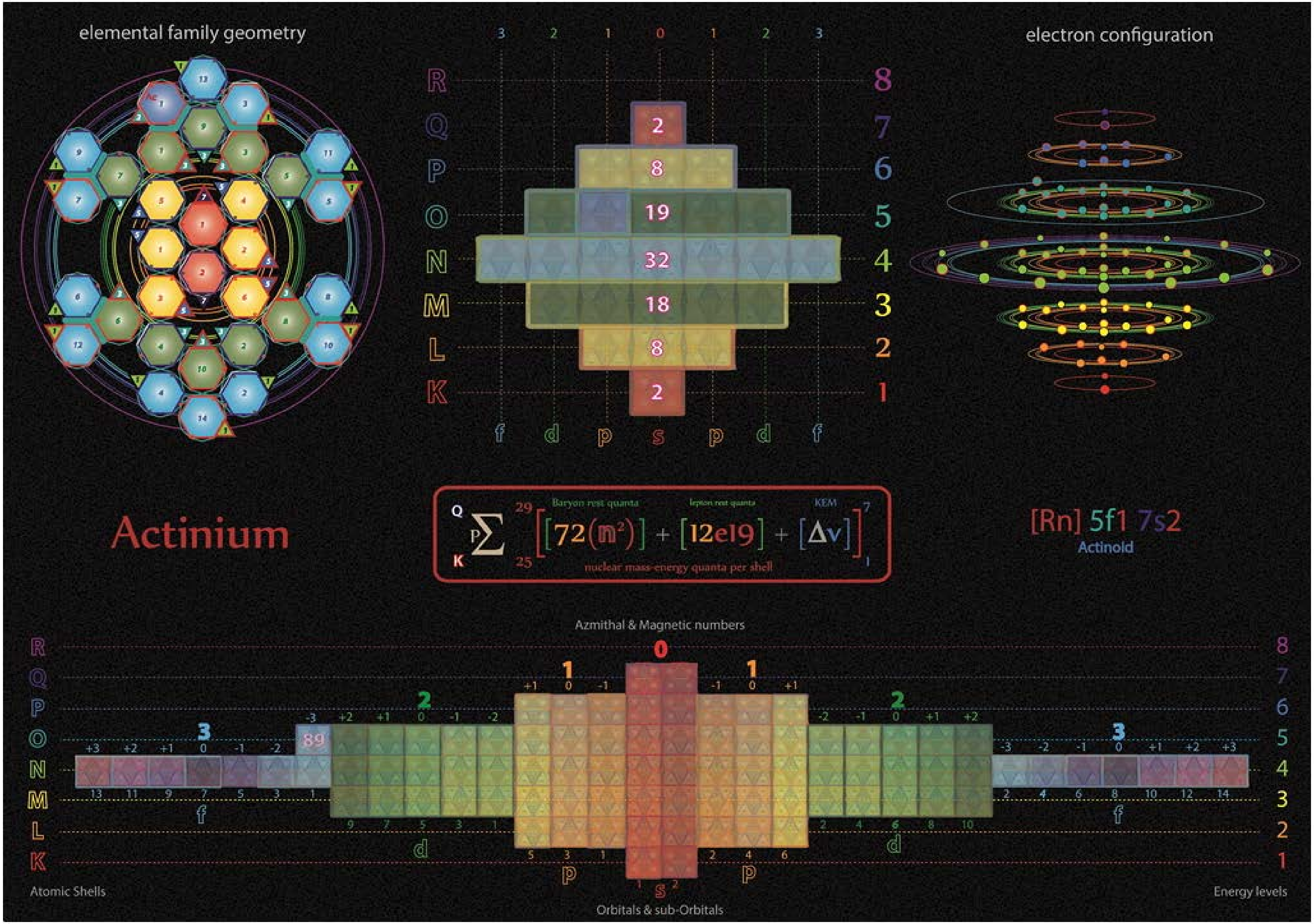
Tetryonics 53.87 - Francium atomic config

Copyright ABRAHAM [2008] - All rights reserved

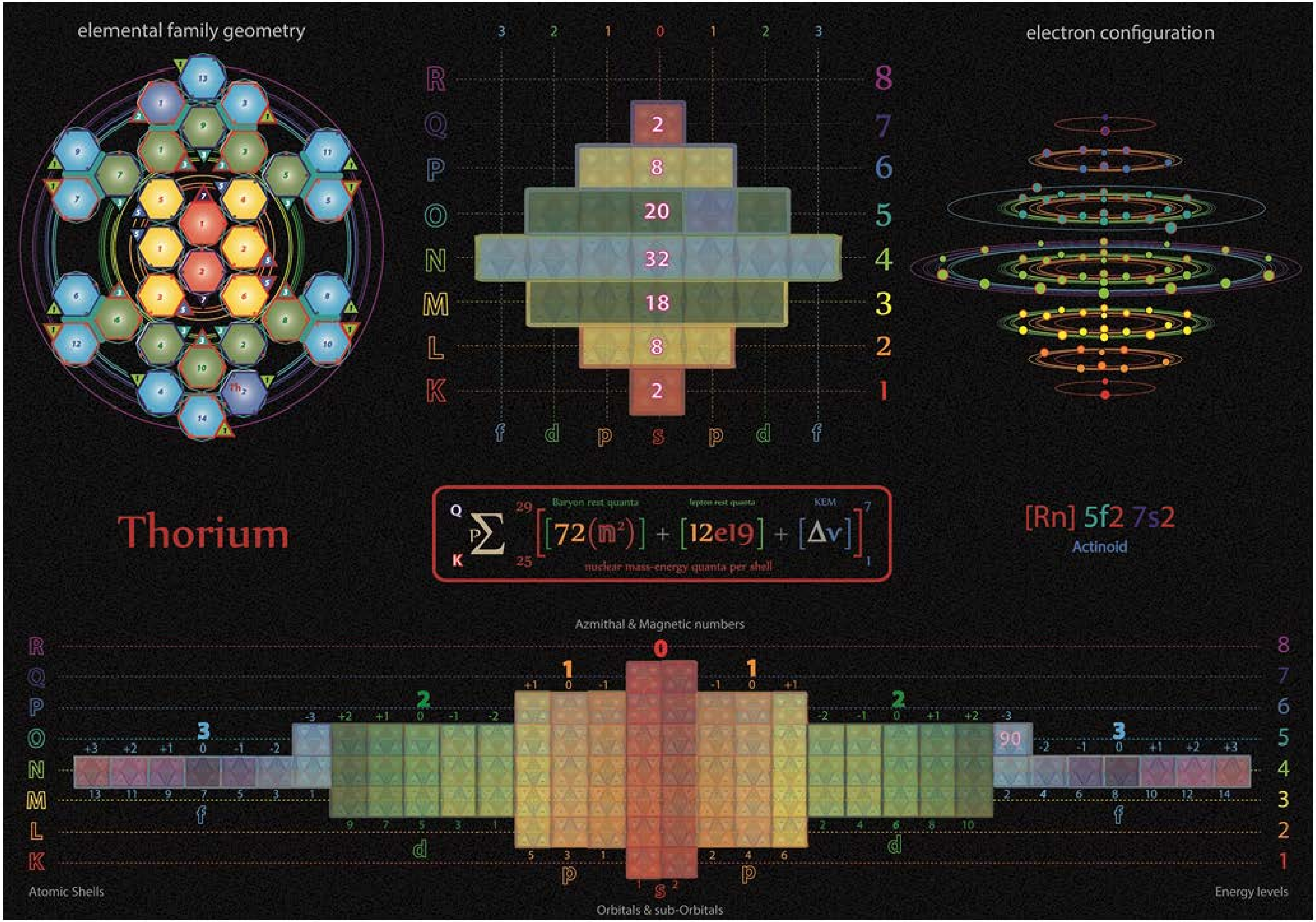


Tetryonics 53.88 - Radium atomic config

Copyright ABRAHAM [2008] - All rights reserved

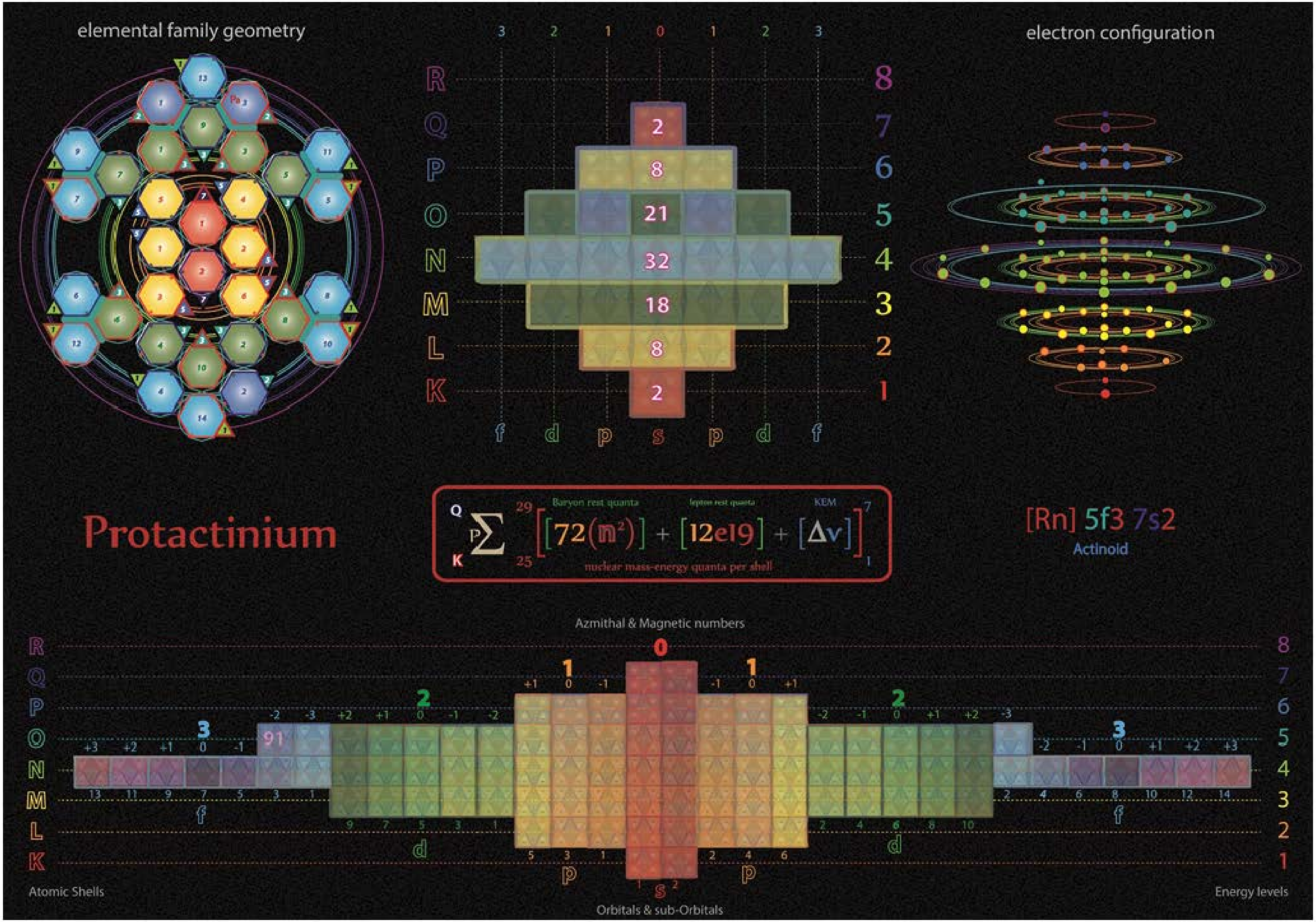


Copyright ABRAHAM [2008] - All rights reserved

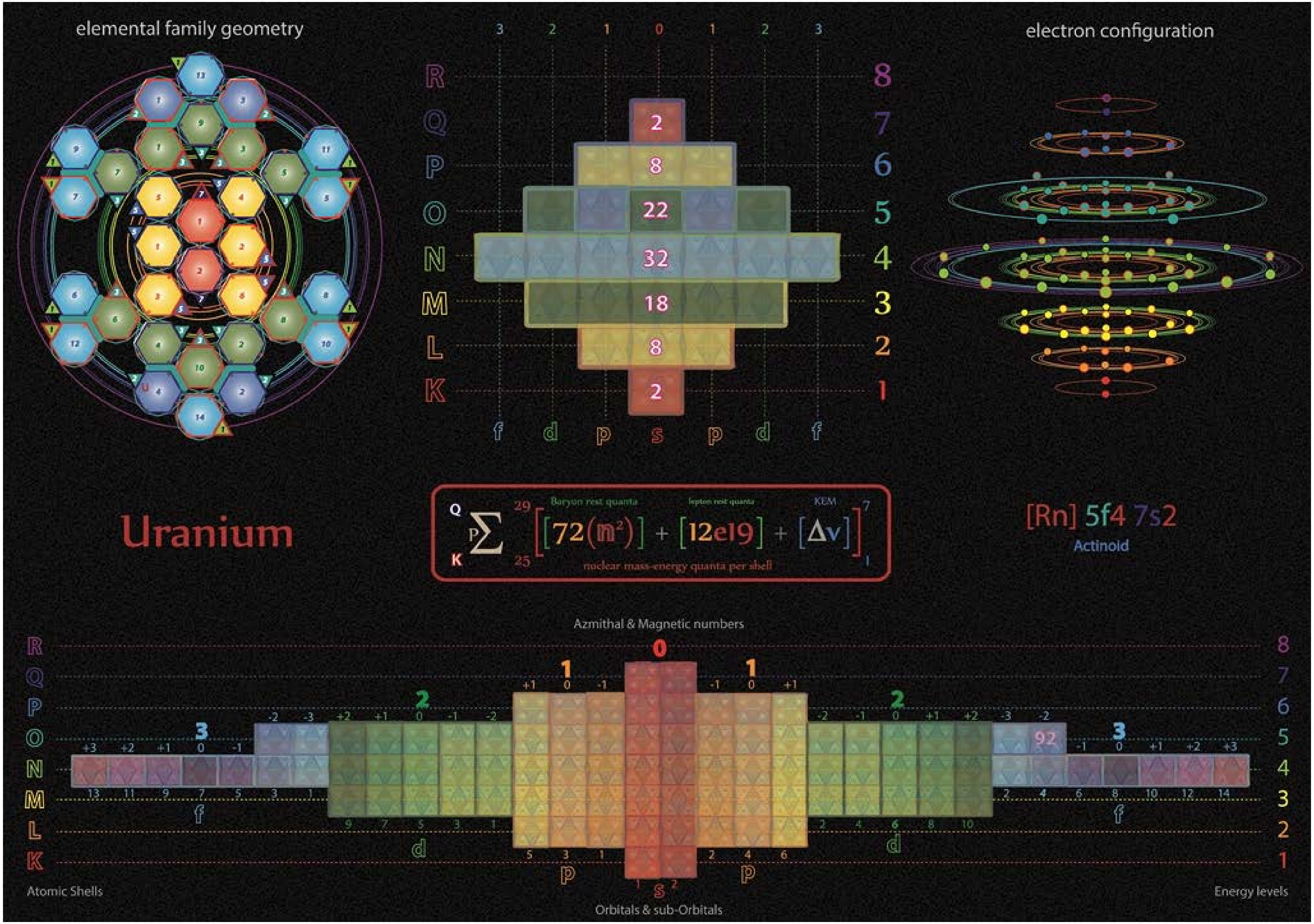


Tetryonics 53.90 - Thorium atomic config

Copyright ABRAHAM [2008] - All rights reserved

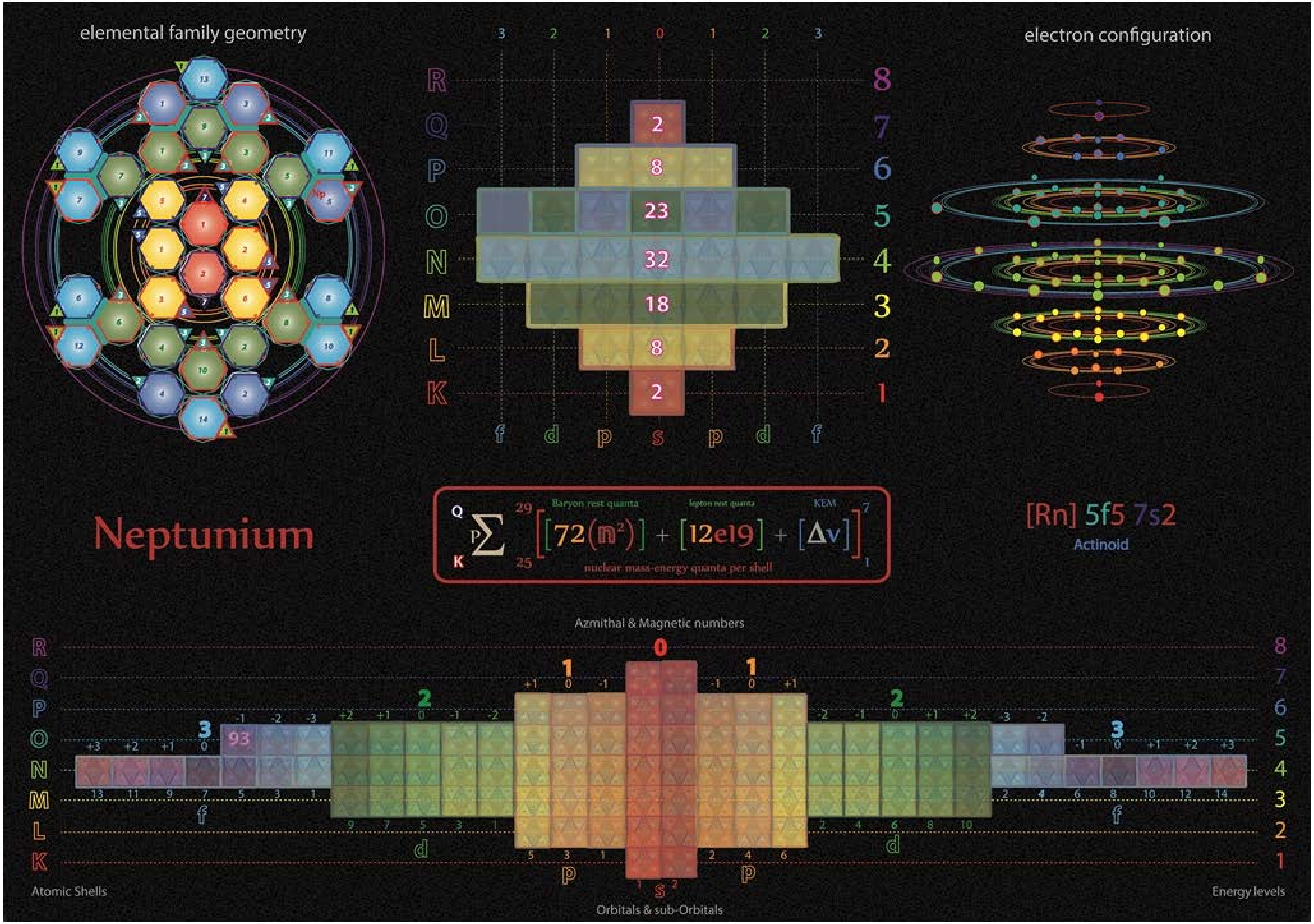


Copyright ABRAHAM [2008] - All rights reserved

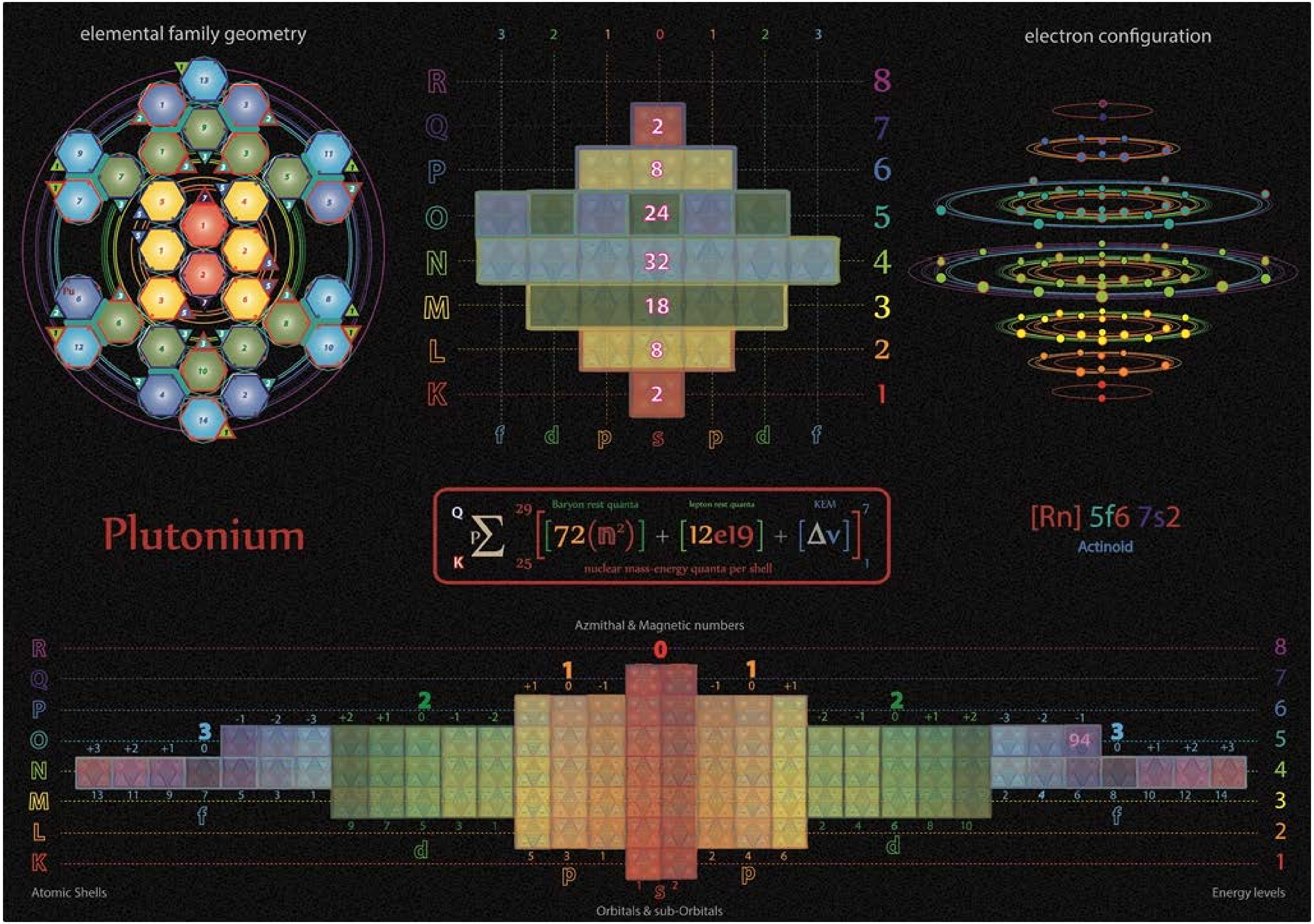


Tetryonics 53.92 - Uranium atomic config

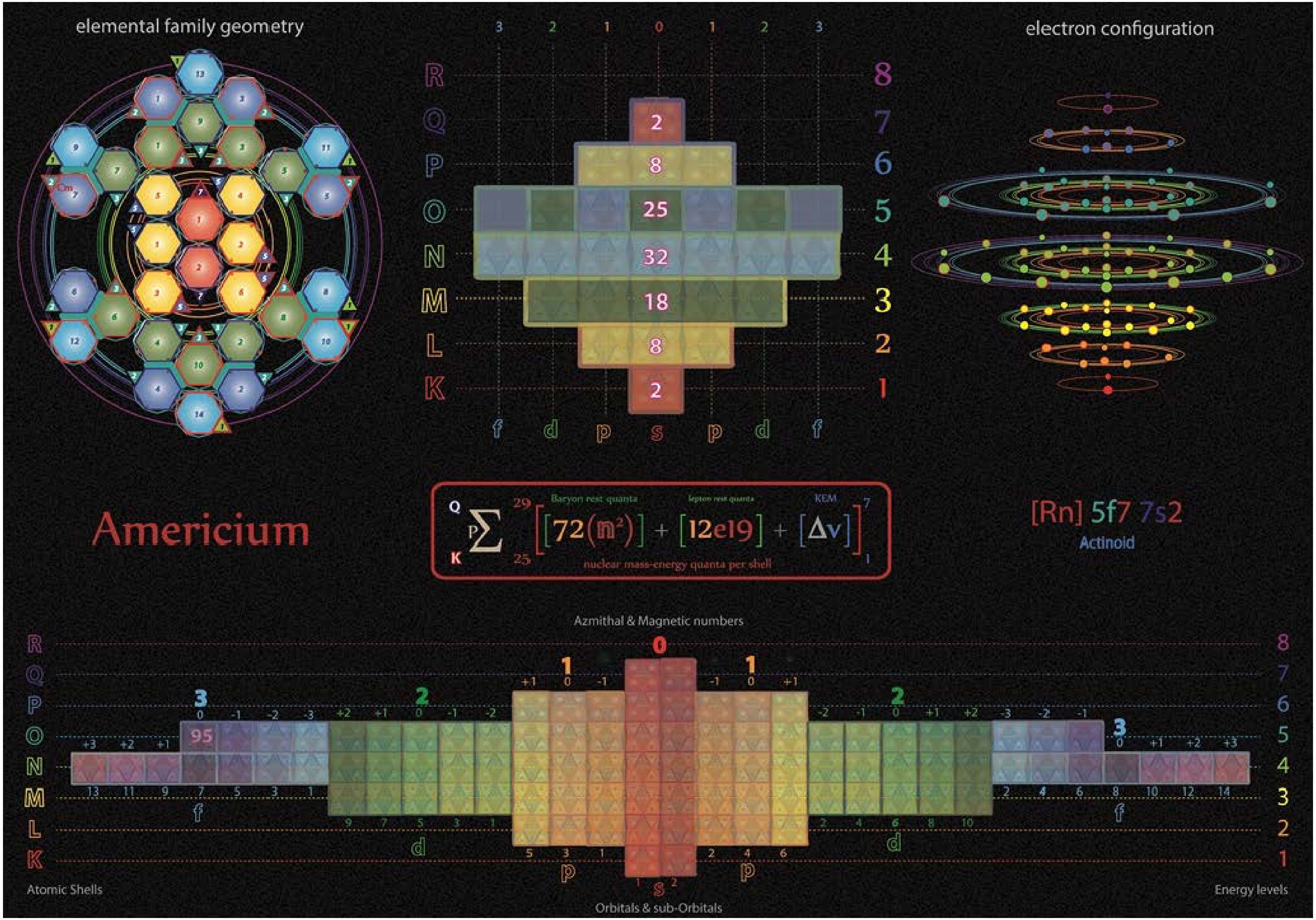
Copyright ABRAHAM [2008] - All rights reserved



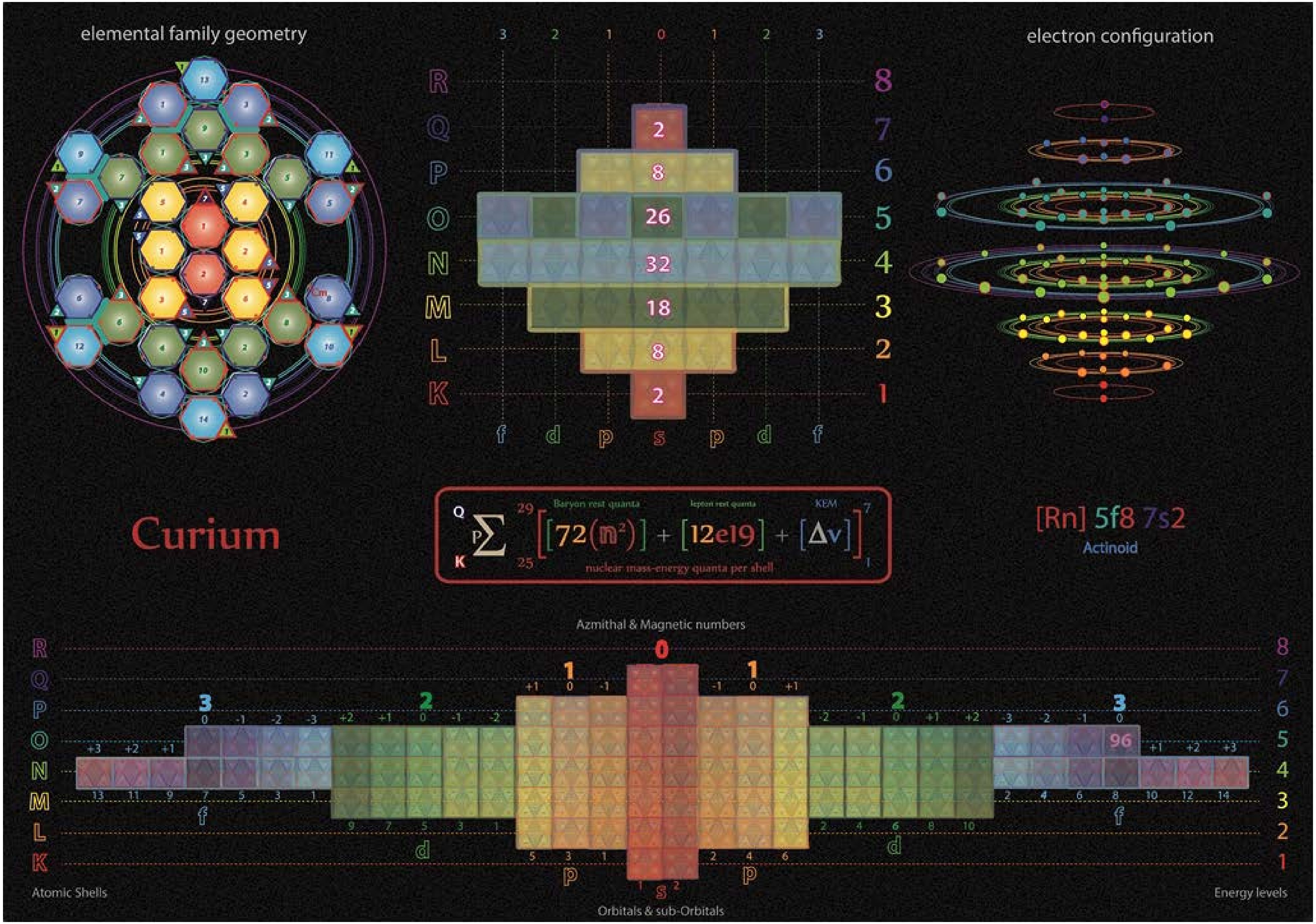
Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 53.94 - Plutonium atomic config

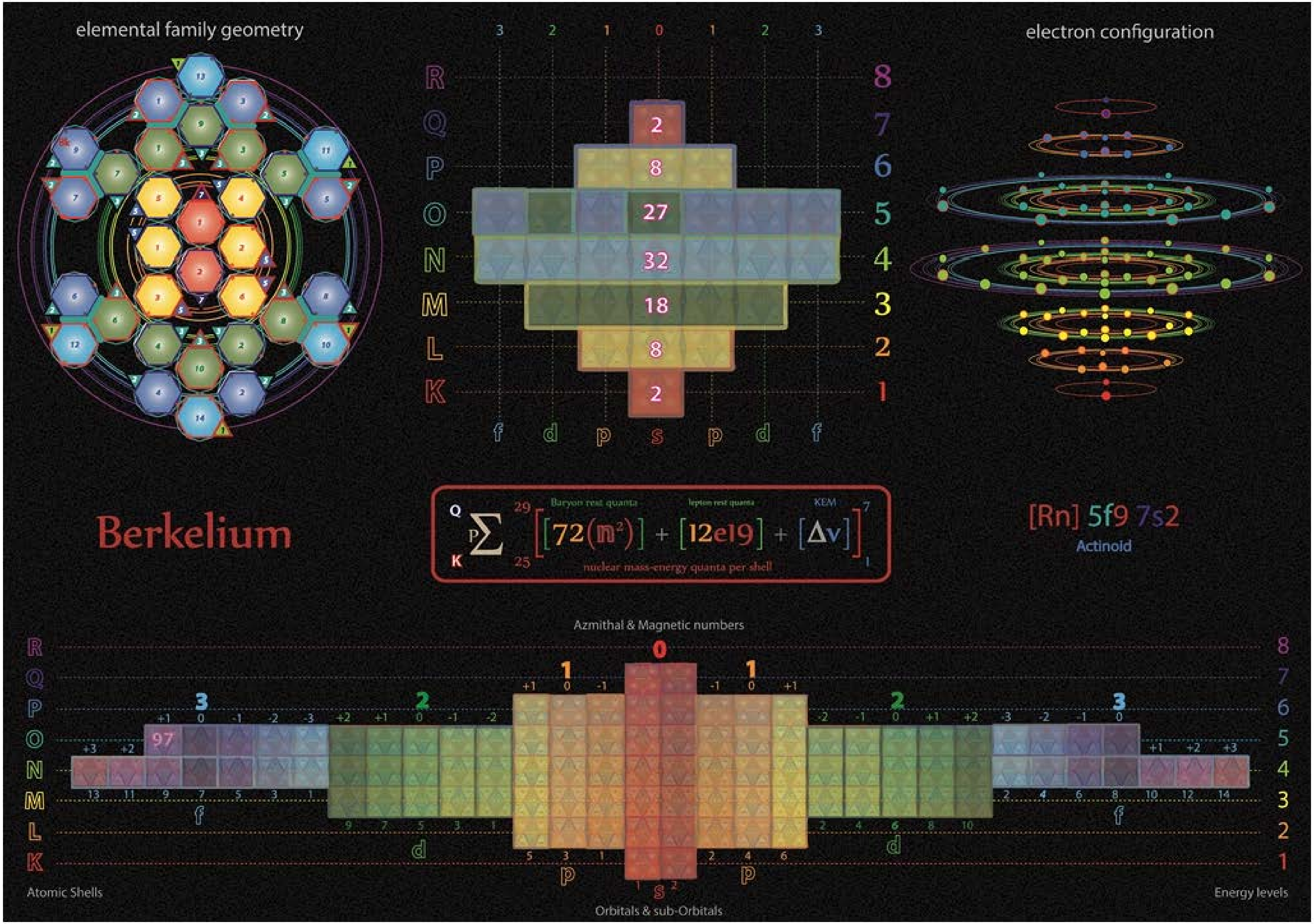

elemental family geometry
electron configuration
R Q P O N M L K
8 7 6 5 4 3 2 1
f d p s p d f
Americium
Baryon rest quanta
lepton rest quanta
KEM
[72(m²)] + [12e19] + [Δv]
nuclear mass-energy quanta per shell
[Rn] 5f7 7s2
Actinoid
Azmithal & Magnetic numbers
95
Atomic Shells
Energy levels
Orbitals & sub-Orbitals

Copyright ABRAHAM [2008] - All rights reserved



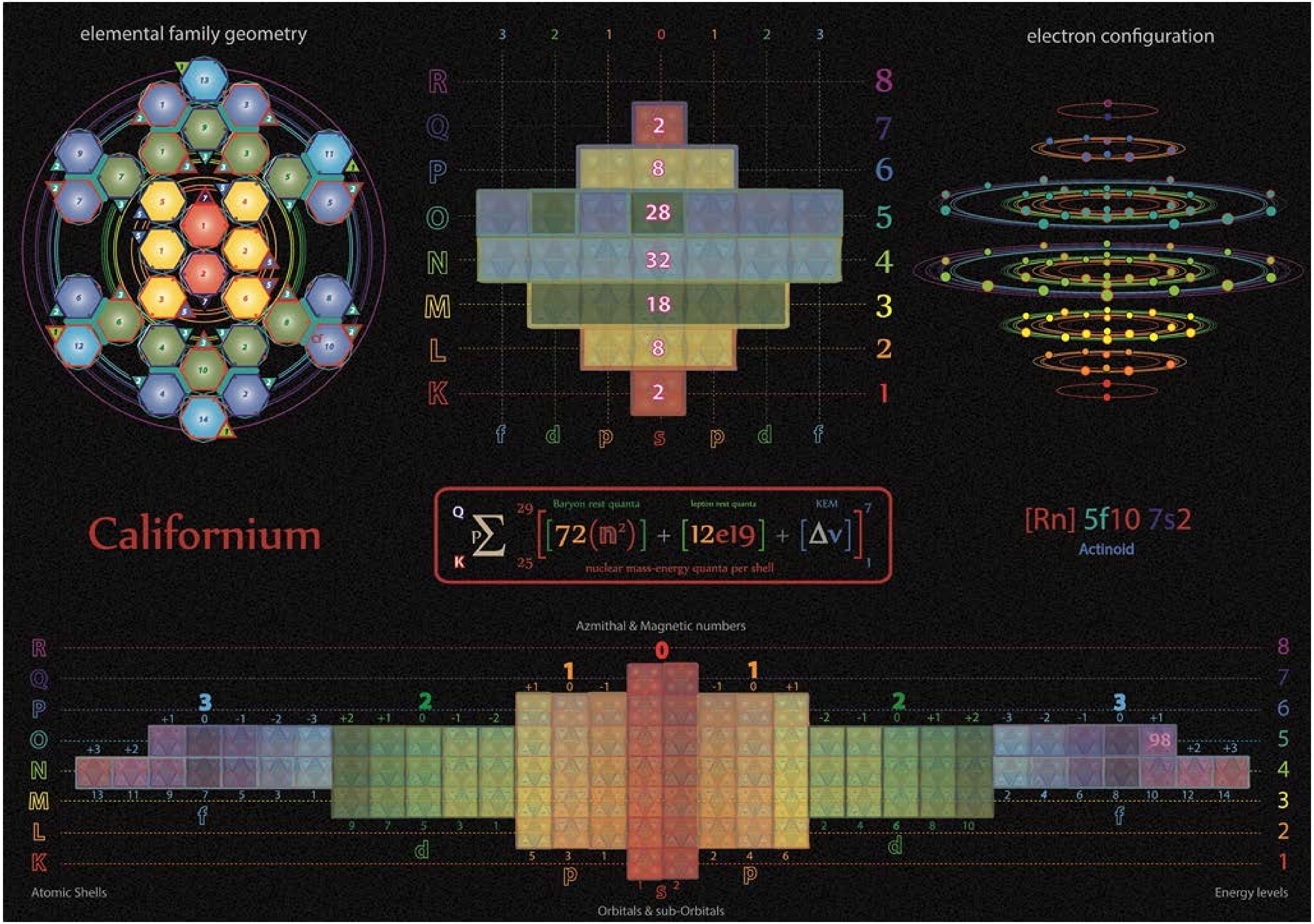
Tetryonics 53.96 - Curium atomic config

Copyright ABRAHAM [2008] - All rights reserved

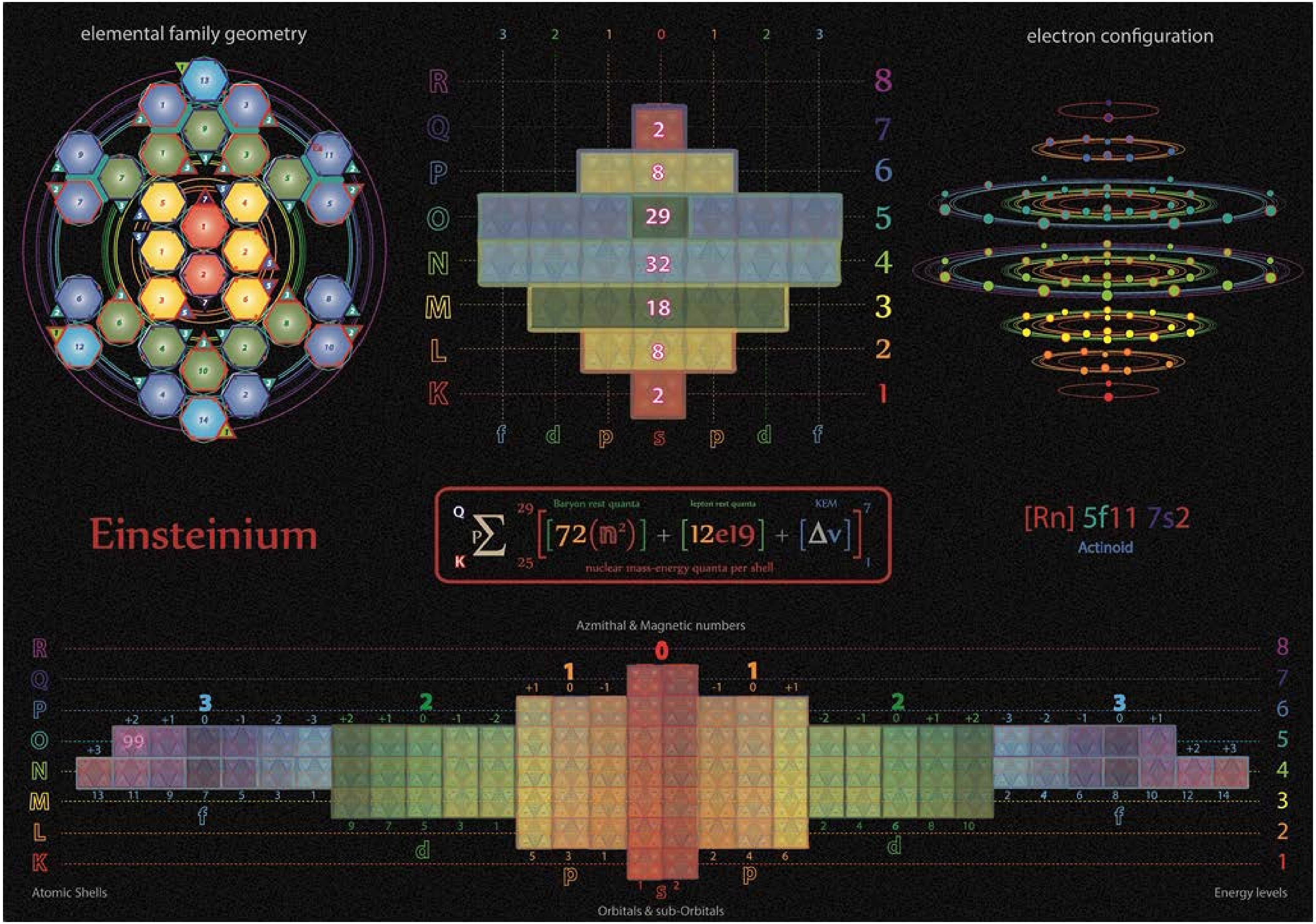


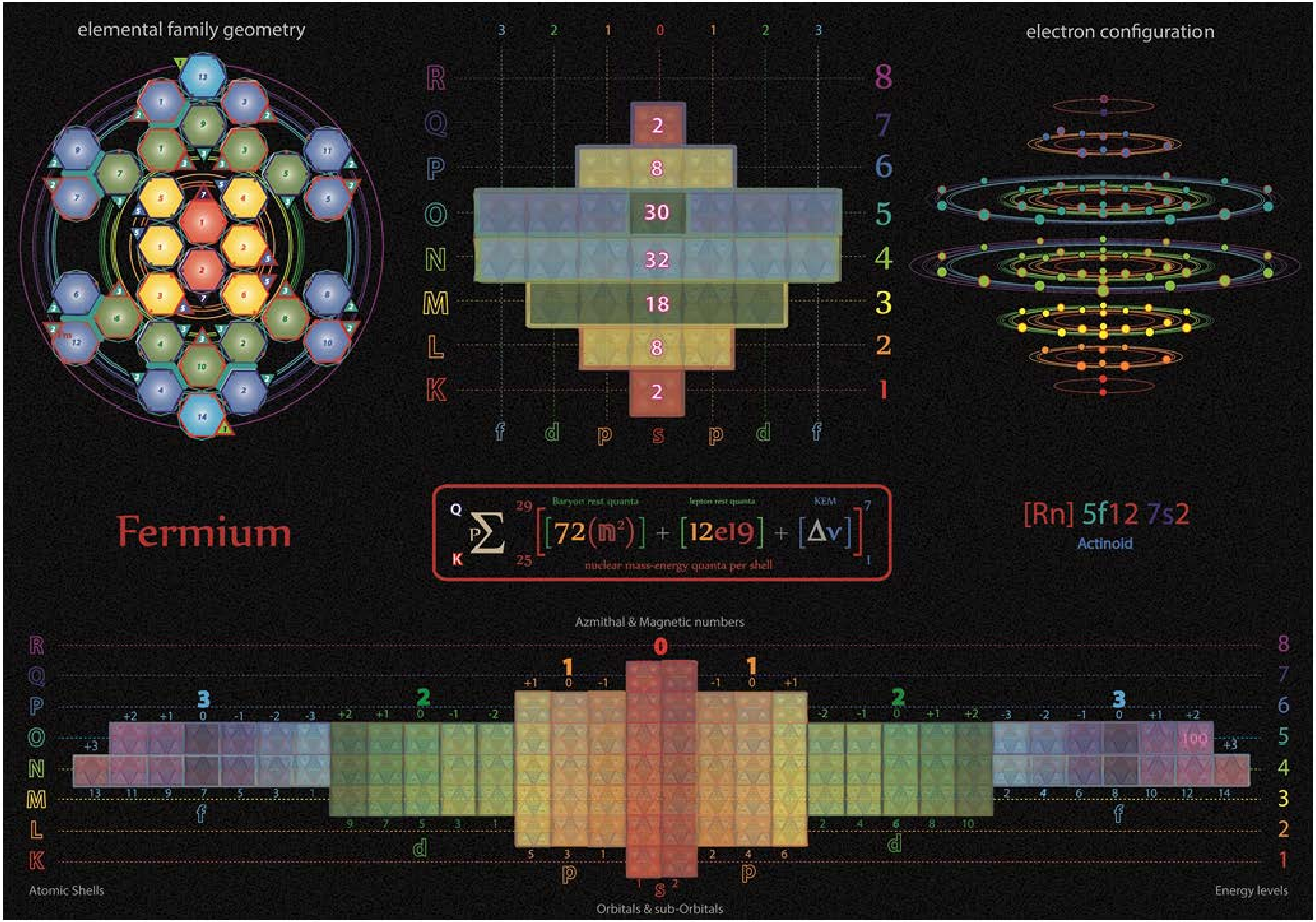
Tetryonics 53.97 - Berkelium atomic config

Copyright ABRAHAM [2008] - All rights reserved



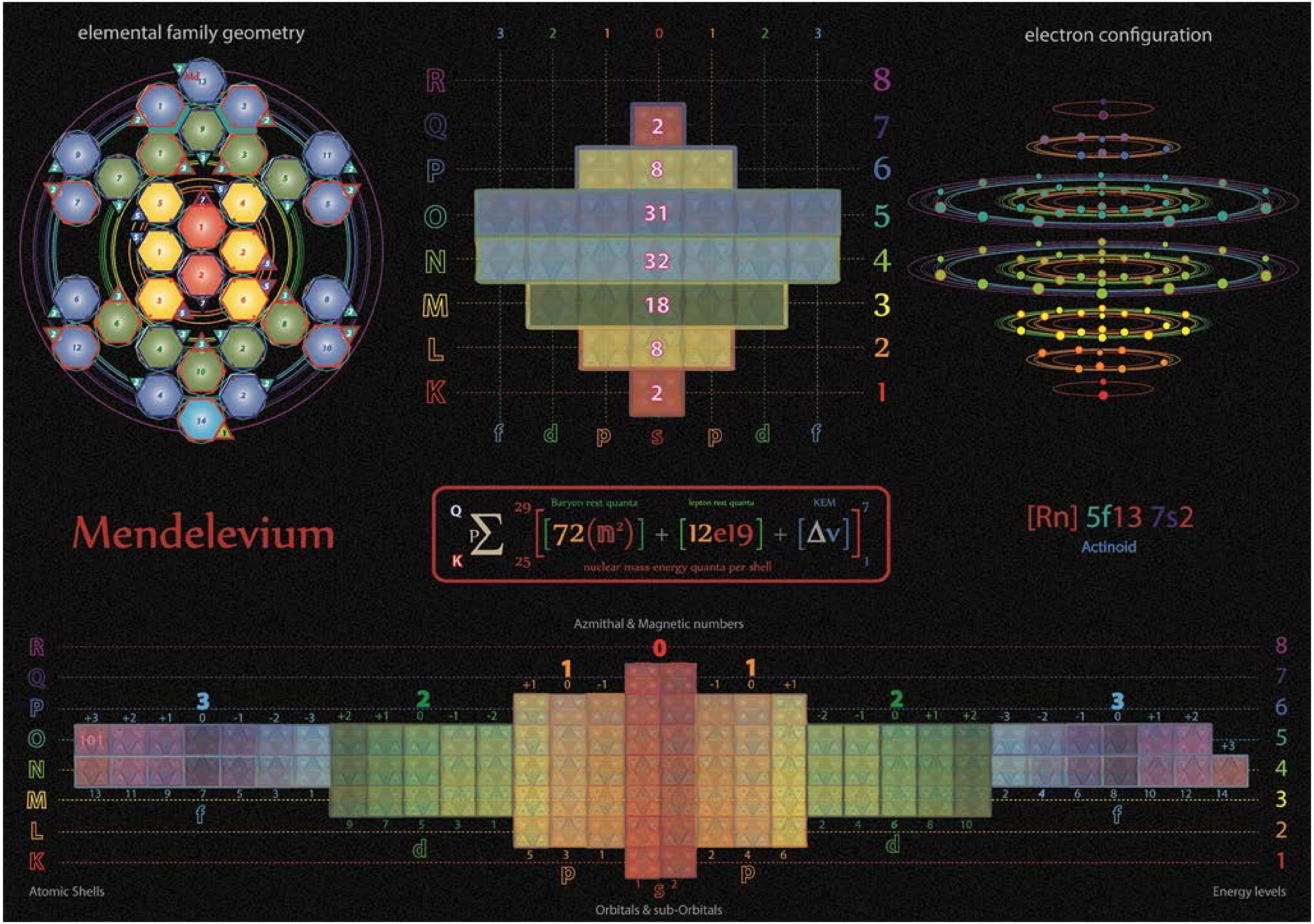
Copyright ABRAHAM [2008] - All rights reserved



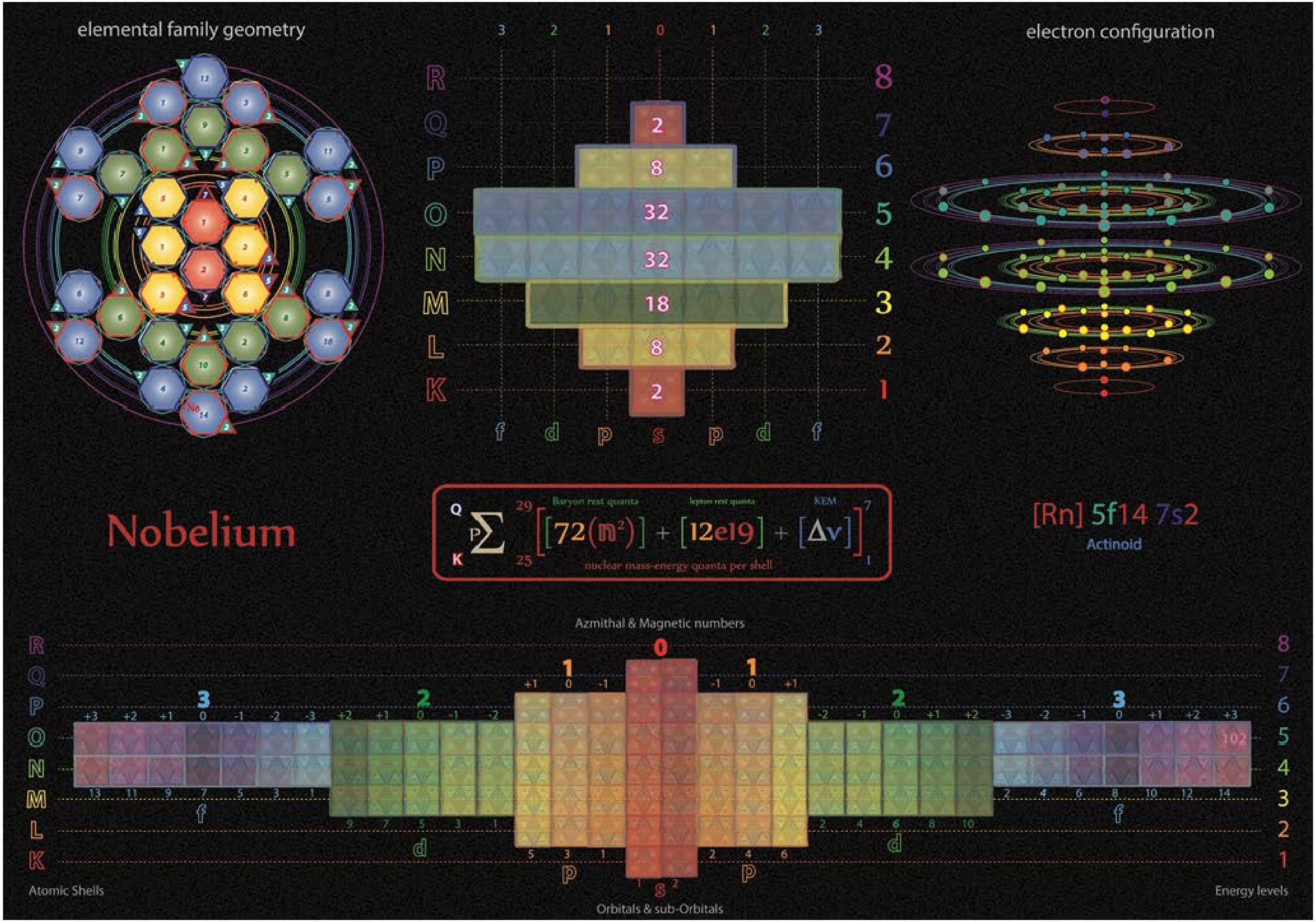


Tetryonics 53.100 - Fermium atomic config

Copyright ABRAHAM [2008] - All rights reserved

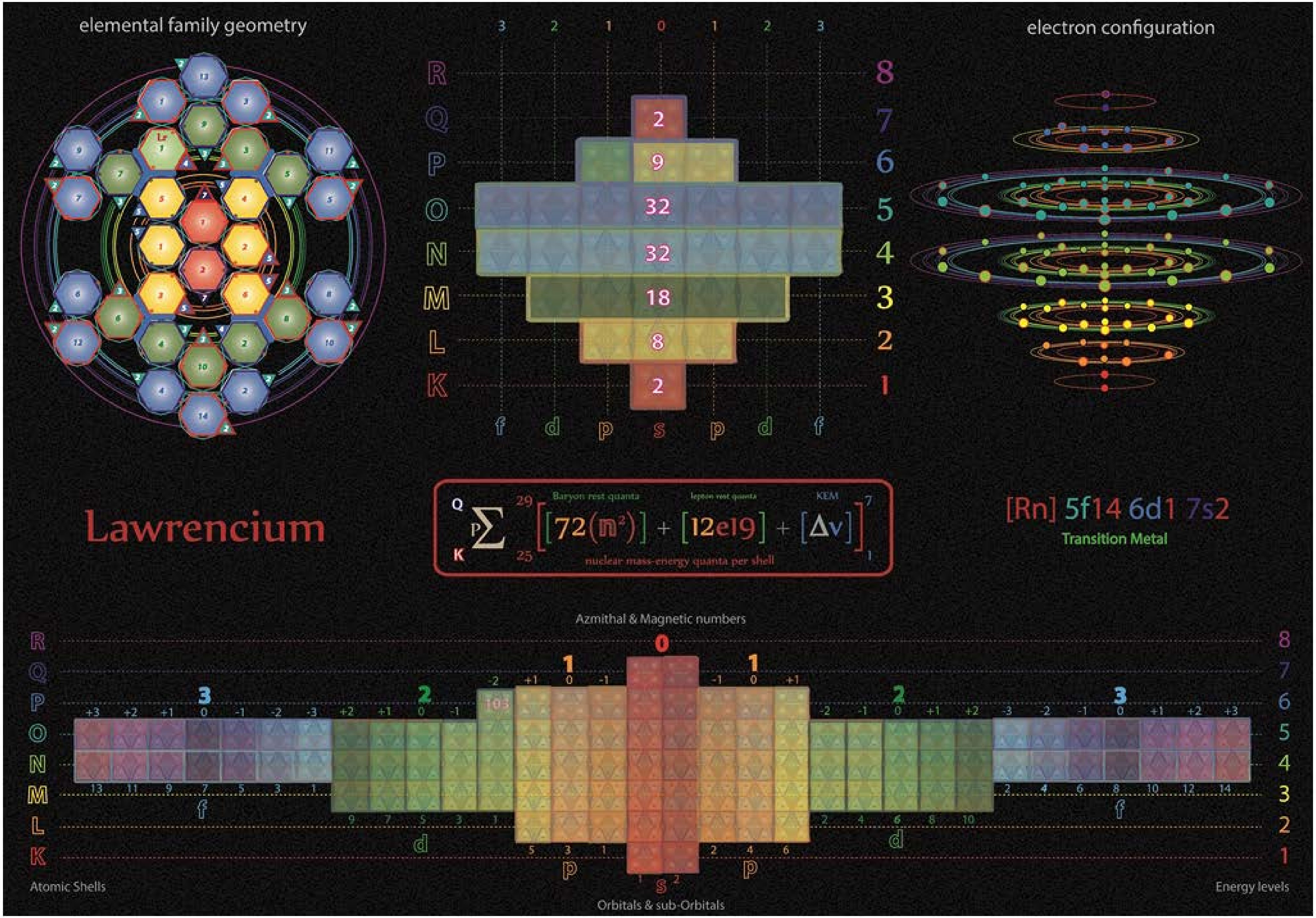


Copyright ABRAHAM [2008] - All rights reserved

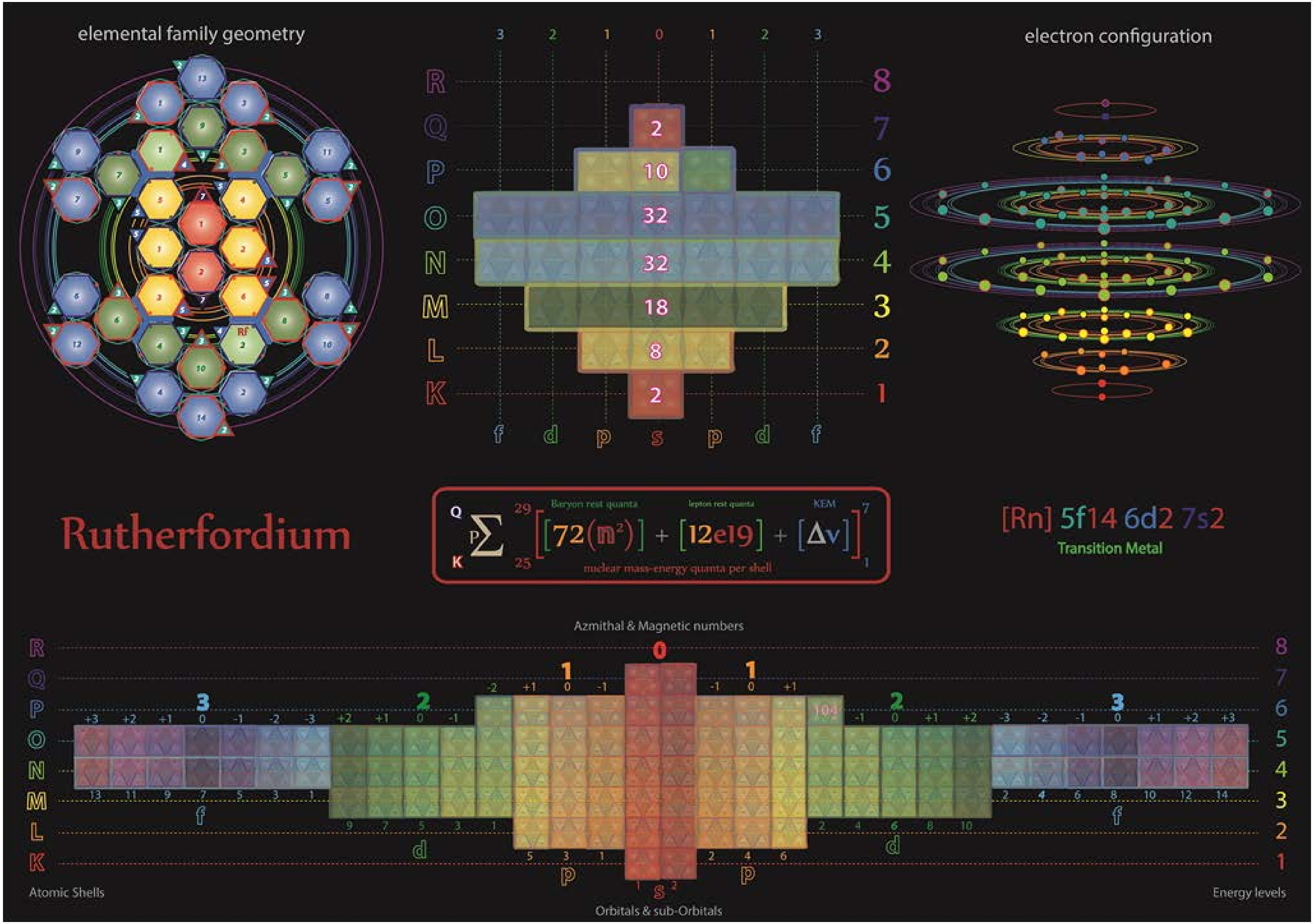


Tetryonics 53.102 - Nobelium atomic config

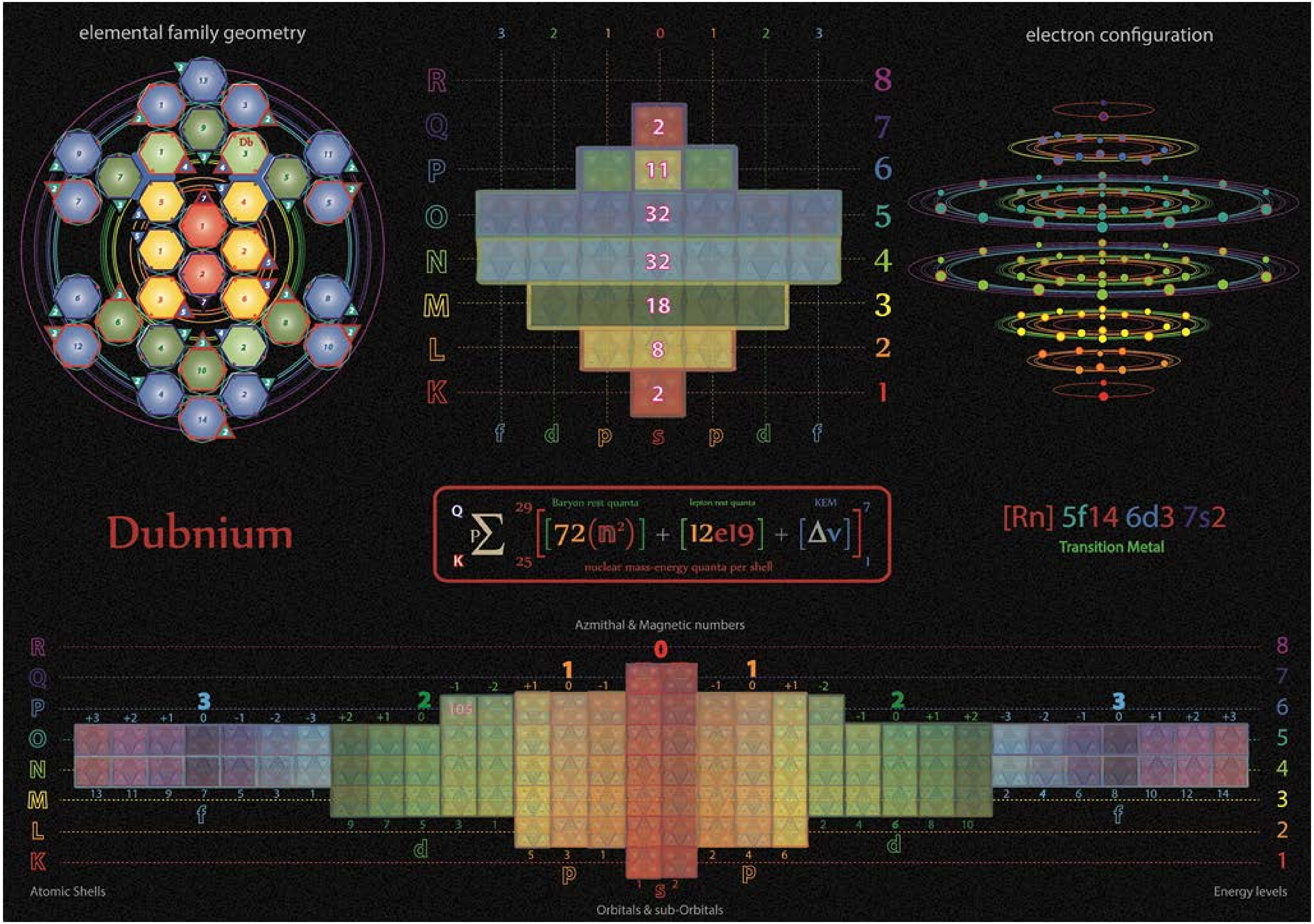
Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 53.103 - Lawrencium atomic config

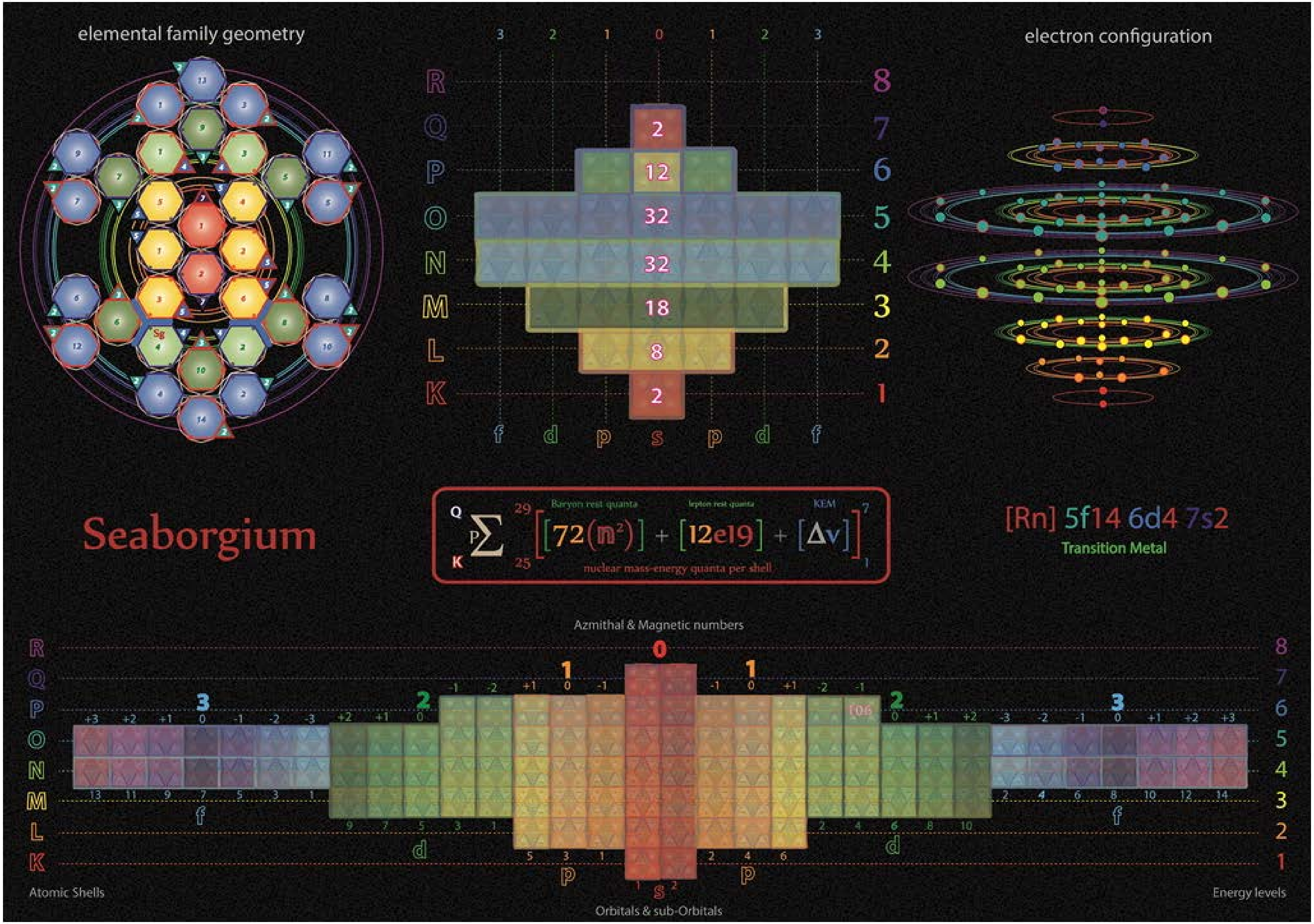


elemental family geometry
electron configuration
R Q P O N M L K
8 7 6 5 4 3 2 1
2 10 32 32 18 8 2
f d p s p d f
Rutherfordium
Baryon rest quanta
lepton rest quanta
KEM
[72(m²)] + [12e19] + [Δv]
nuclear mass-energy quanta per shell
[Rn] 5f14 6d2 7s2
Transition Metal
Azmithal & Magnetic numbers
Atomic Shells
Energy levels
Orbitals & sub-Orbitals

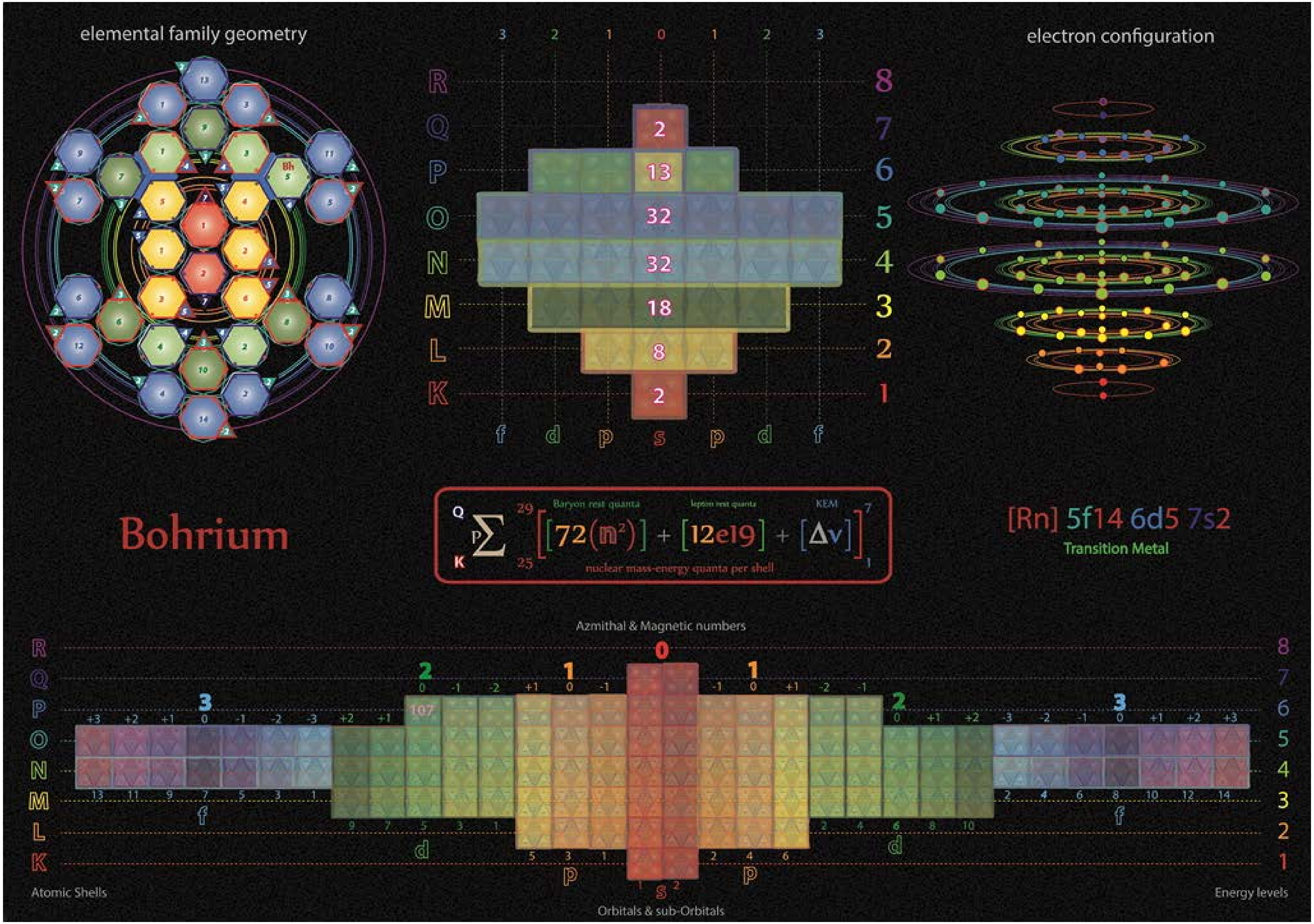


Tetryonics 53.105 - Dubnium atomic config

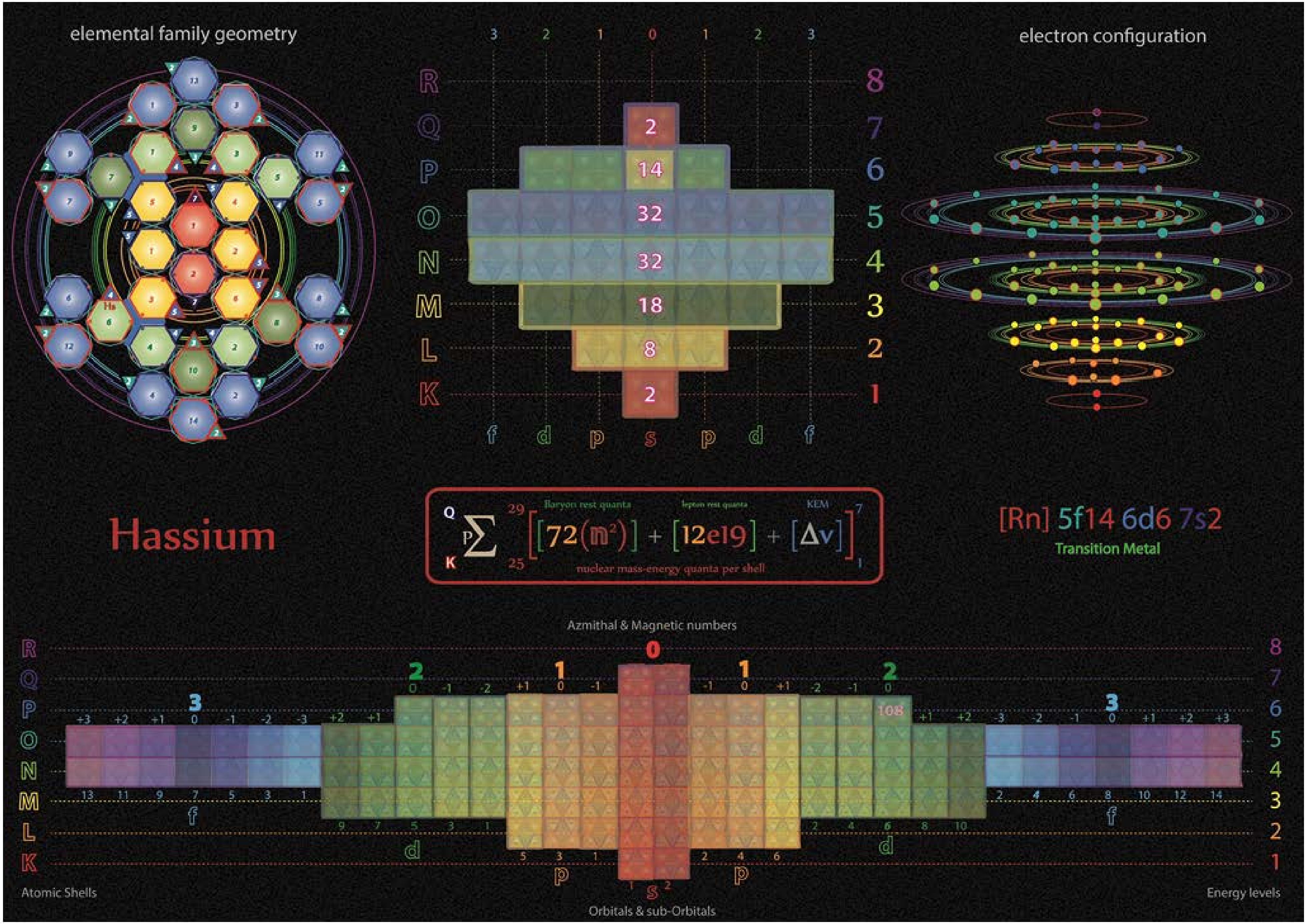
Copyright ABRAHAM [2008] - All rights reserved



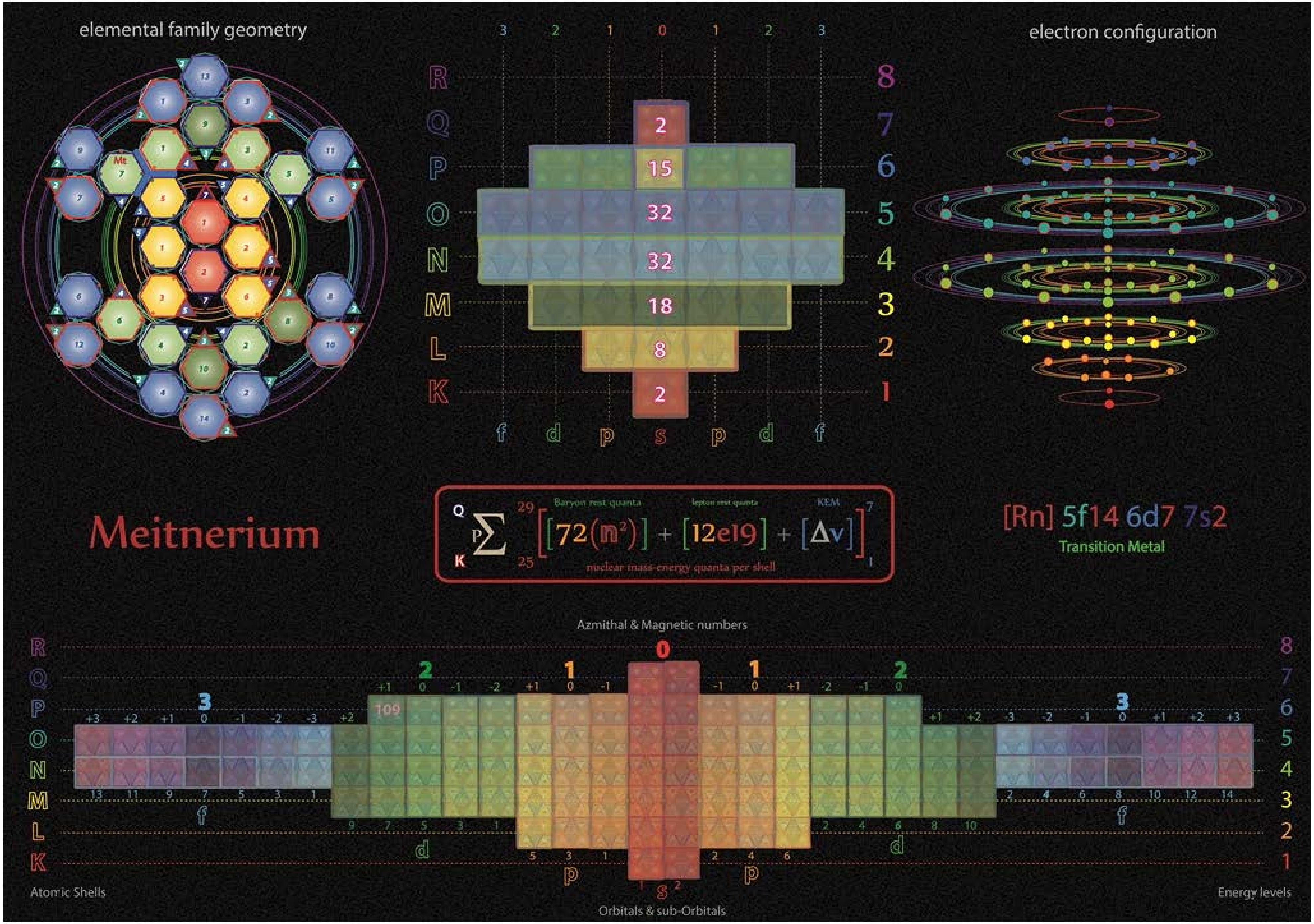
Tetryonics 53.106 - Seaborgium atomic config



Tetryonics 53.107 - Bohrium atomic config

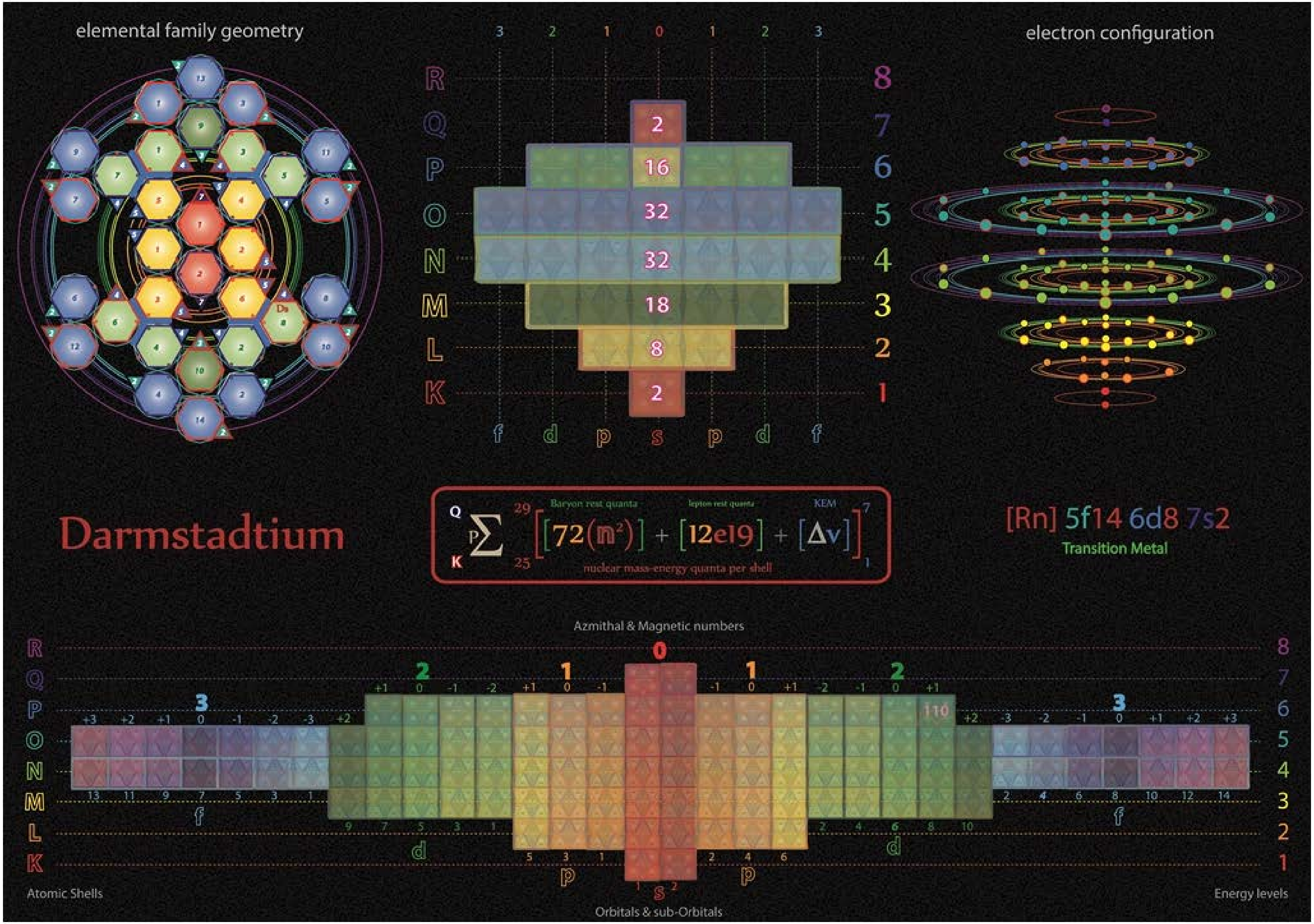


Tetryonics 53.108 - Hassium atomic config



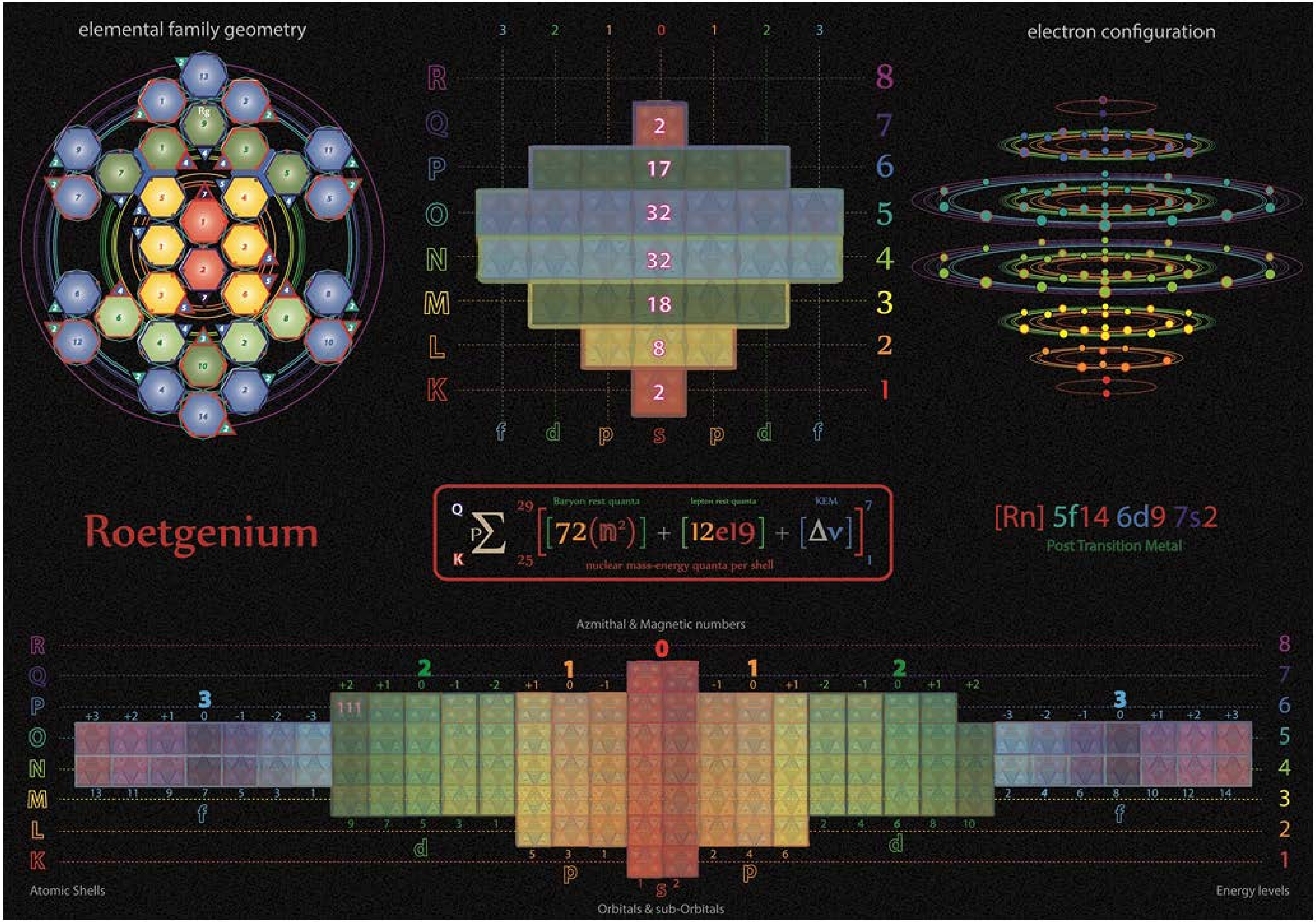
Tetryonics 53.109 - Meitnerium atomic config

Copyright ABRAHAM [2008] - All rights reserved



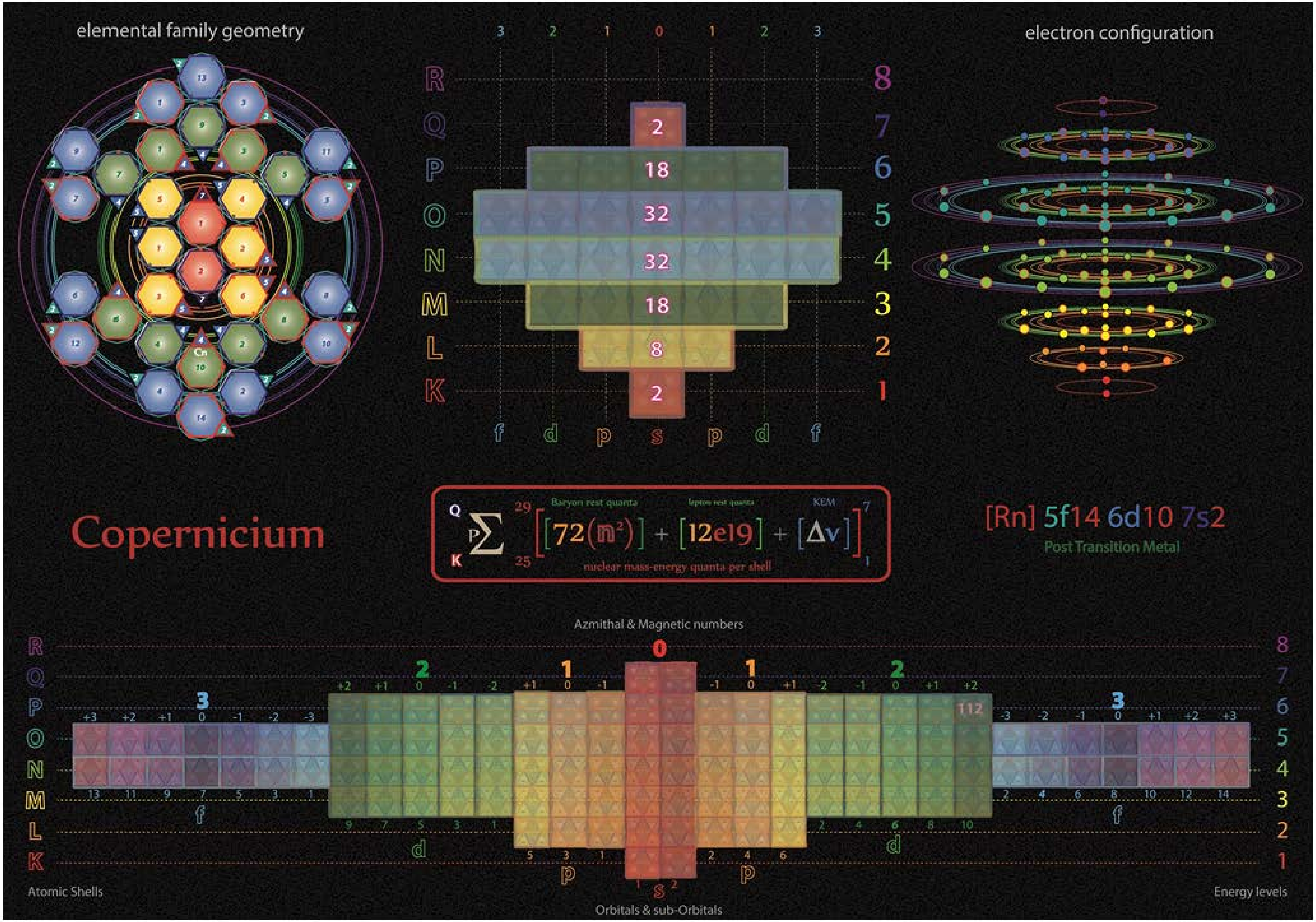
Tetryonics 53.110 - Darmstadtium atomic config

Copyright ABRAHAM [2008] - All rights reserved



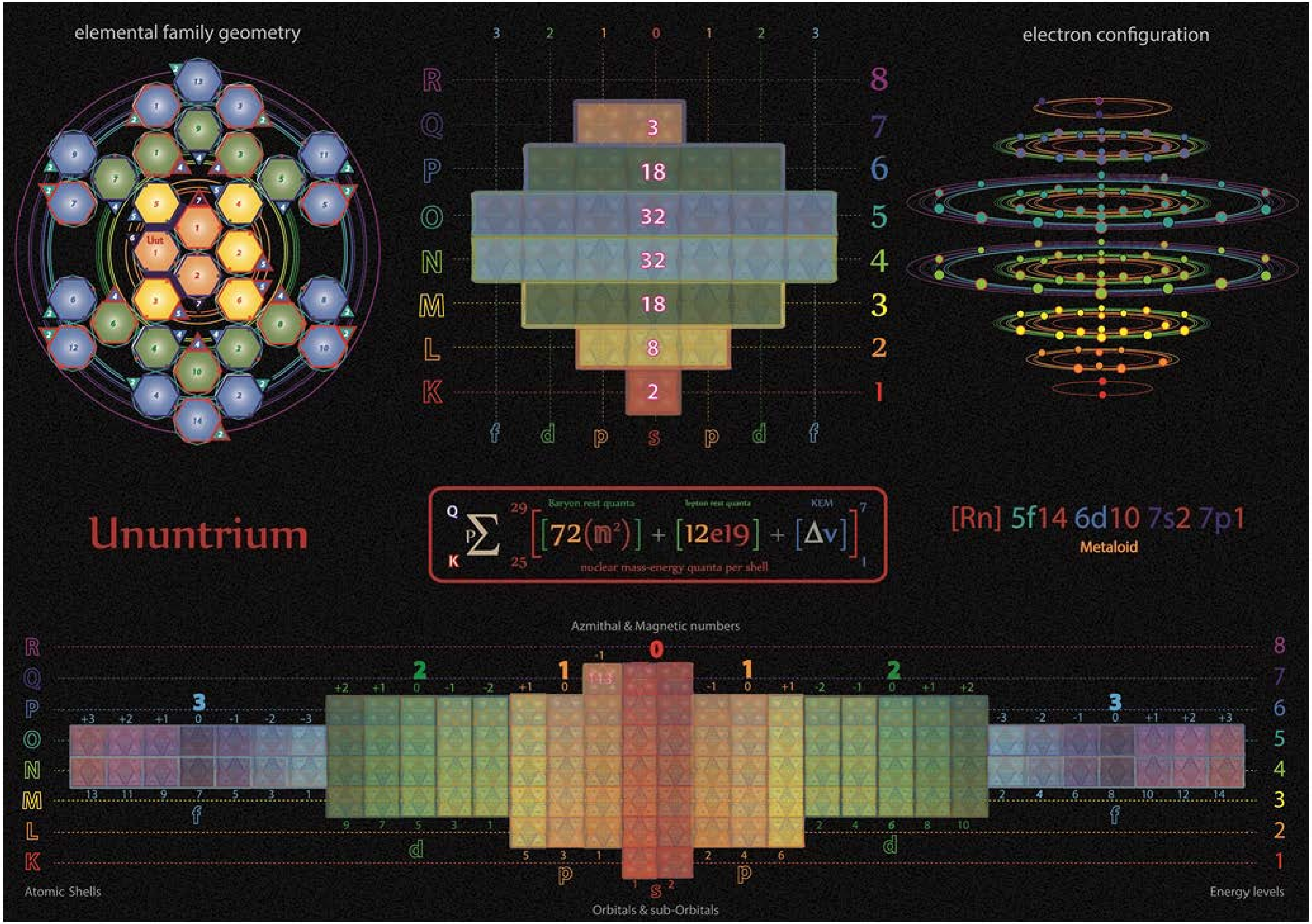
Tetryonics 53.111 - Roetgenium atomic config

Copyright ABRAHAM [2008] - All rights reserved



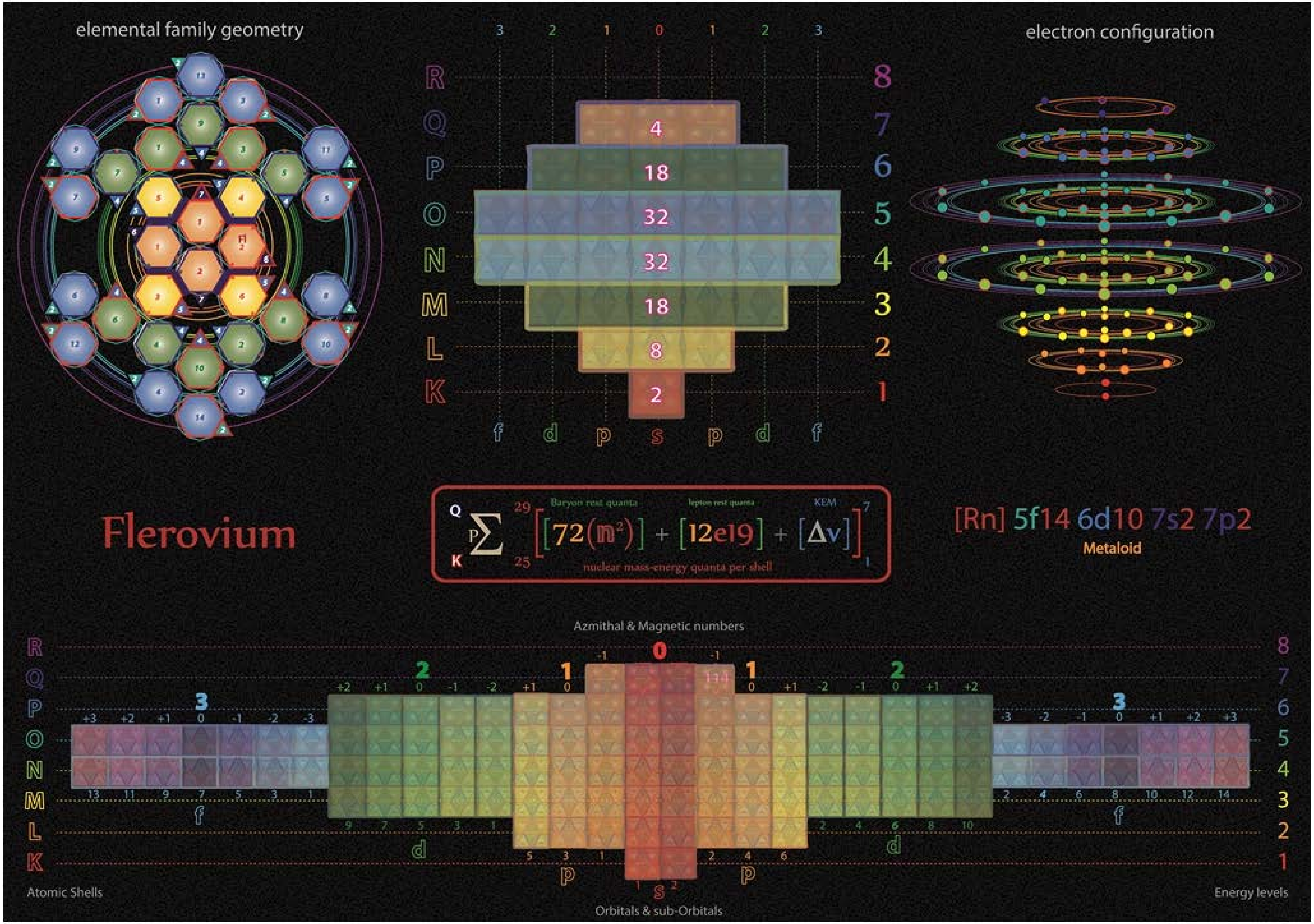
Tetryonics 53.112 - Copernicium atomic config

Copyright ABRAHAM [2008] - All rights reserved

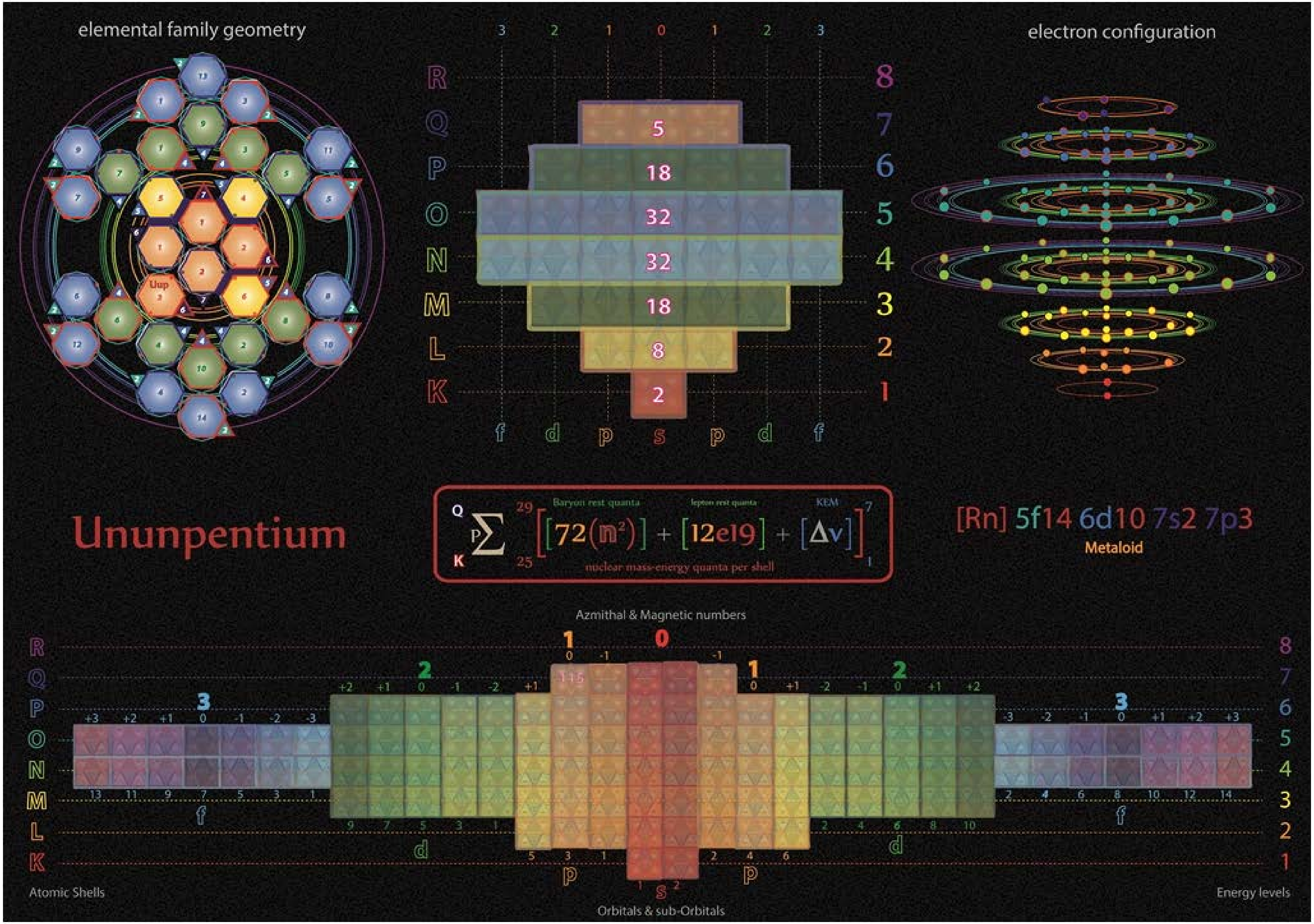


Tetryonics 53.113 - Ununtrium atomic config

Copyright ABRAHAM [2008] - All rights reserved

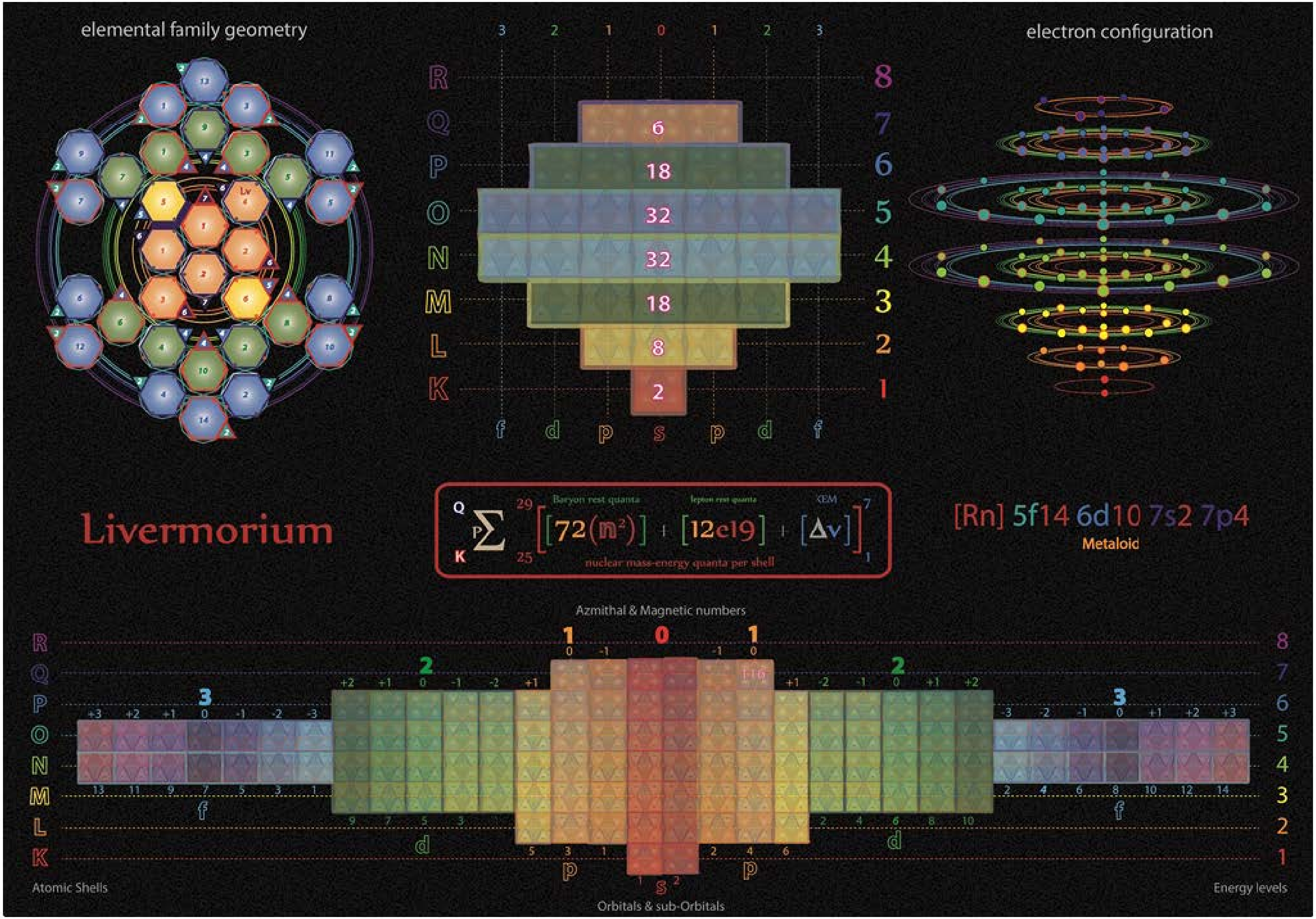


Tetryonics 53.114 - Flerovium atomic config



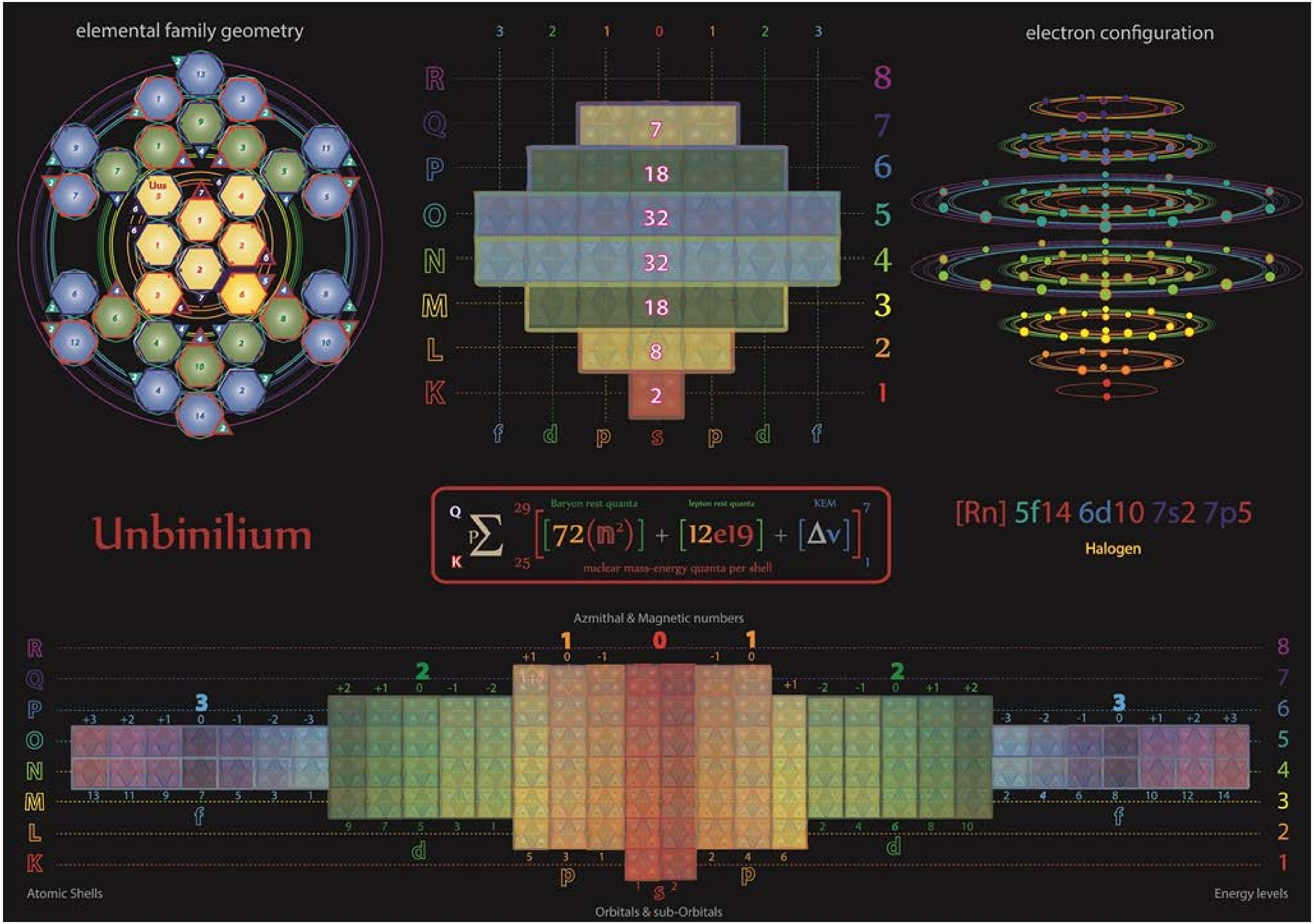
Tetryonics 53.115 - Ununpentium atomic config

Copyright ABRAHAM [2008] - All rights reserved

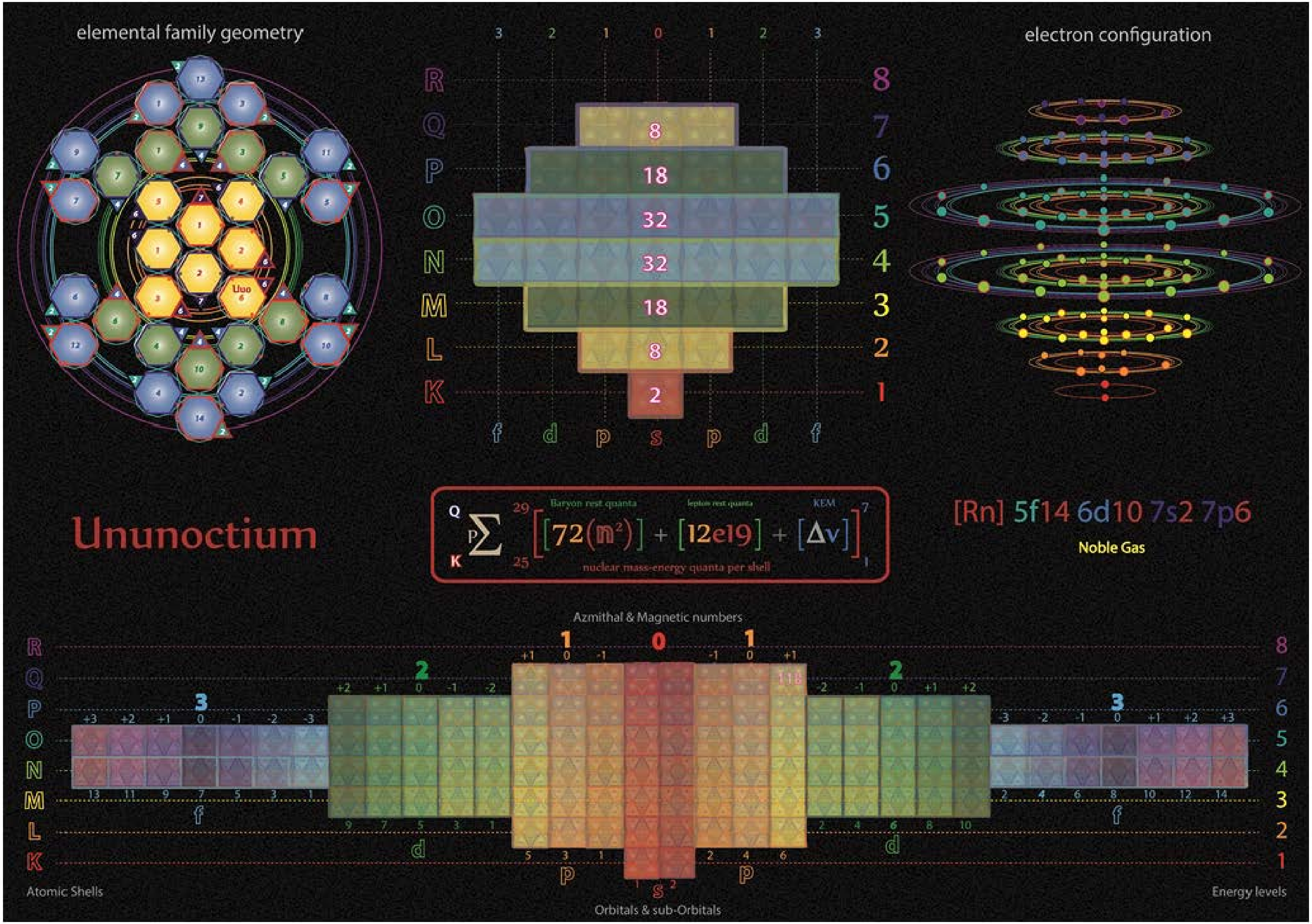


Tetryonics 53.116 - Livermorium atomic config

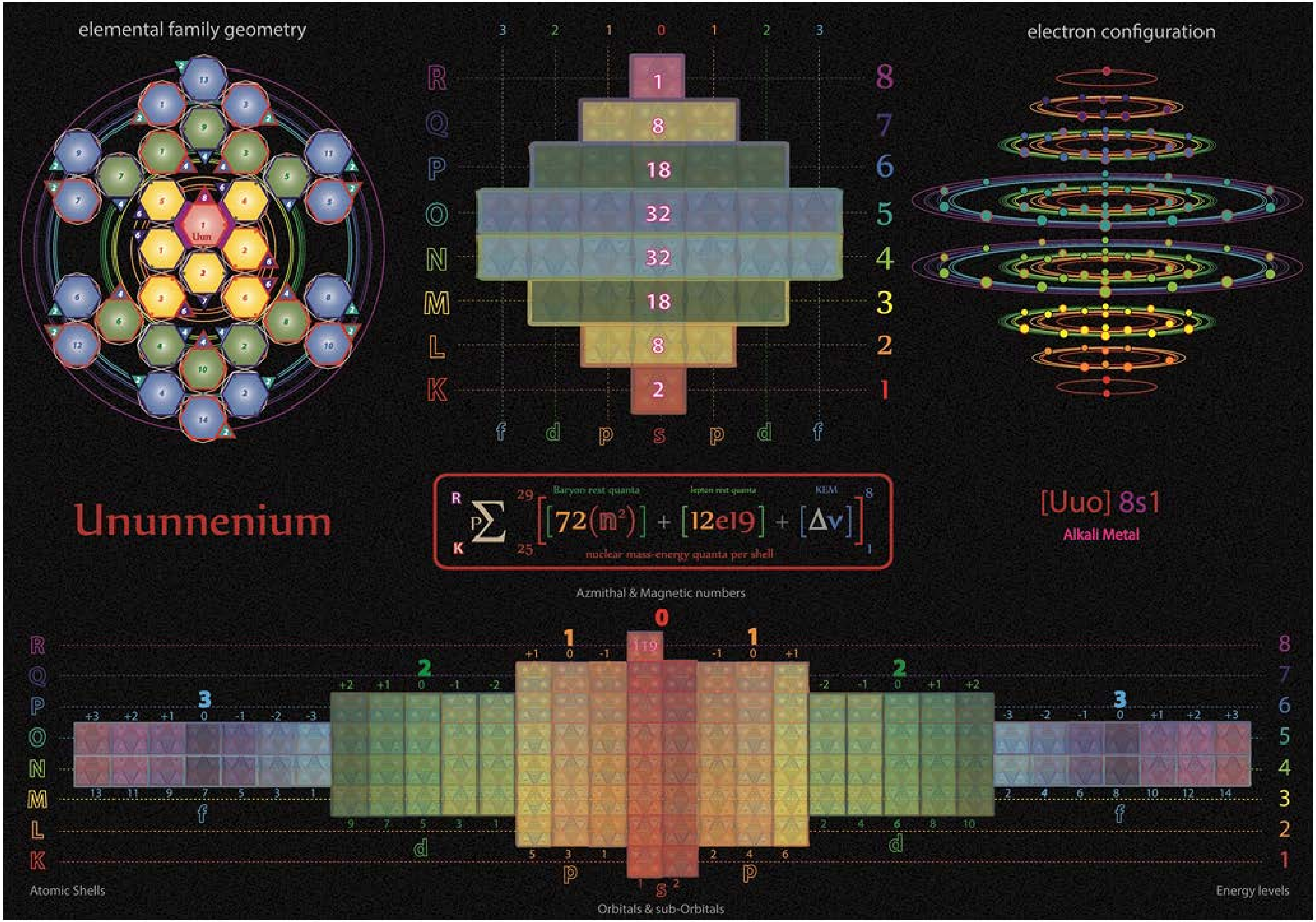
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

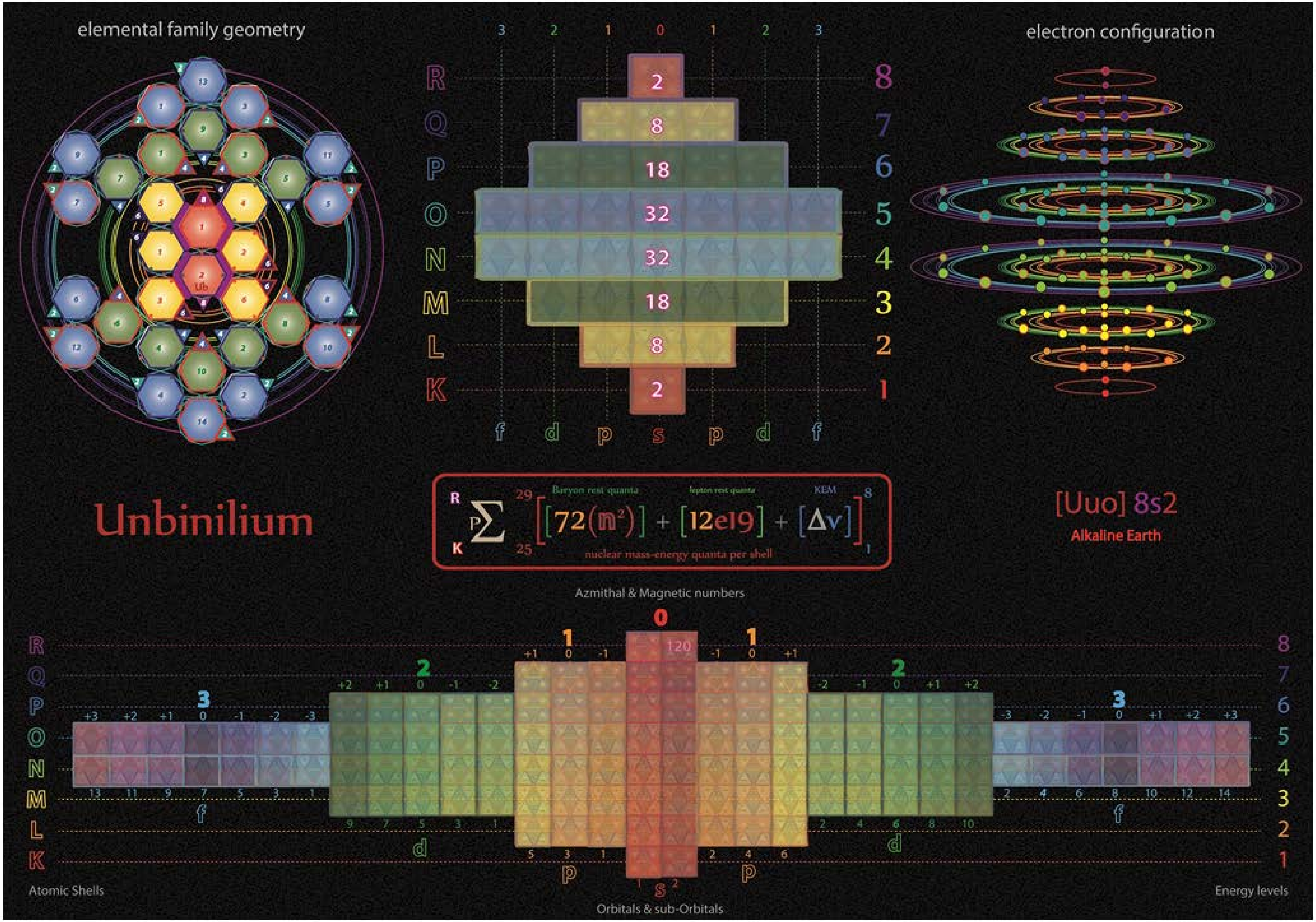


Copyright ABRAHAM [2008] - All rights reserved



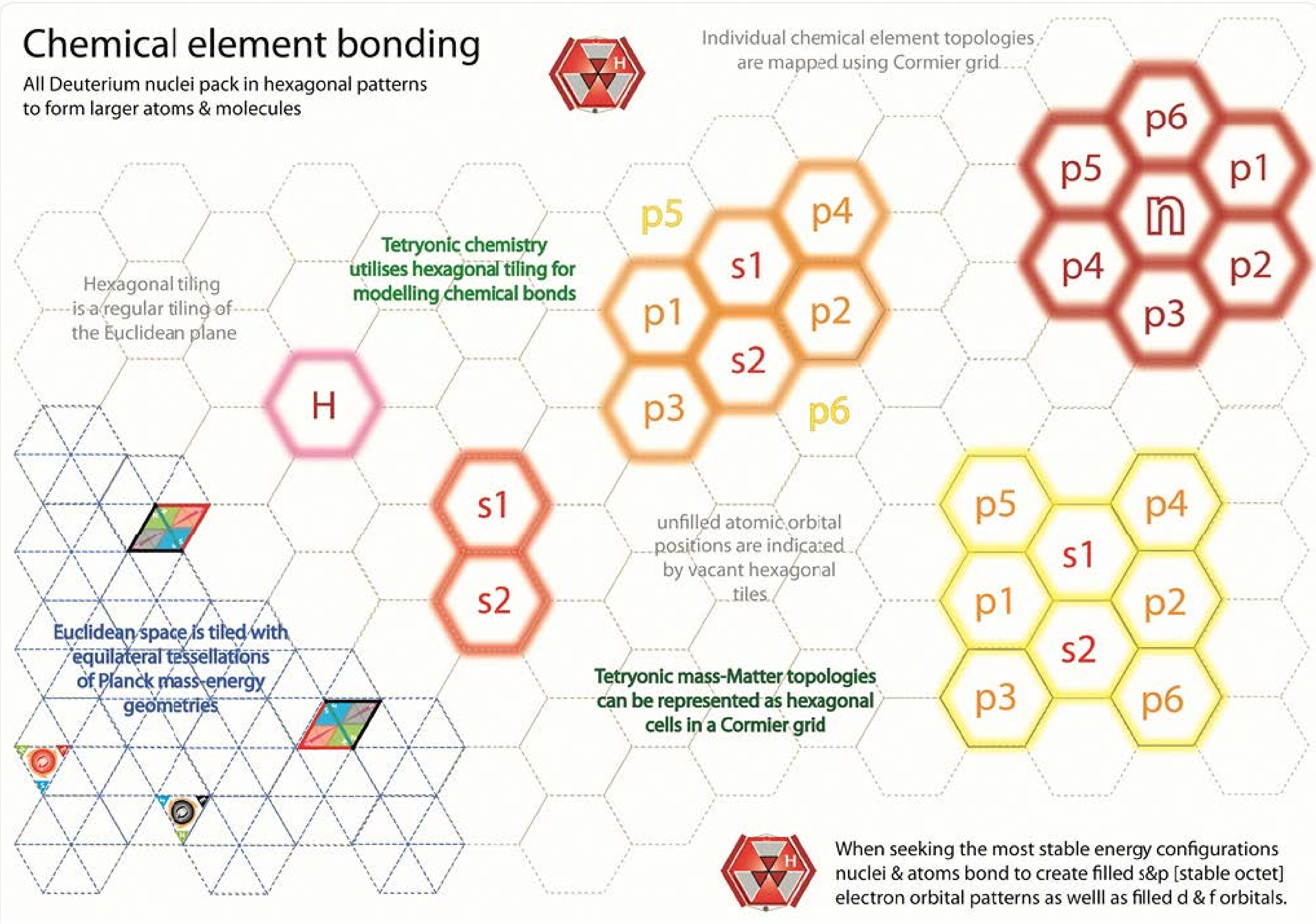
Tetryonics 53.119 - Ununnenium atomic config

Copyright ABRAHAM [2008] - All rights reserved



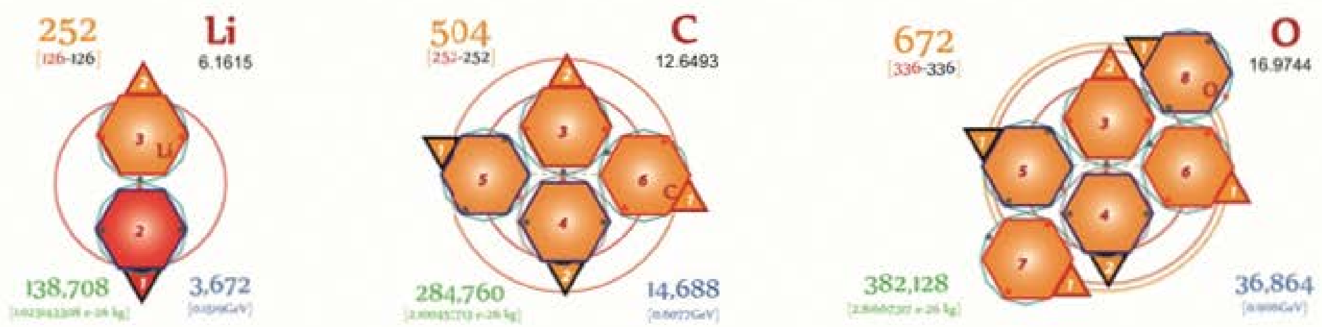
Tetryonics 53.120 - Unbinilium atomic config

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Periodic Table Atomic configurations



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

Lithium

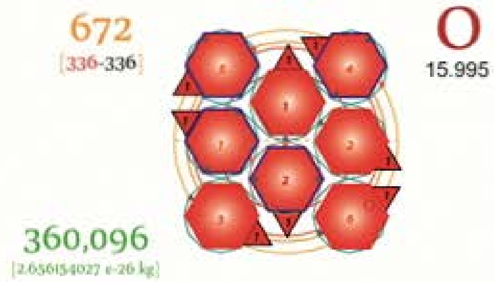
Allotropes

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

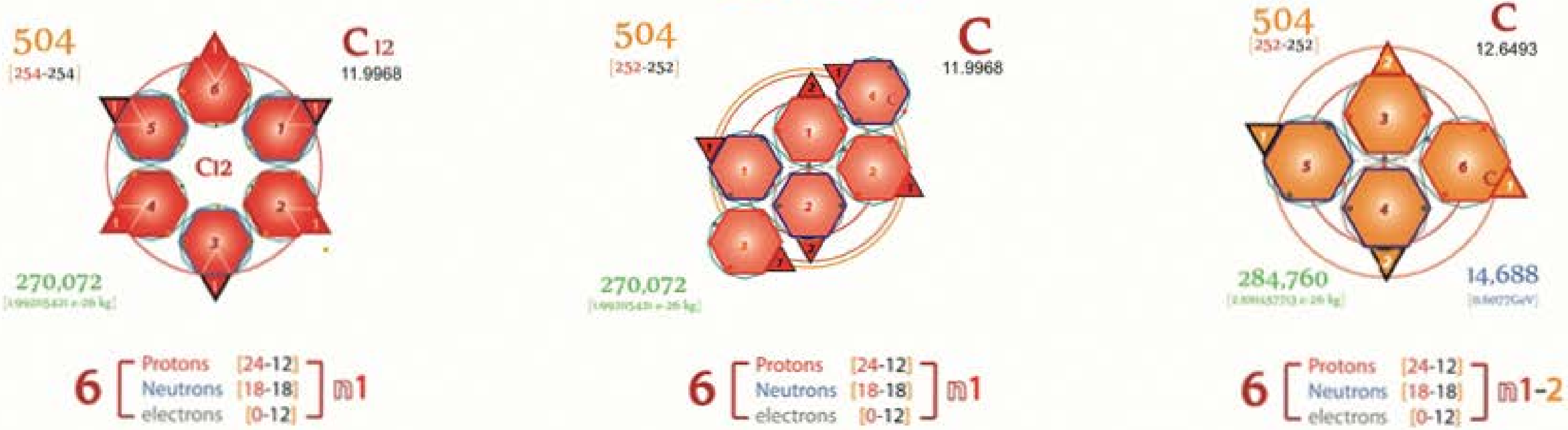
Various atomic configurations with the same Tetryonic charge, but differing in their final mass-Matter topologies and properties can be formed - they are the Allotropes

Some of the more plentiful chemical elements form this way

Oxygen



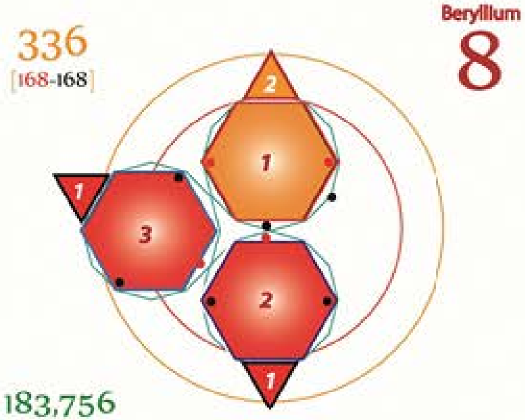
Carbon



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

Q

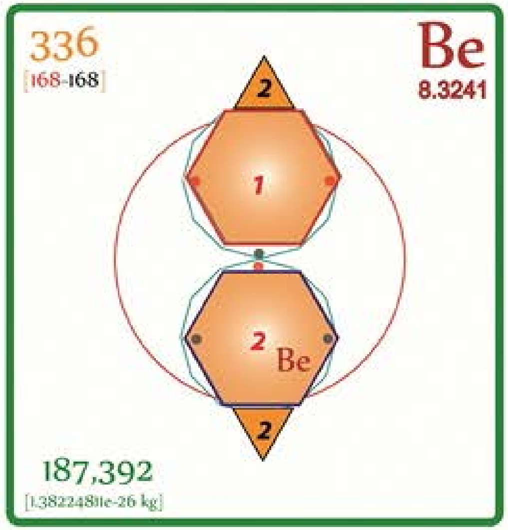
same component charge



different Matter geometries

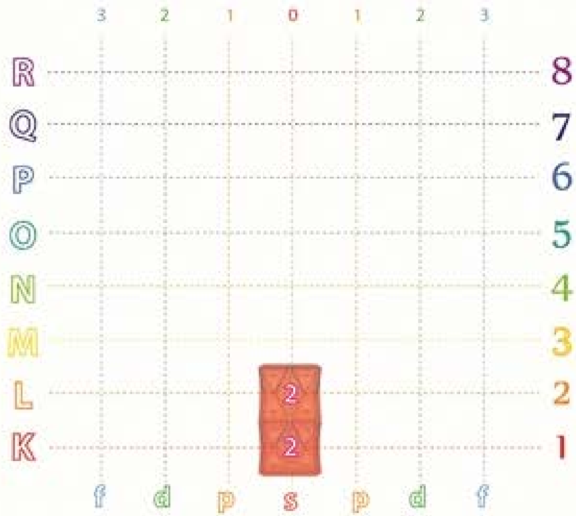
M

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

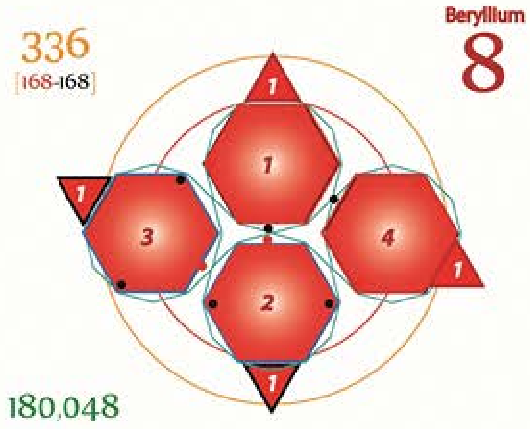


Allotropic geometries

[charge vs Matter]

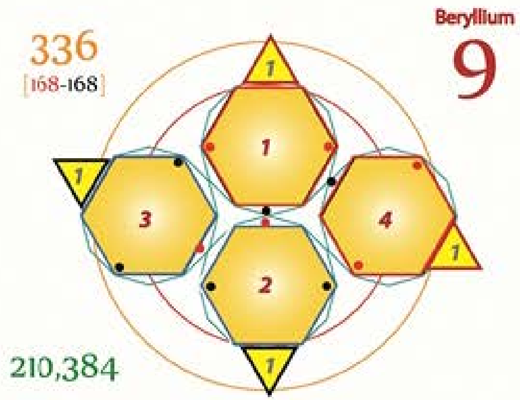


Some element allotropes have different Matter topologies that persist in different phases

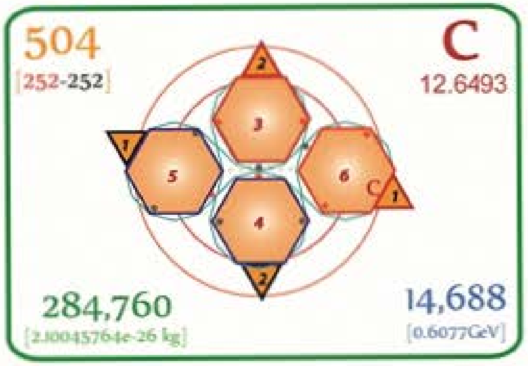


Allotropes vs. Isotopes

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



Copyright ABRAHAM [2008] - All rights reserved



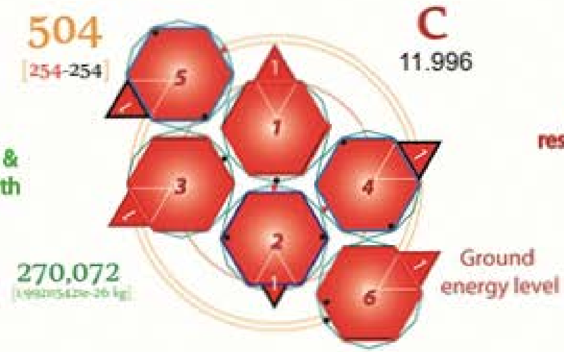
Carbon Allotropes

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

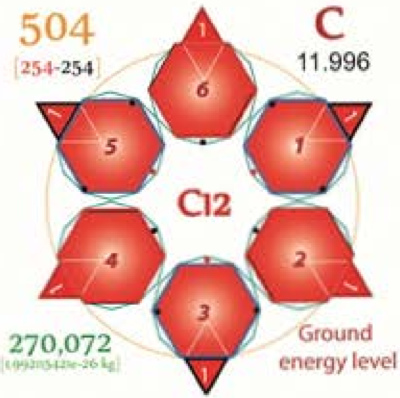
Well known forms of carbon include:

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

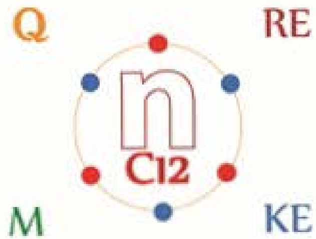
Tetryonic theory affords us the ability to model the charged mass-energy geometries & 3D Matter topologies of each element along with its bonding points



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



Graphene has a unique p orbital arrangement of its electrons

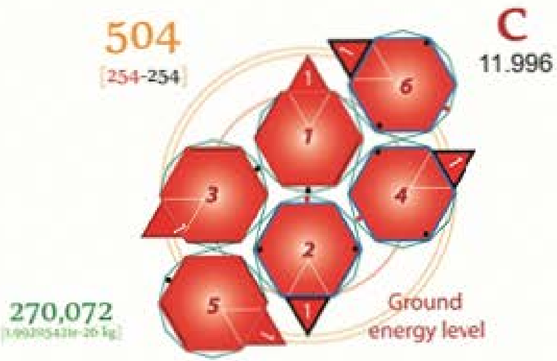


Electron Configuration

[n] p6

Shell			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

energy level



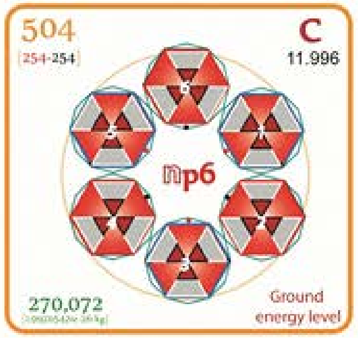
Carbon-14, a radioactive isotope of carbon with a half-life of 5,730 years, is used to find the age of formerly living things through a process known as radiocarbon dating.

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.

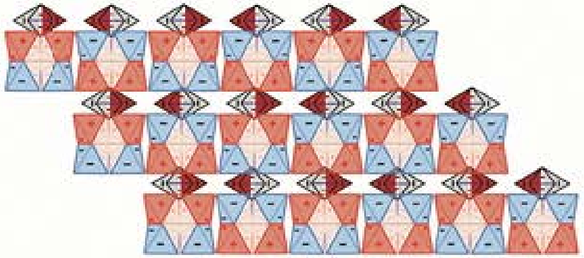
Copyright ABRAHAM [2008] - All rights reserved

Graphene

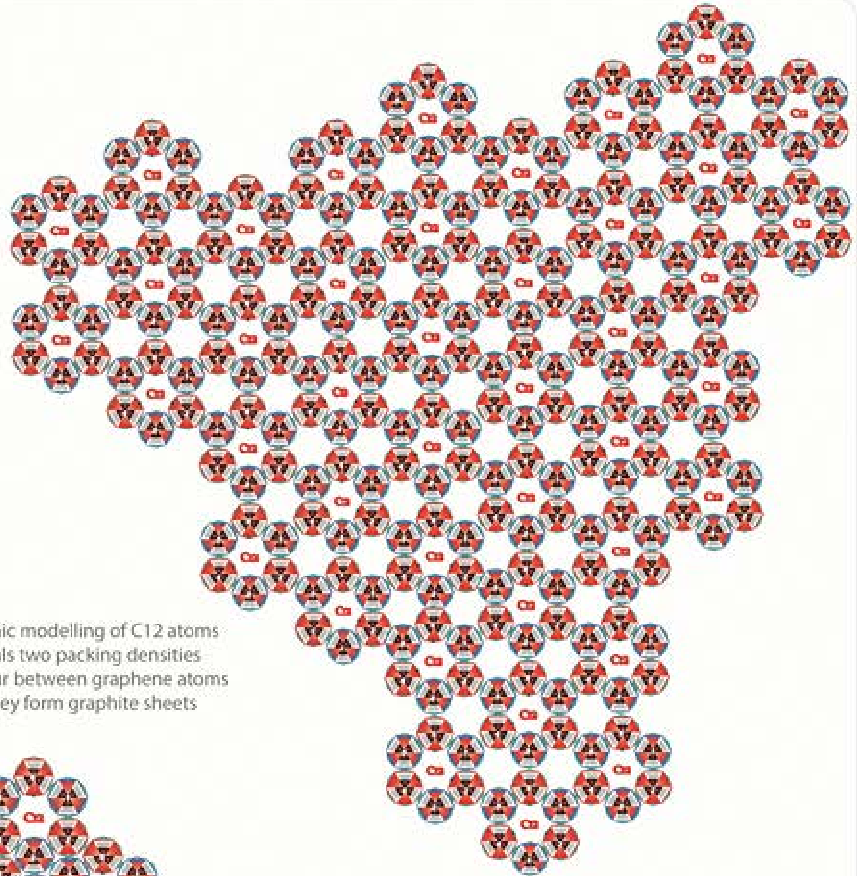


Graphene is also an allotrope of carbon.

Its structure is one-atom-thick planar sheets of sp2-bonded carbon atoms that are densely packed in a honeycomb crystal lattice



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

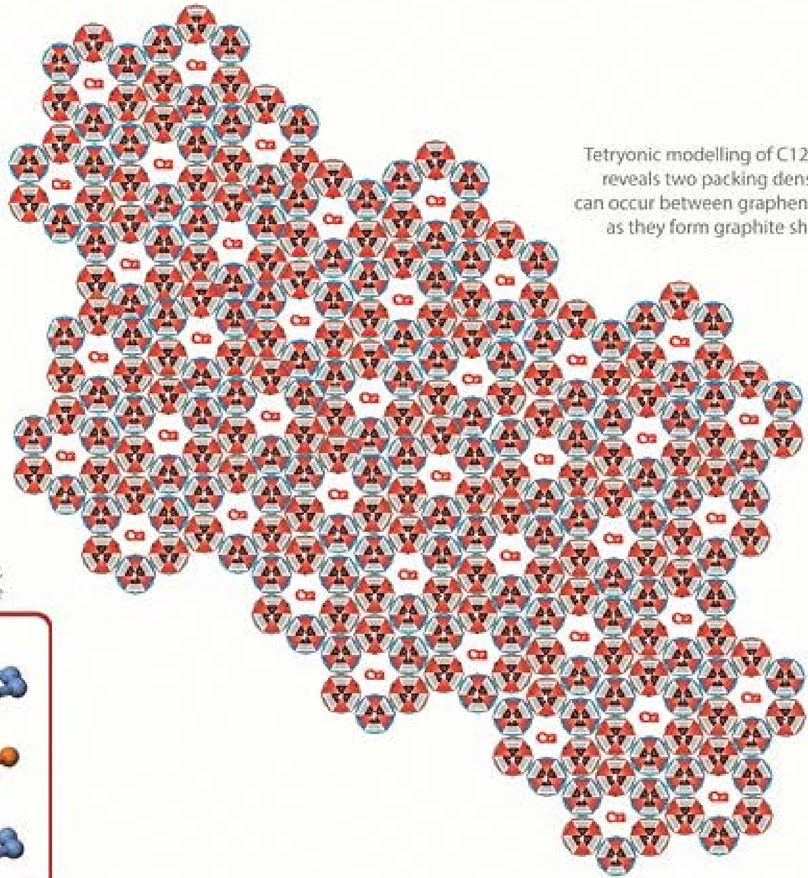


Graphite

The mineral graphite is an allotrope of carbon.

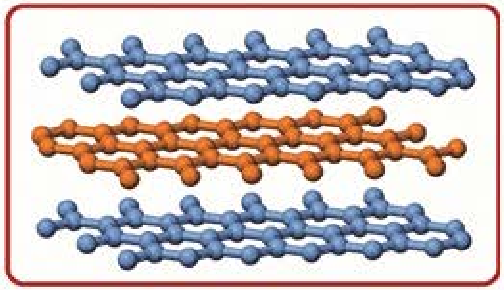
Unlike periodic table carbon [diamond], graphite is an electrical conductor, a semi-metal.

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

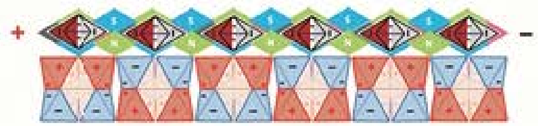


Tetryonic modelling of C12 atoms reveals two packing densities can occur between graphene atoms as they form graphite sheets

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



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 loosley bound to the top of the Deuterium nuclei

Copyright ABRAHAM [2008] - All rights reserved

Carbon Nanotubes

Carbon nanotubes (CNTs) are allotropes of carbon
with a cylindrical nanostructure.

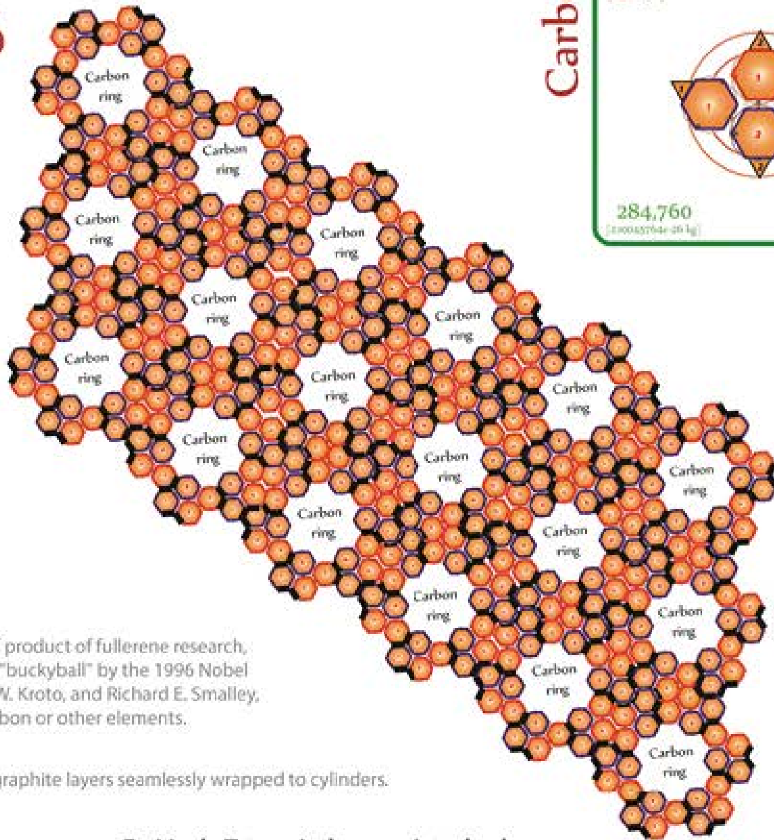
Large molecules consisting only of carbon, known as buckminsterfullerenes, or buckyballs, have recently been discovered and are currently the subject of much scientific interest.

A single buckyball consists of 60 or 70 carbon atoms (C60 or C70) linked together in a structure that looks like a soccer ball.

They can trap other atoms within their framework, appear to be capable of withstanding great pressures and have magnetic and superconductive properties.

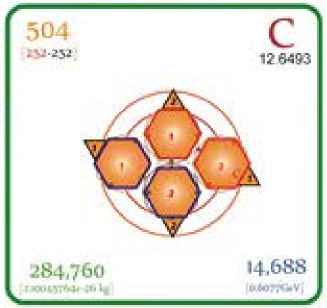
They can be thought of as a sheet of graphite (a hexagonal lattice of carbon) rolled into a cylinder.

C36



Carbyne

Carbon



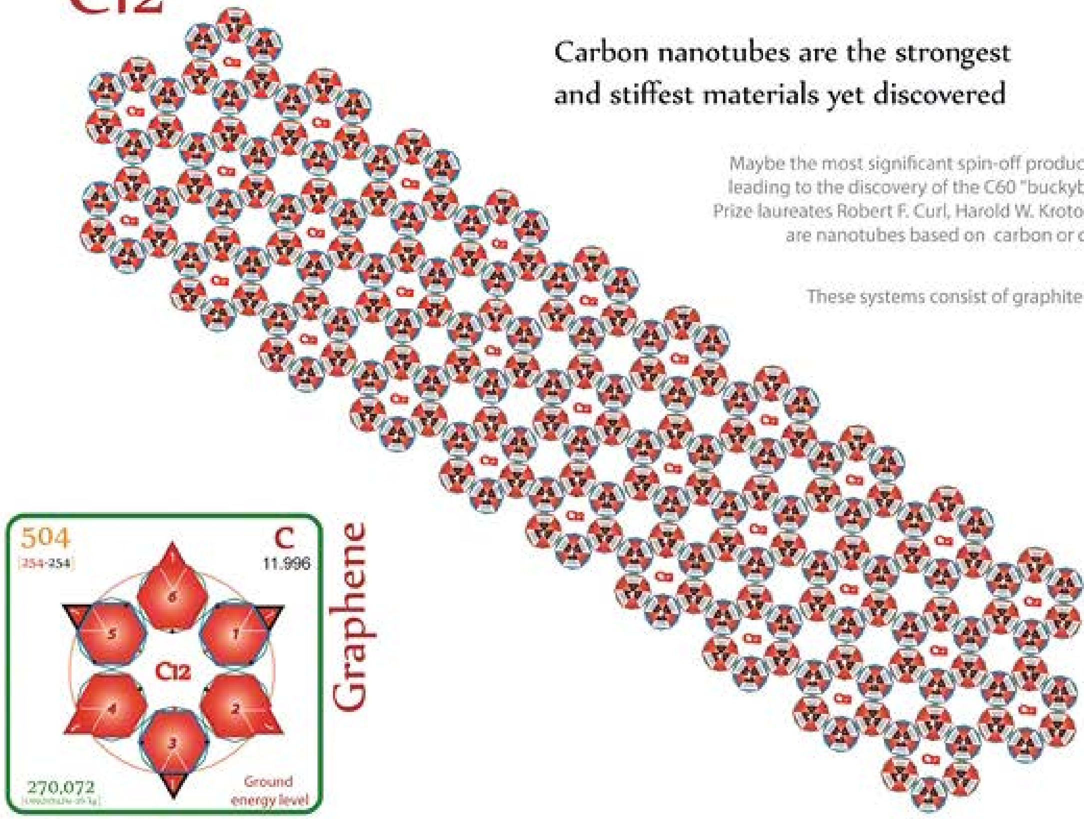
Carbon nanotubes are the strongest and stiffest materials yet discovered

Maybe the most significant spin-off product of fullerene research, leading to the discovery of the C60 "buckyball" by the 1996 Nobel Prize laureates Robert F. Curl, Harold W. Kroto, and Richard E. Smalley, are nanotubes based on carbon or other elements.

These systems consist of graphite layers seamlessly wrapped to cylinders.

C12

Graphene



Excitingly, Tetryonic theory points clearly to the possibility that organo-carbon nanotubes can be created.

Where C36 periodic carbon could be used insetad of conventional C12 graphene atoms

Carbyne

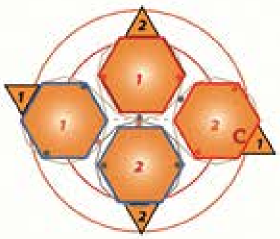
C60

Nanotubes are members of the fullerene structural family, which also includes the spherical buckyballs, and the ends of a nanotube may be capped with a hemisphere of the buckyball structure.

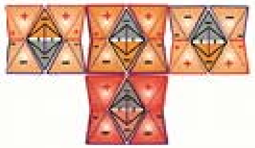
Copyright ABRAHAM [2008] - All rights reserved

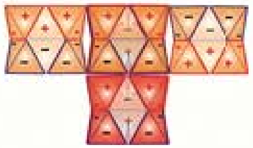
Diamonds

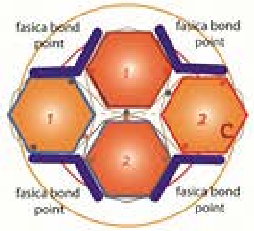
are a metastable allotrope of carbon, where the carbon atoms are arranged in cubic crystal structure called a diamond lattice.



Periodic [C6] Carbon



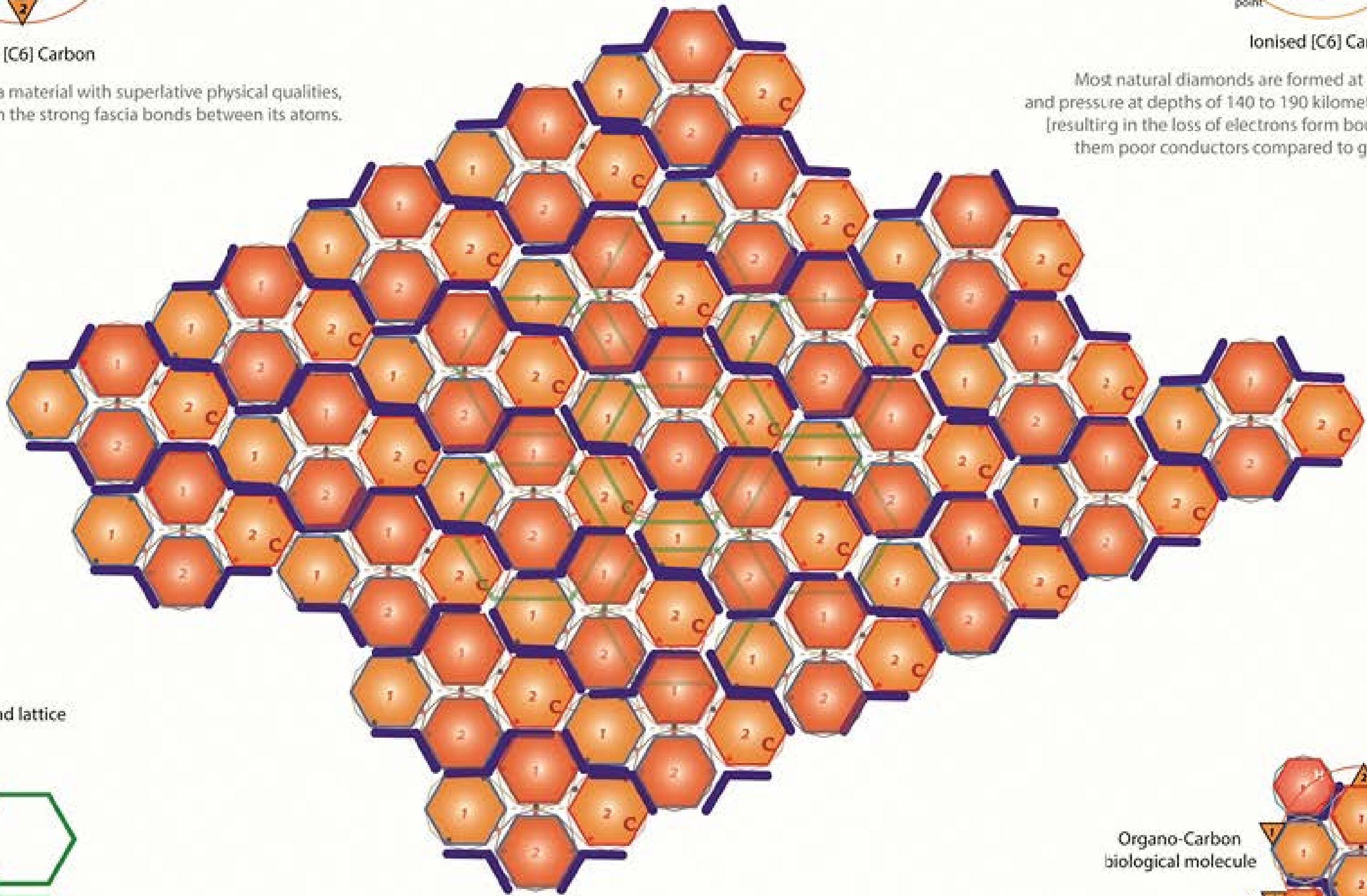




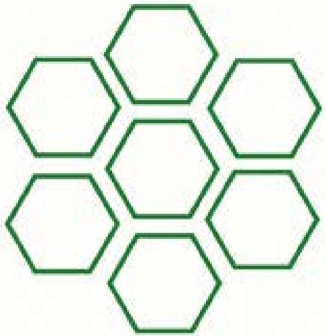
Ionised [C6] Carbon

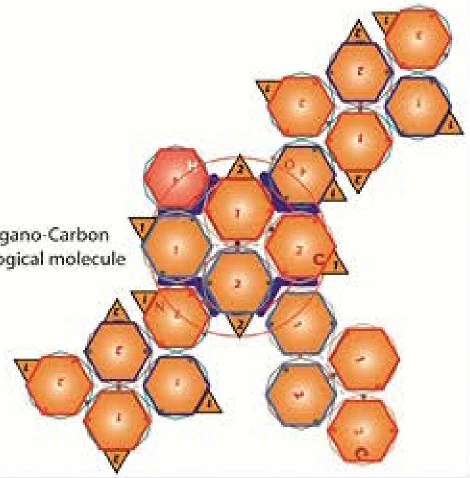
Diamonds are renowned as a material with superlative physical qualities, most of which originate from the strong fascia bonds between its atoms.

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 form bound positions, making them poor conductors compared to grahphene atoms].



filled n[C7] Carbon diamond lattice



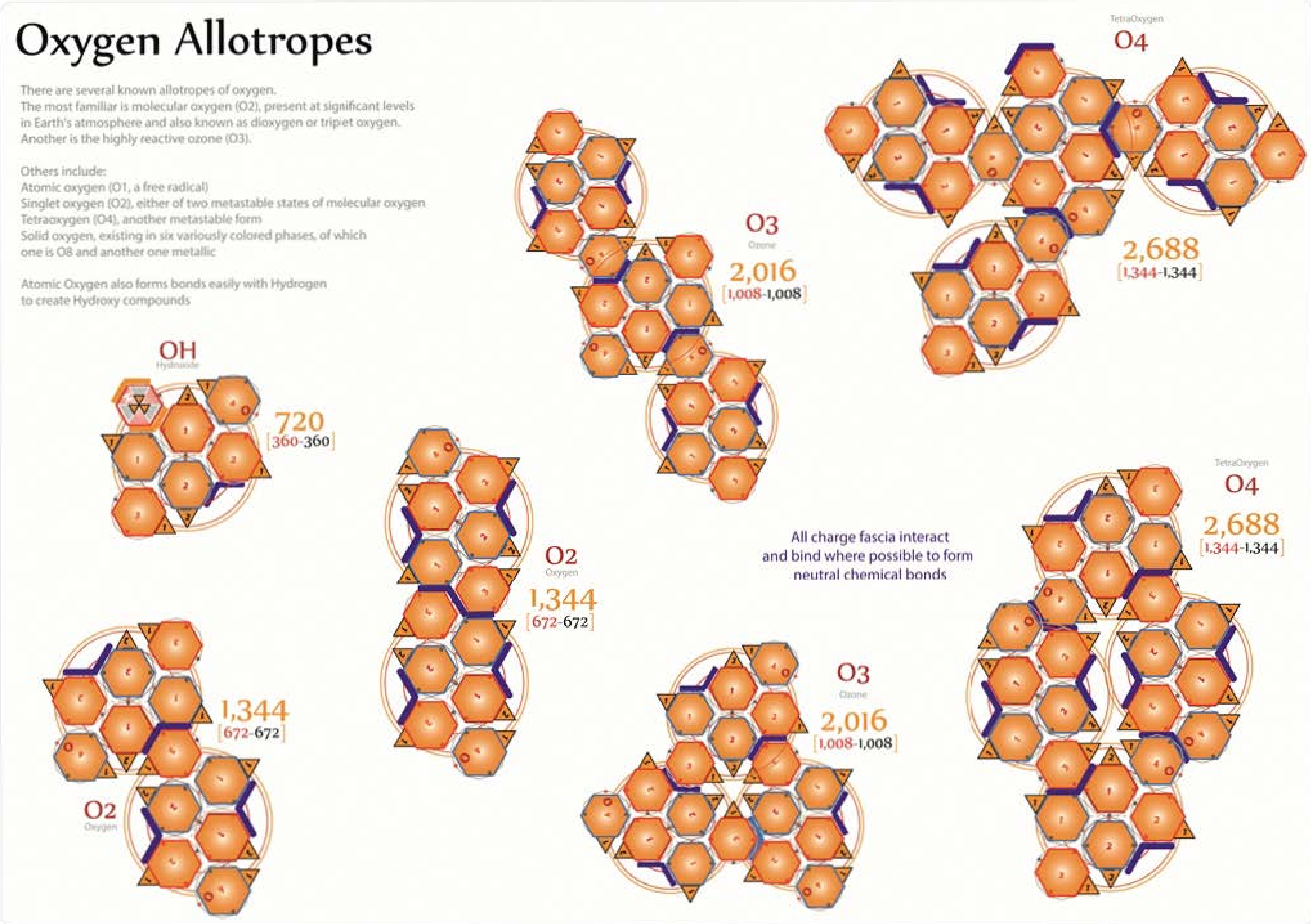


Organo-Carbon biological molecule

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

Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 54.08 - Oxygen allotropes

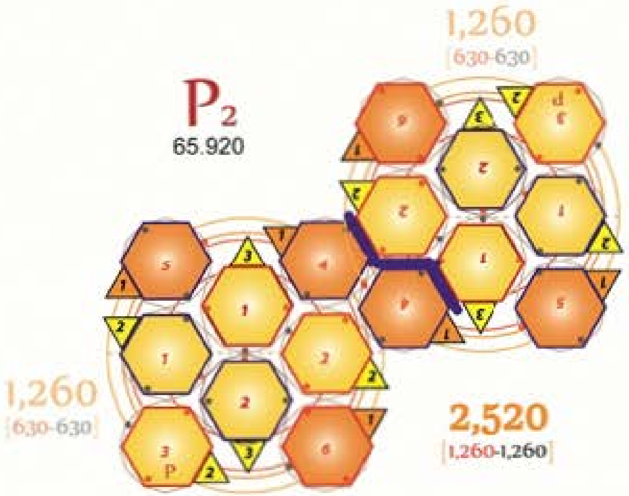
Copyright ABRAHAM [2008] - All rights reserved

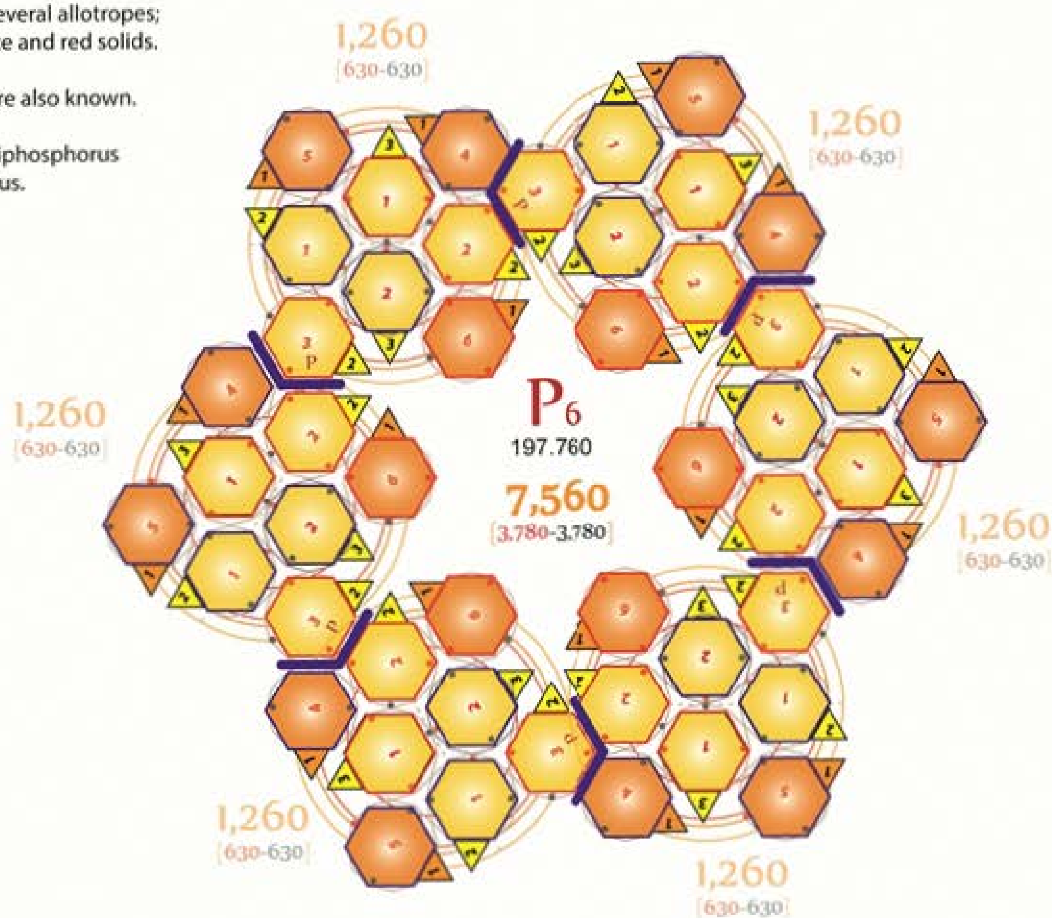
Phosphor Allotropes

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.





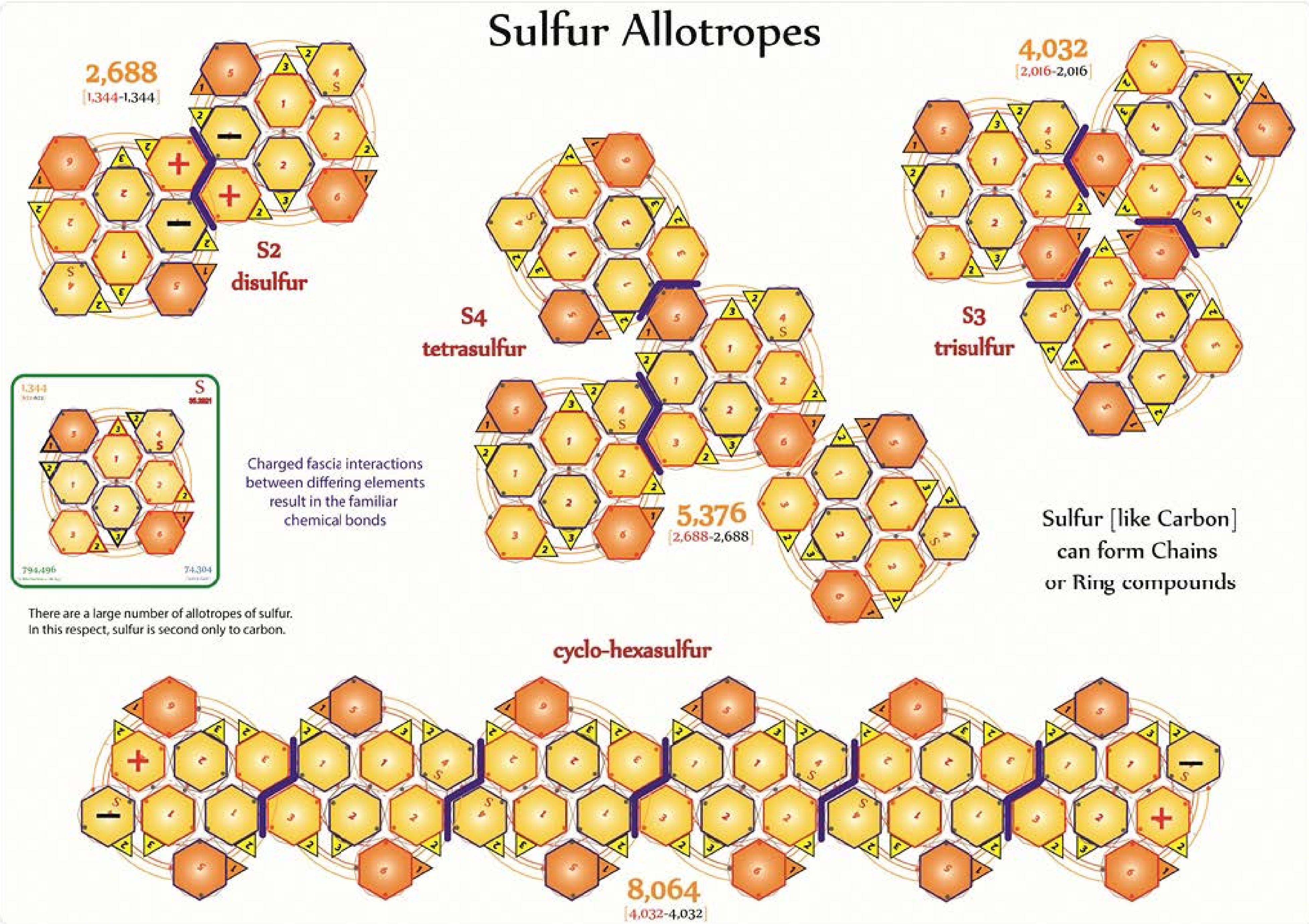
The diphosphorus allotrope (P2) can be obtained normally only under extreme conditions (for example, from P4 at 1100 kelvin).

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

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Isotopes

In addition to forming varying allotropic elements

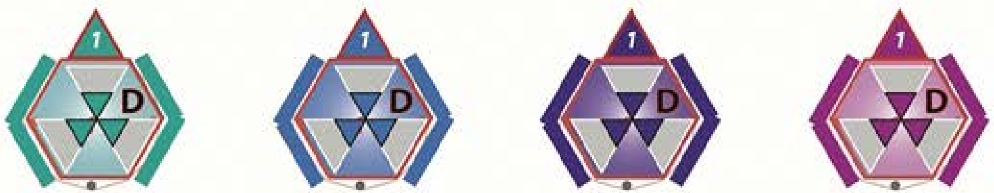
Atoms can also absorb energy directly and create numerous elemental isotopes as a result of their differing nuclear energy levels

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

n

0	Hydrogen	22,512	24,384	26,352	28,416	30,576	32,832	35,184	37,632
Element		1	2	3	4	5	6	7	8
1	Deuterium	45,012	48,720	52,596	56,640	60,852	65,232	69,780	74,496
2	Helium	90,024	97,440	105,192	113,280	121,704	130,464	139,560	148,992
3	Lithium	135,036	146,160	157,788	169,920	182,556	195,696	209,340	223,488
4	Berylium	180,048	194,880	210,384	226,560	243,408	260,928	279,120	297,984
5	Boron	225,060	243,600	262,980	283,200	304,260	326,160	348,900	372,480
6	Carbon	270,072	292,320	315,576	339,840	365,112	391,392	418,680	446,976
7	Nitrogen	315,084	341,040	368,172	396,480	425,964	456,624	488,460	521,472
8	Oxygen	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

Copyright ABRAHAM [2008] - All rights reserved

Carbon Isotopes

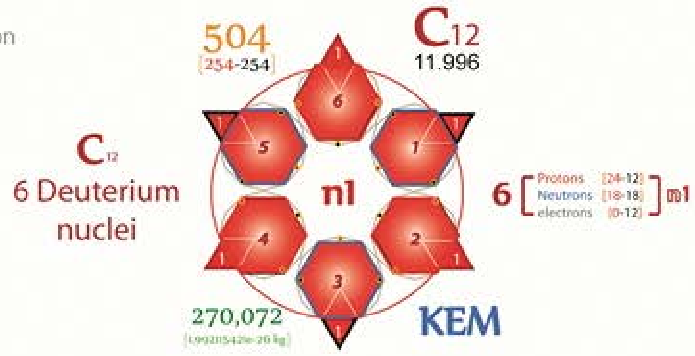
It is widely held in the scientific community that: Carbon-14, 14C, or radiocarbon, is a radioactive isotope of carbon with a nucleus containing 6 protons and 8 neutrons.

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



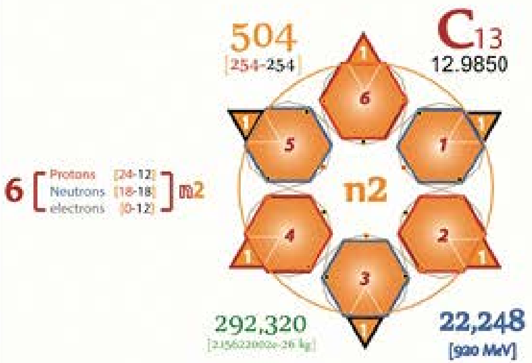
There are NO extra neutrons (in excess of the element's Z#) in the nuclei of atomic isotopes.

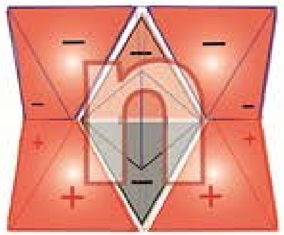
The measured 'excess mass' is the direct result of the raised quantum levels of the Deuterium nuclei that comprise each atomic element

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

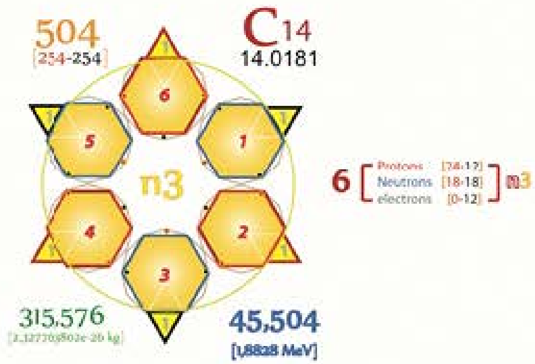
The 'extra' mass historically attrtibuted to neutron numbers above that of the elemental number are now reflected as stored kinetic 'chemical' energies as they always were.

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





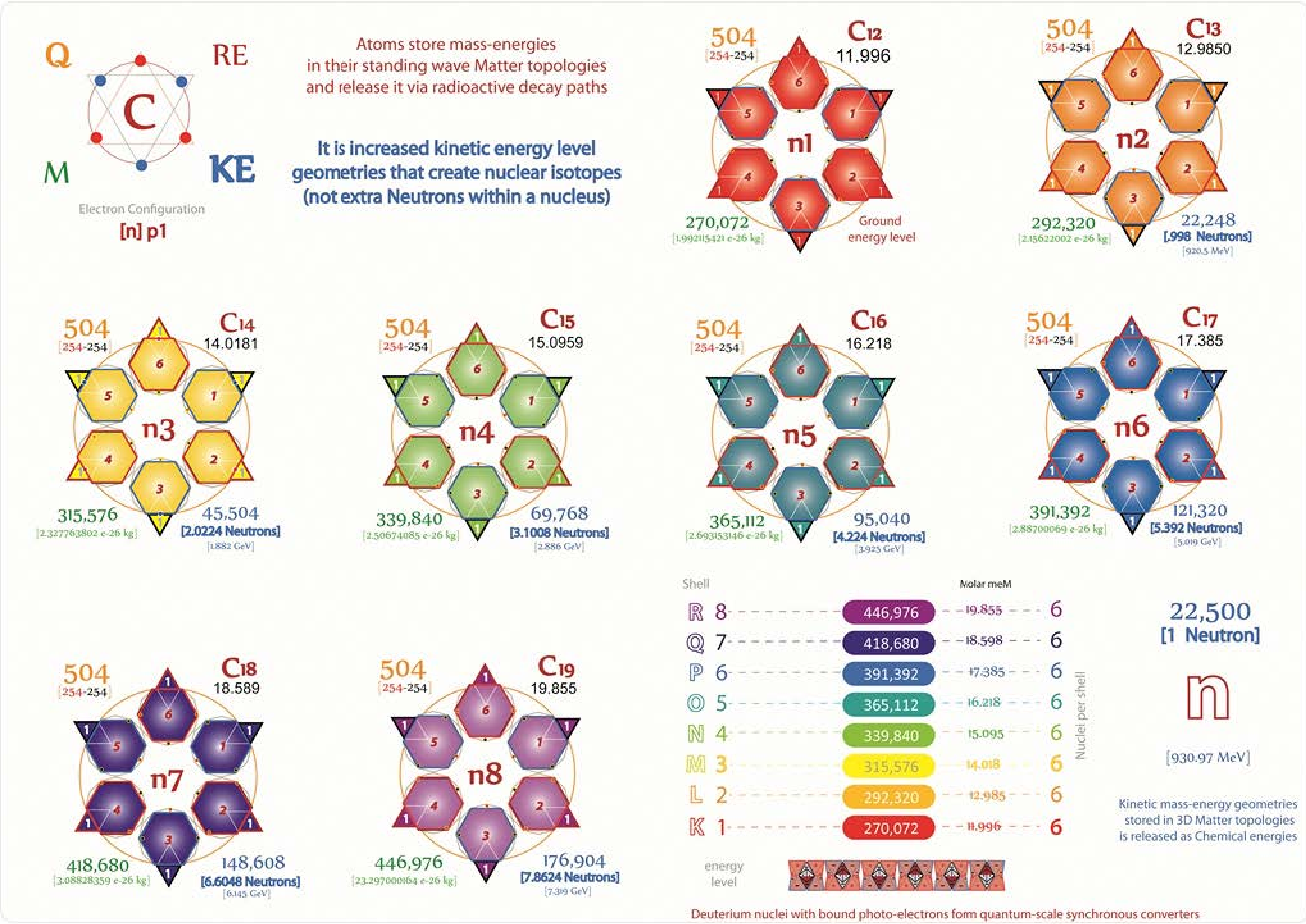
Quantum levels of atomic nuclei contribute to the molar mass [Isotopes are higher energy nuclei]



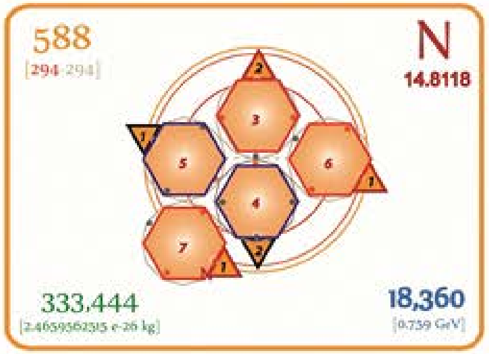
	n1	n2	n3	n4	n5	n6	n7	n8
C12	270,072	292,320	315,576	339,840	365,112	391,392	418,680	446,976
KEM diff	0	22,248	45,504	69,768	95,040	121,320	148,608	176,904
neutron #		.98	2.0	3.1	4.2	5.4	6.6	7.8

This applies equally to all atomic nuclei

Copyright ABRAHAM [2008] - All rights reserved

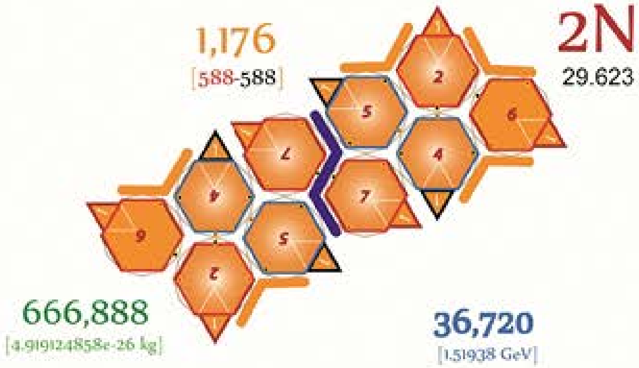


Copyright ABRAHAM [2008] - All rights reserved



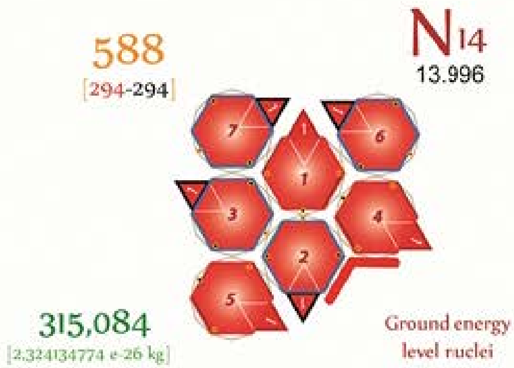
It is increased Nucleonic energy levels that creates Isotopes
(not extra Neutrons within any elementary Nucleus)

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

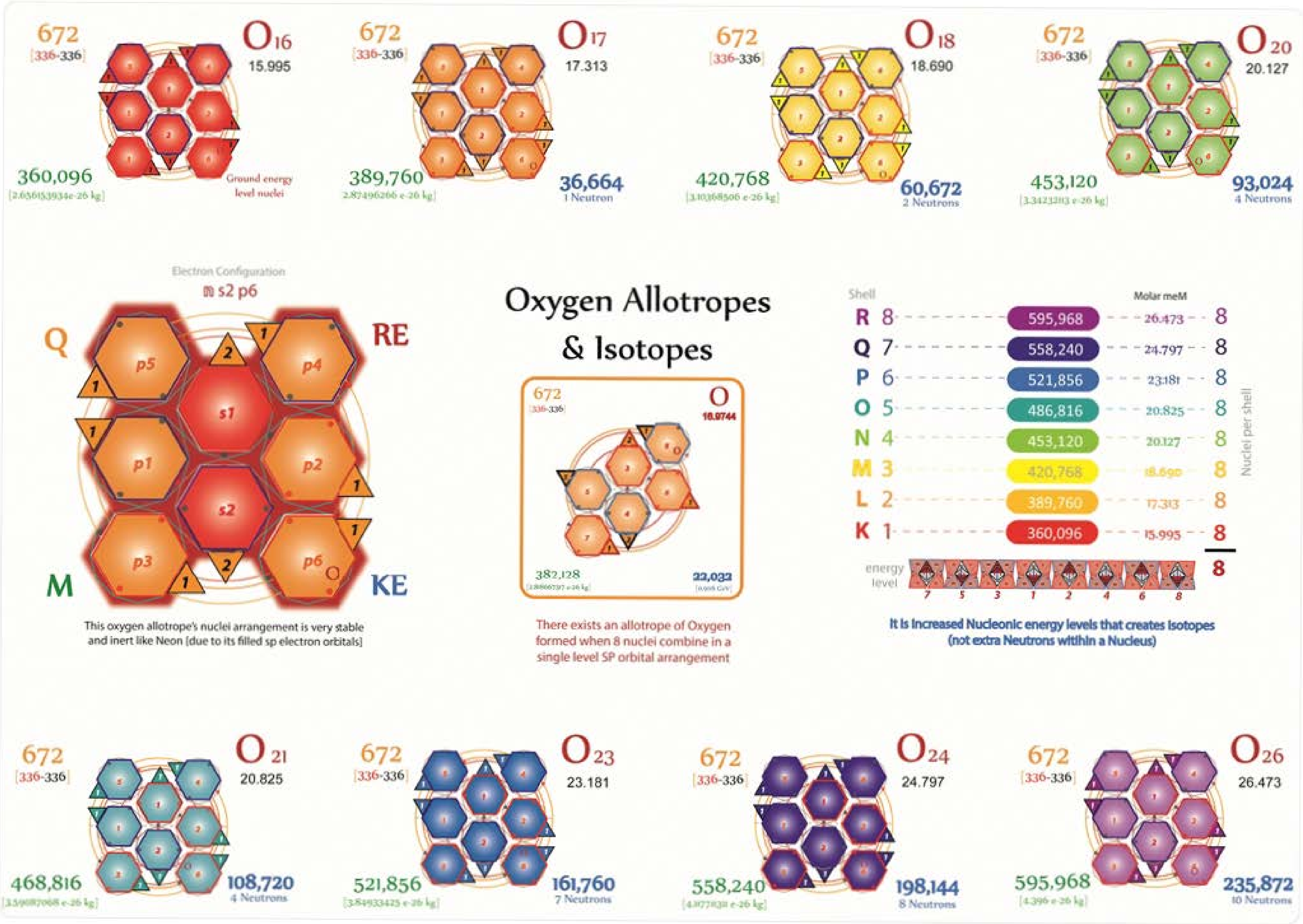


The charged mass-energy geometries of differing allotropic topologies create various chemical bond points

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

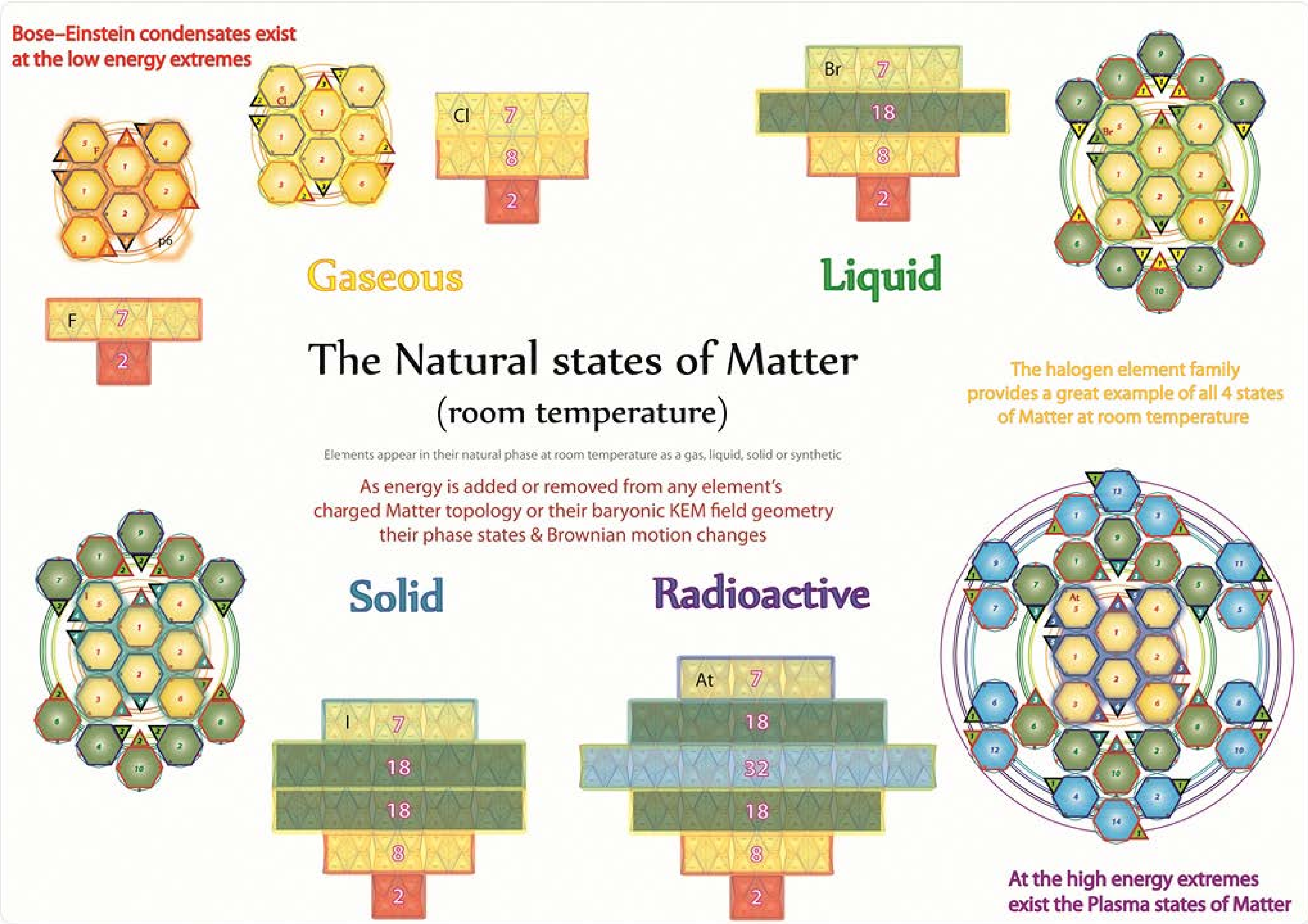
energy level

Copyright ABRAHAM [2008] - All rights reserved

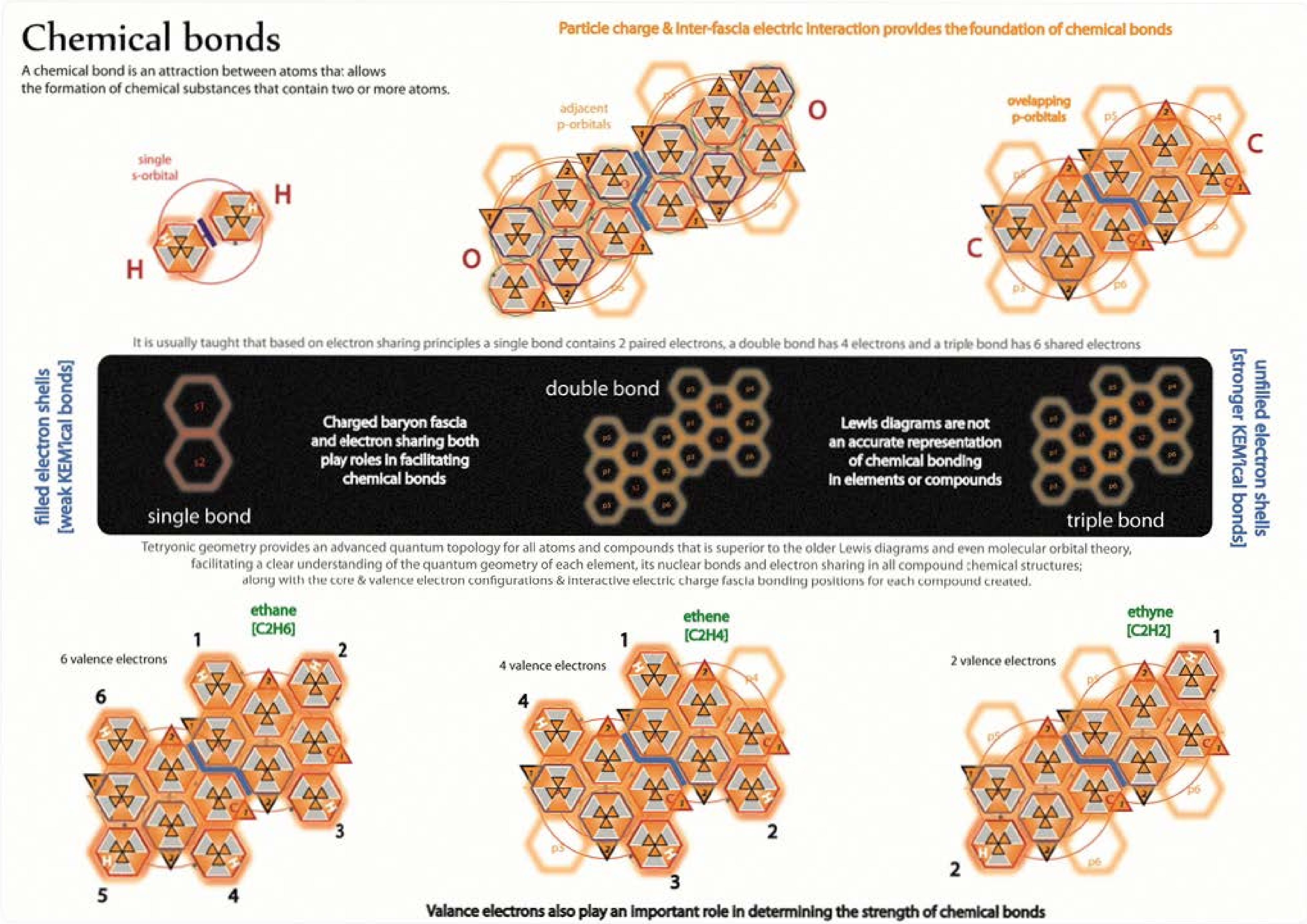


Tetryonics 54.15 - Oxygen isotopes

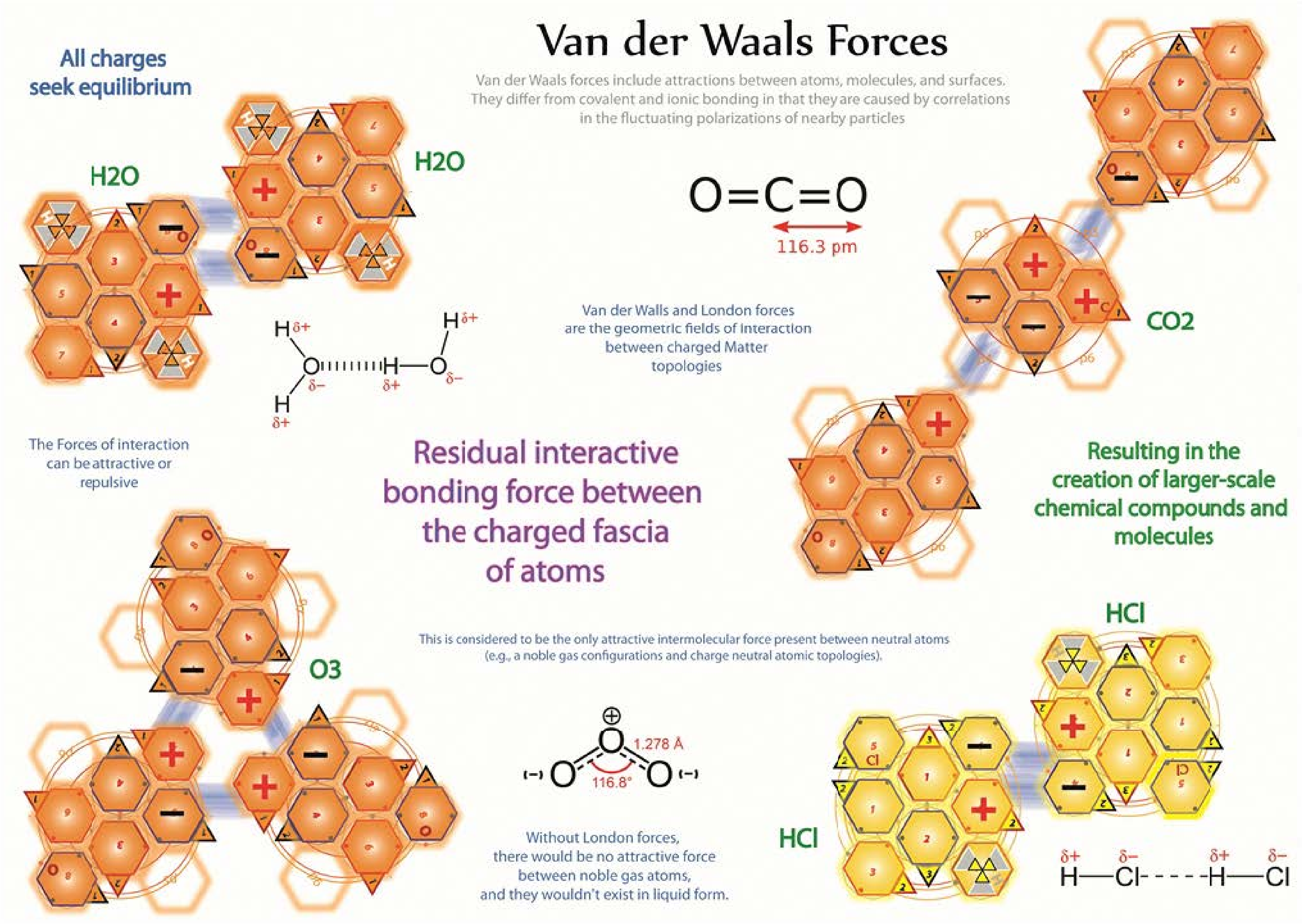
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Tetryonics 55.03 - Van der Waals force

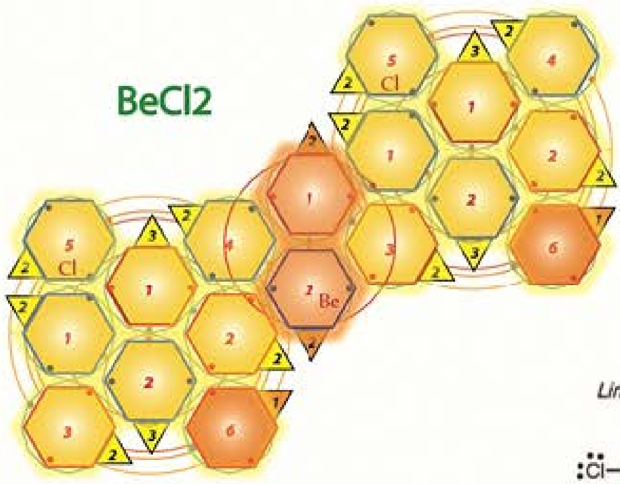
Copyright ABRAHAM [2008] - All rights reserved

Lewis Structures

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

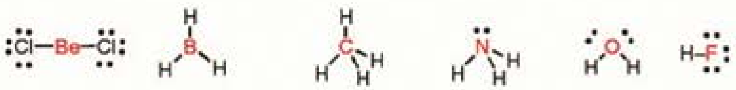
Lewis structures, also called Lewis-dot diagrams,
are diagrams that show the bonding between the atoms of any molecule,
and the lone pairs of electrons that may exist in the molecule.

BeCl2



HF

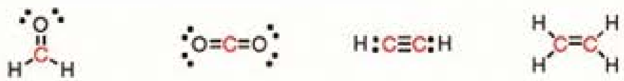
Line drawings can be used to depict molecular geometry:



Beryllium dichloride $BeCl_2$ *linear*	Borane BH_3 *trigonal planar*	Methane CH_4 *tetrahedral*	Ammonia NH_3 *trigonal pyrimidal*	Water H_2O *bent*	Hydrofluoric acid HF *linear*

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

Also applies to molecules with multiple bonding:



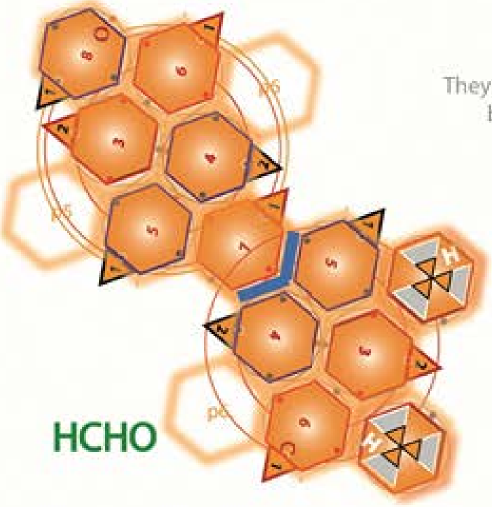
methanal (formaldehyde) *trigonal planar*	Carbon dioxide *linear*	ethyne (acetylene) *linear*	ethane (ethylene) *both carbons are trigonal planar*

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

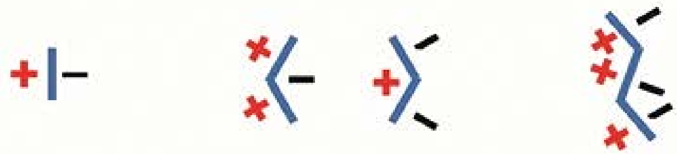
as well as the actual final quantum topology of compound elements and molecules

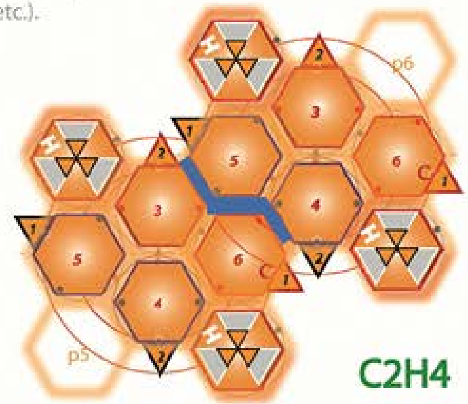
They are similar to electron dot diagrams in that the valence electrons in lone pairs are represented as dots,
but they also contain lines to represent shared pairs in a chemical bond (single, double, triple, etc.).



HCHO

single fascia bond | double fascia bonds | triple fascia bond

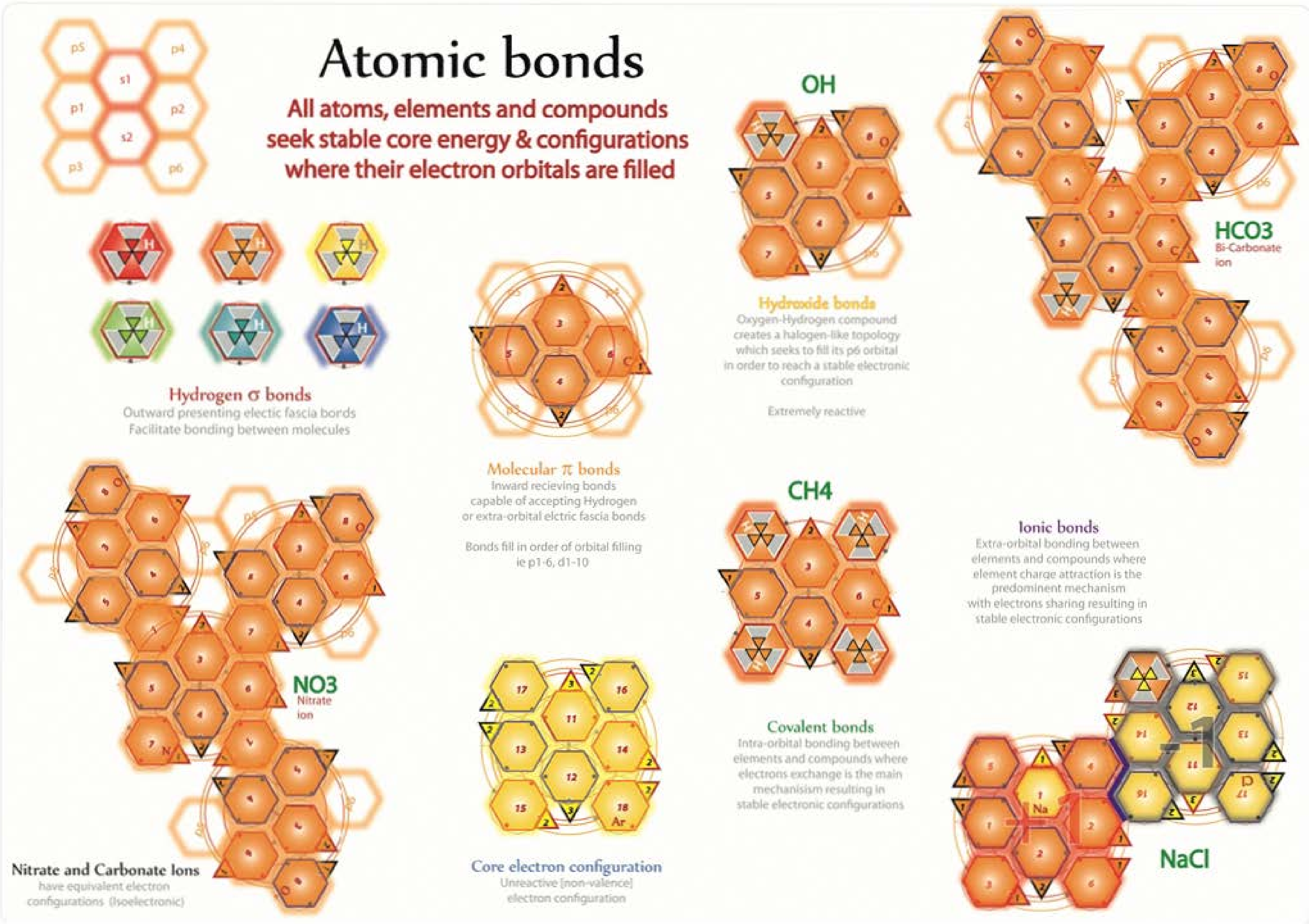




C2H4

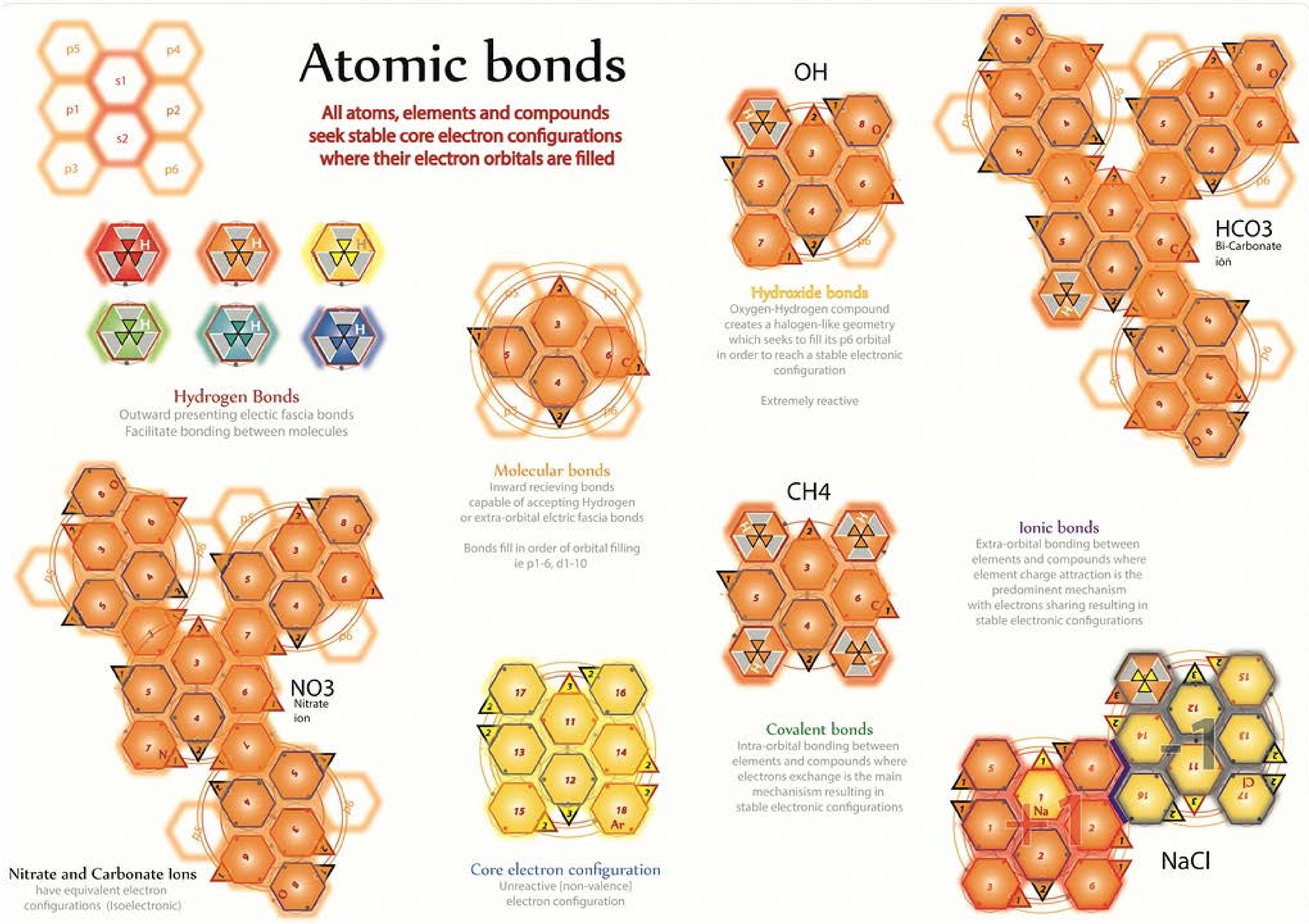
it is the electric field fascia of baryons that facilitates chemical bonds

Copyright ABRAHAM [2008] - All rights reserved

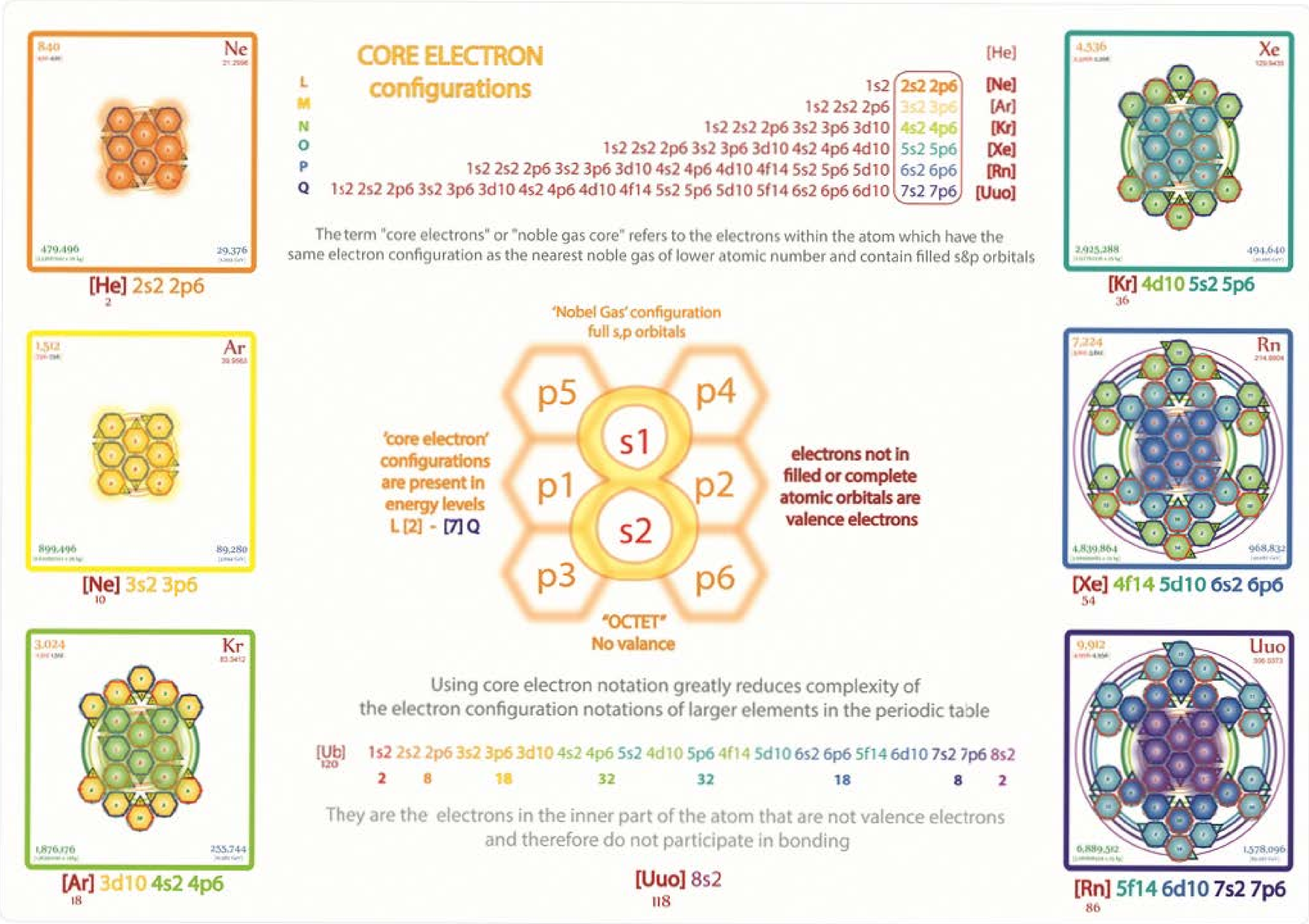


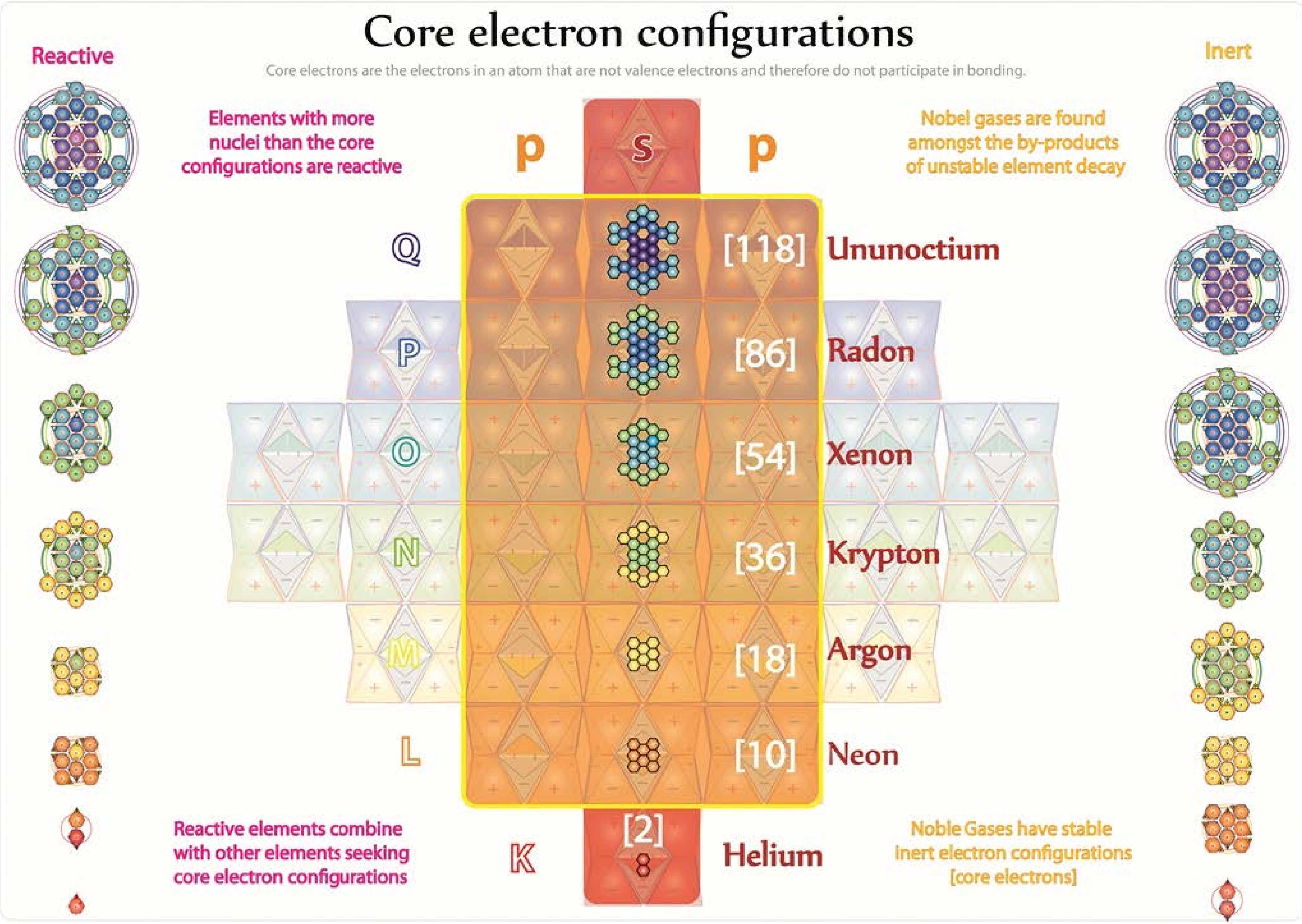
Tetryonics 55.05 - Atomic facsia Bonds

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

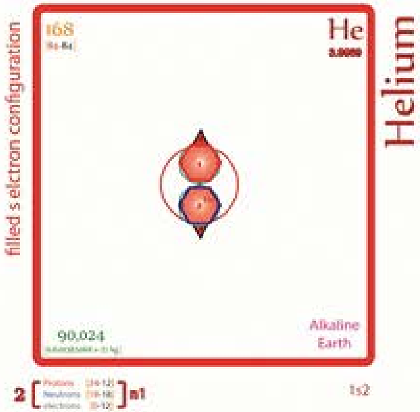



Core electron configurations
Core electrons are the electrons in an atom that are not valence electrons and therefore do not participate in bonding.
Reactive
Inert
Elements with more nuclei than the core configurations are reactive
Nobel gases are found amongst the by-products of unstable element decay
p
s
p
Q
[118]
Ununoctium
P
[86]
Radon
O
[54]
Xenon
N
[36]
Krypton
M
[18]
Argon
L
[10]
Neon
K
[2]
Helium
Reactive elements combine with other elements seeking core electron configurations
Noble Gases have stable inert electron configurations [core electrons]

!

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



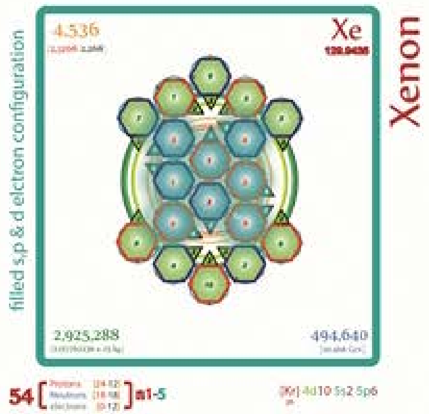
Nobel gases all have inert core sp electron configurations

The Nobel Gases

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

2			[He]
10	1s2	2s2 2p6	[Ne]
18	1s2 2s2 2p6	3s2 3p6	[Ar]
36	1s2 2s2 2p6 3s2 3p6 3d10	4s2 4p6	[Kr]
54	1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d10	5s2 5p6	[Xe]
86	1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d10 4f14 5s2 5p6 5d10	6s2 6p6	[Rn]
118	1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d10 4f14 5s2 5p6 5d10 5f14 6s2 6p6 6d10	7s2 7p6	[Uuo]

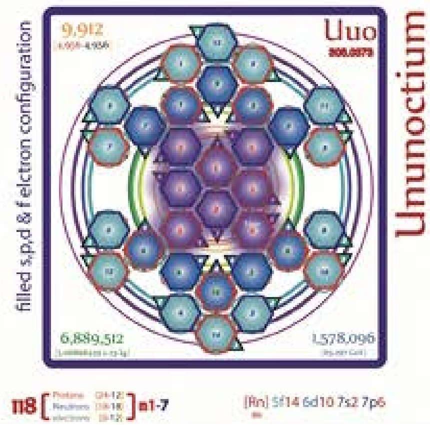
All nobel gases have filled electron orbitals creating inert, chemically un-reactive elements



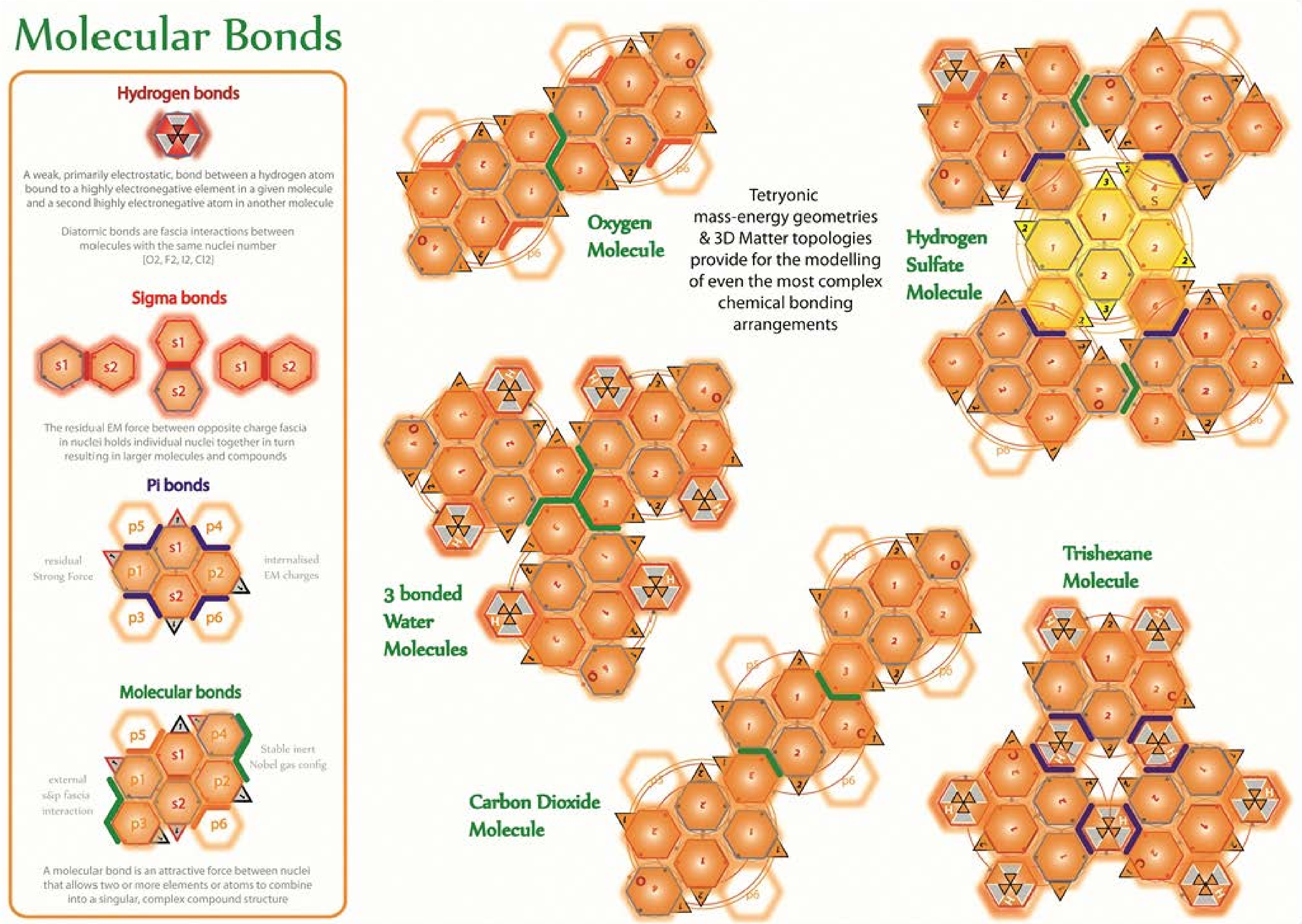
The noble gases are a group of chemical elements with very similar properties: under standard conditions, they are all odorless, colorless, monatomic gases, with a very low chemical reactivity.

Whilst some of the nobel 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 Ununioctium (Uuo).

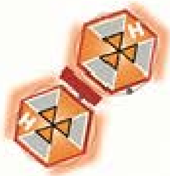


Copyright ABRAHAM [2008] - All rights reserved

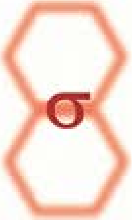


Copyright ABRAHAM [2008] - All rights reserved

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

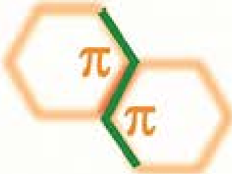


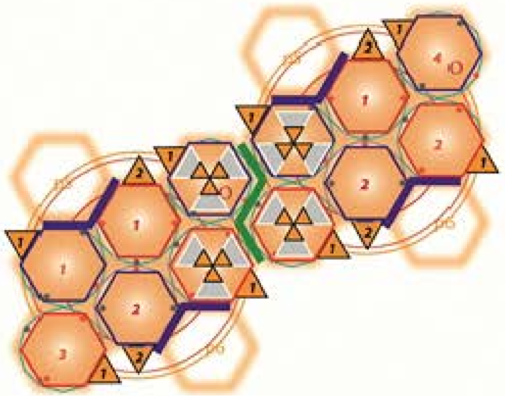
Sigma bonds are covalent bonds formed by direct overlapping of two adjacent atom's outermost orbitals.



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

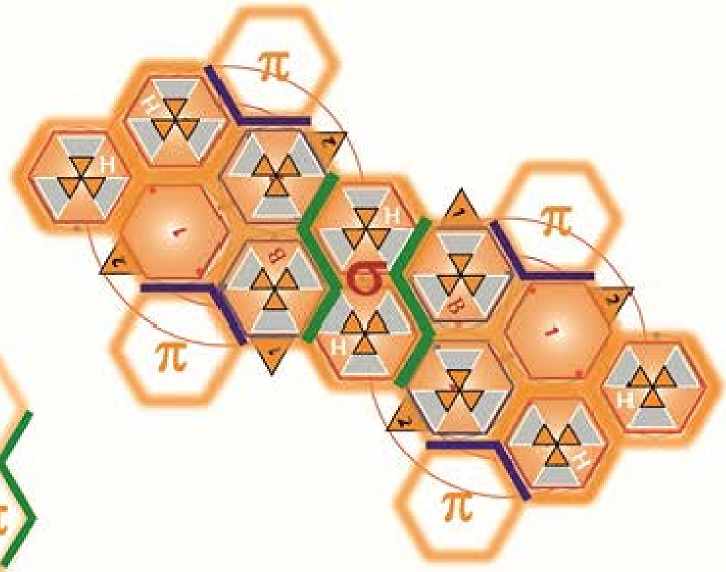
Note: sigma bonds can be formed by the bonding of either s-orbitals [or two adjacent p-orbitals]





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

π—σ—π

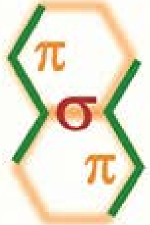


Lewis electron dot diagrams fail to illustrate reality in that molecules exist as 3D objects and not as a two dimensional systems as shown by them.

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.

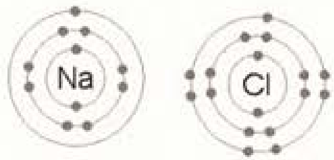
Sigma & Pi covalent bonds

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



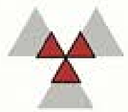
Copyright ABRAHAM [2008] - All rights reserved

Alkali Metals



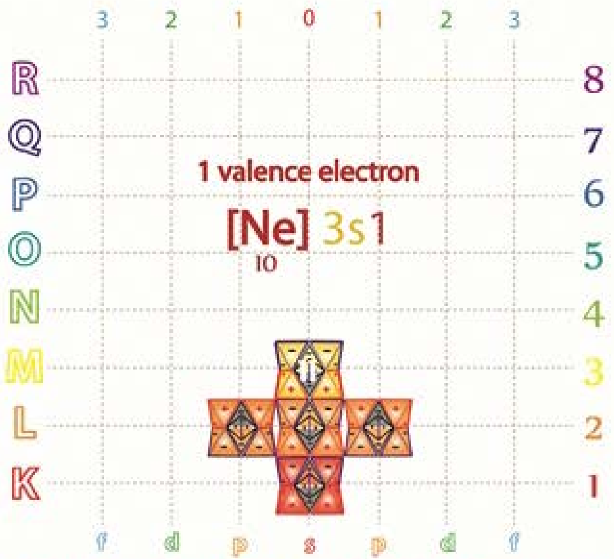
Halogens

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

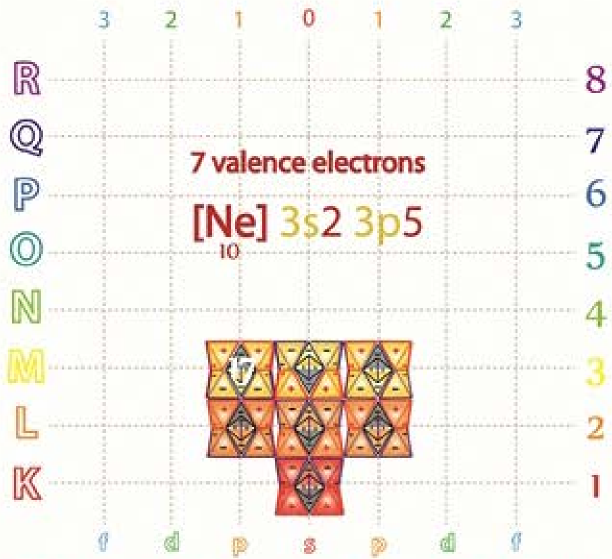


Atoms with more electrons than a closed shell are also highly reactive, as the extra valence electrons are easily removed from that orbital (to form a positive ion)

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

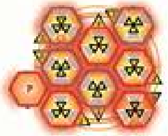
providing a superior visual means of accurately determining the energies and position of any electron in chemical compounds and determining the valence numbers



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)

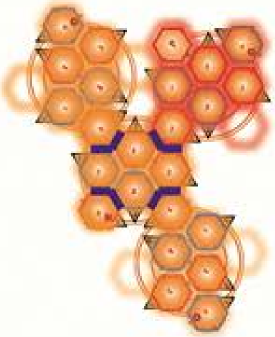
Copyright ABRAHAM [2008] - All rights reserved

Hydro-Chloric acid



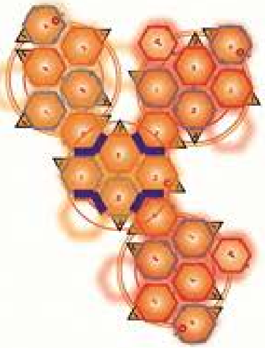
HCl

HNO3



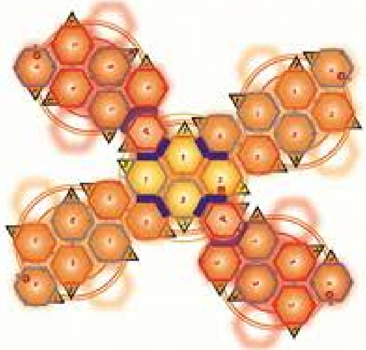
Nitric acid

Carbonic acid



H2CO3

H2SO4



Sulfuric acid

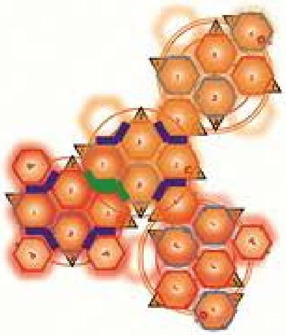
Common Acids

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.

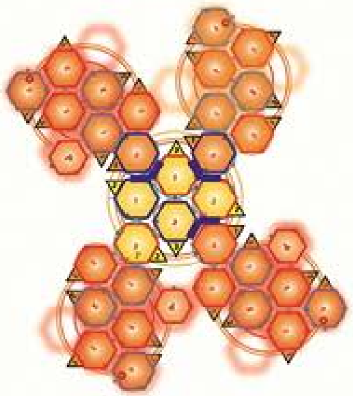
A Lewis acid is a substance that can accept a pair of electrons to form a covalent bond.

HC2H3O2



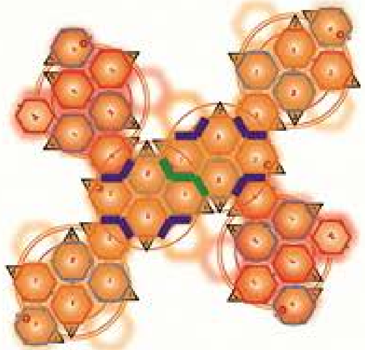
Acetic acid

Phosphoric acid



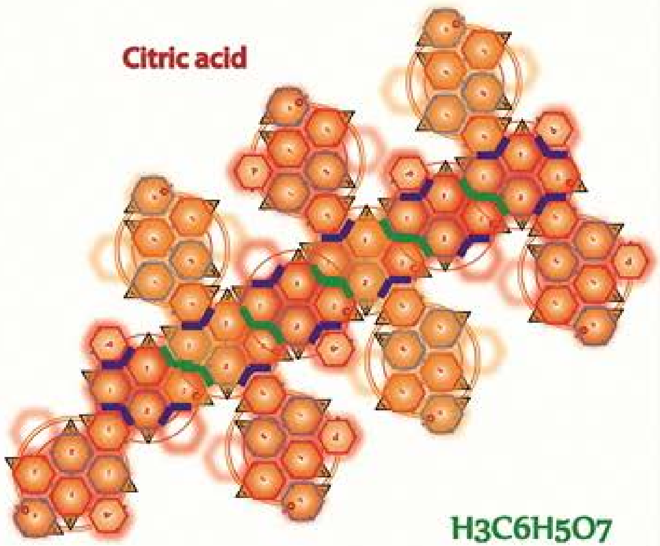
H3PO4

H2C2O4



Oxalic acid

Citric acid



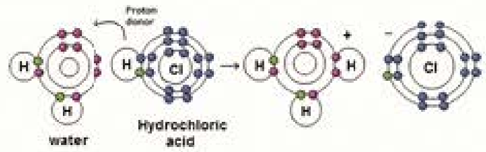
H3C6H5O7

Chemical reactions

Valence Bonds & Molecular orbitals

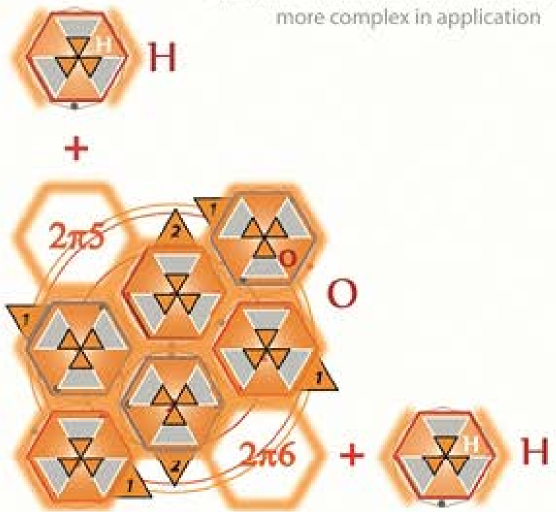
A chemical reaction is a process that leads to the transformation of one set of chemical substances to another.

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



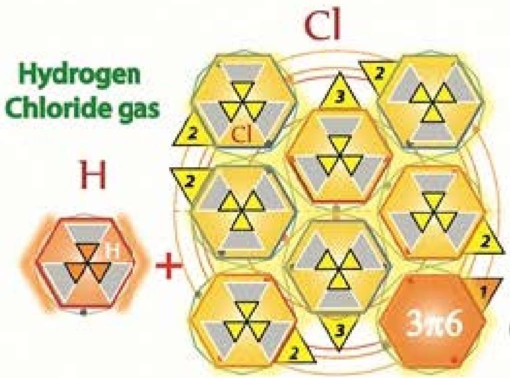
In contrast, molecular orbital theory has orbitals that are designed to cover the whole molecule but is mathematically more complex in application

Aqueous Hydro-Chloric acid solution



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

Hydrogen Chloride gas



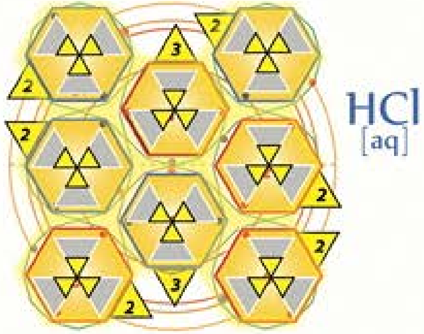
7 valence electrons
1 [n3] valence bond available
(8 electron stable configuration)

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

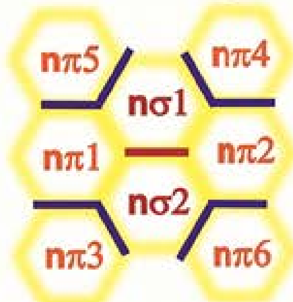
Tetryonic theory replaces both VB & MO theories by modelling the physical quantum charge topologies and rest mass-energy geometry of all elements and compounds

water



Hydrochloric acid

Valence configurations seek to create stable filled obital configurations



Building on exisiting 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

Copyright ABRAHAM [2008] - All rights reserved

Ionic Bonding

960
[480-480]

Alkaline Metal

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

Sodium atom develops into a nett POSITIVE charge ion

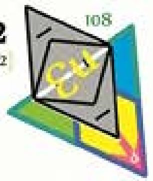
948
[480-468]

2,424
[1,212-1,212]

NaCl

Household Salt

12
[0-12]



OPPOSITES ATTRACT

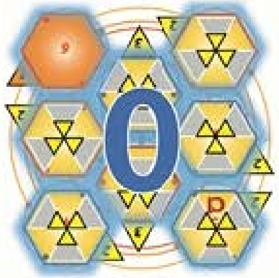
Resultant salt [NaCl] molecule has a NEUTRAL charge with the n3 electron migrating to fill the 3p6 orbital

1,476
[732-744]

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

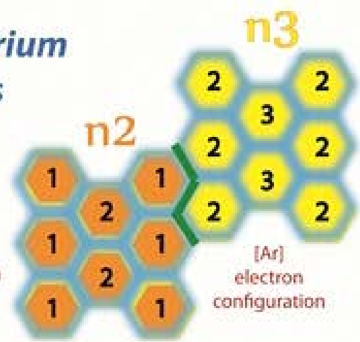
Halogen

1,464
[732-732]



Chlorine atom develops into a nett NEGATIVE charge ion

All atoms and molecules seek equilibrium via stable electron configurations

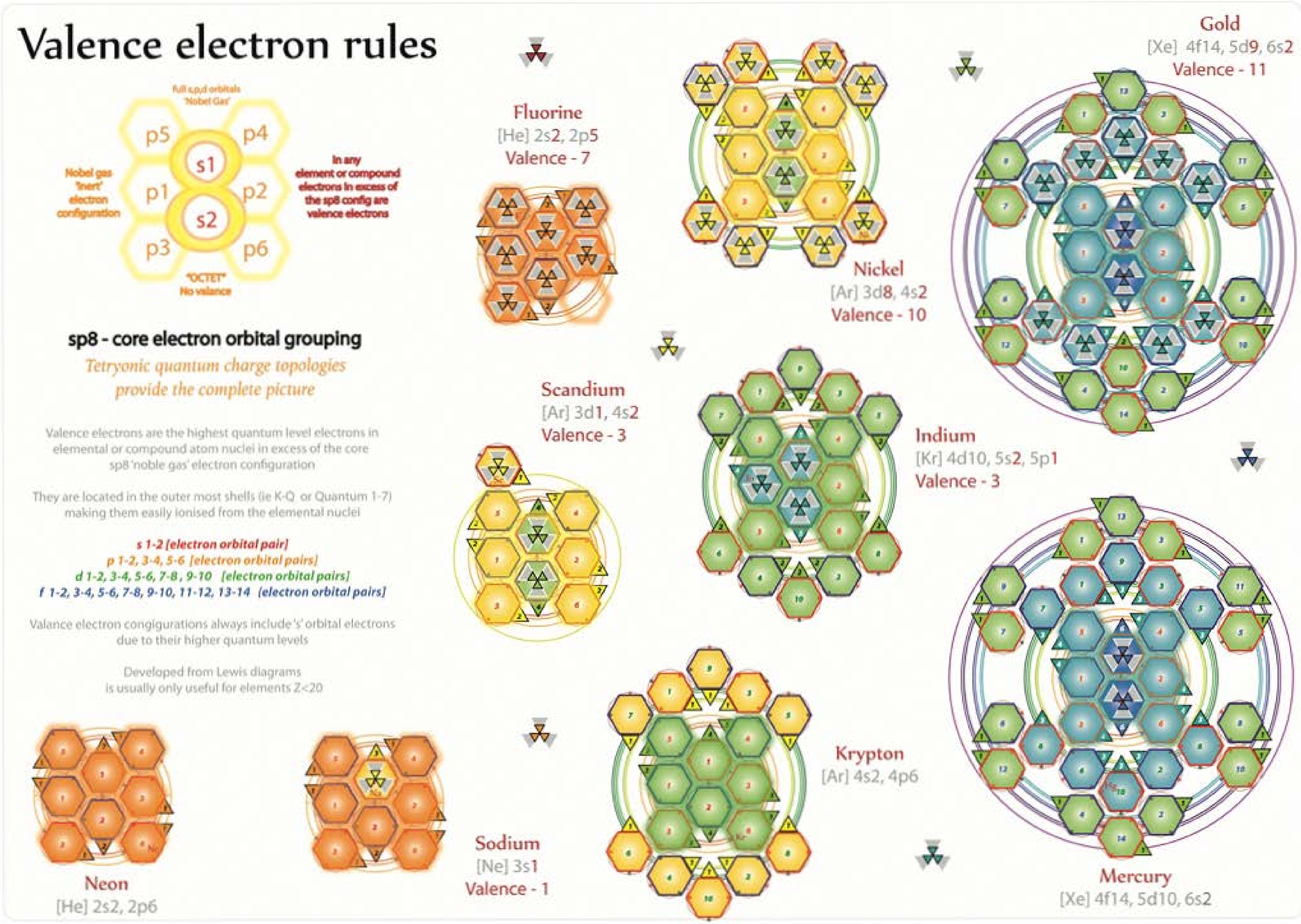


In short, it is a bond formed by the attraction between two oppositely charged ions.

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.

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Filled electron orbitals

Once 8 valence electrons are reached a stable valence cofiguration 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).

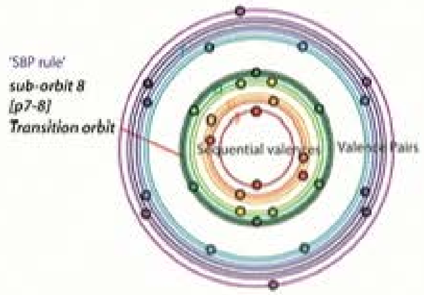
Note that a "full shell" means that there are the eight electrons in the valence shell when the next shell starts filling, even though higher subshells (d, f, etc.) have not been filled.

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.

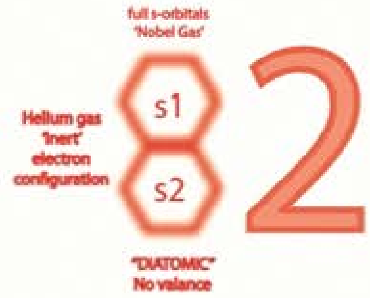
A consequence of the octet rule is that atoms generally react by gaining, losing, or sharing electrons in order to achieve a complete octet of valence electrons. Reaction of atoms occurs primarily in two ways: ionically and covalently.

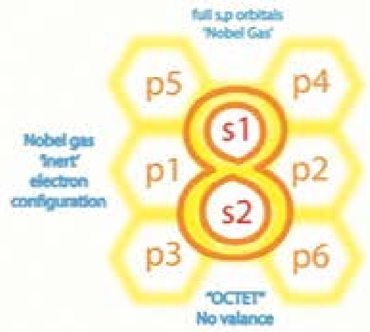


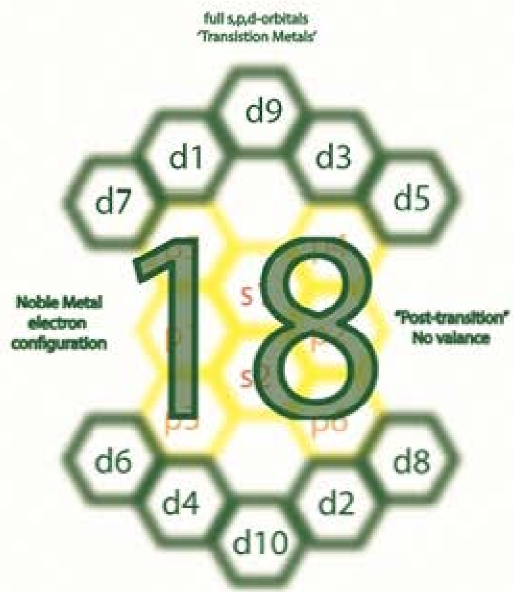
Once 8 valence electrons are reached the sub-orbits are stable and form a stable, non-reactive valence configuration.

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)

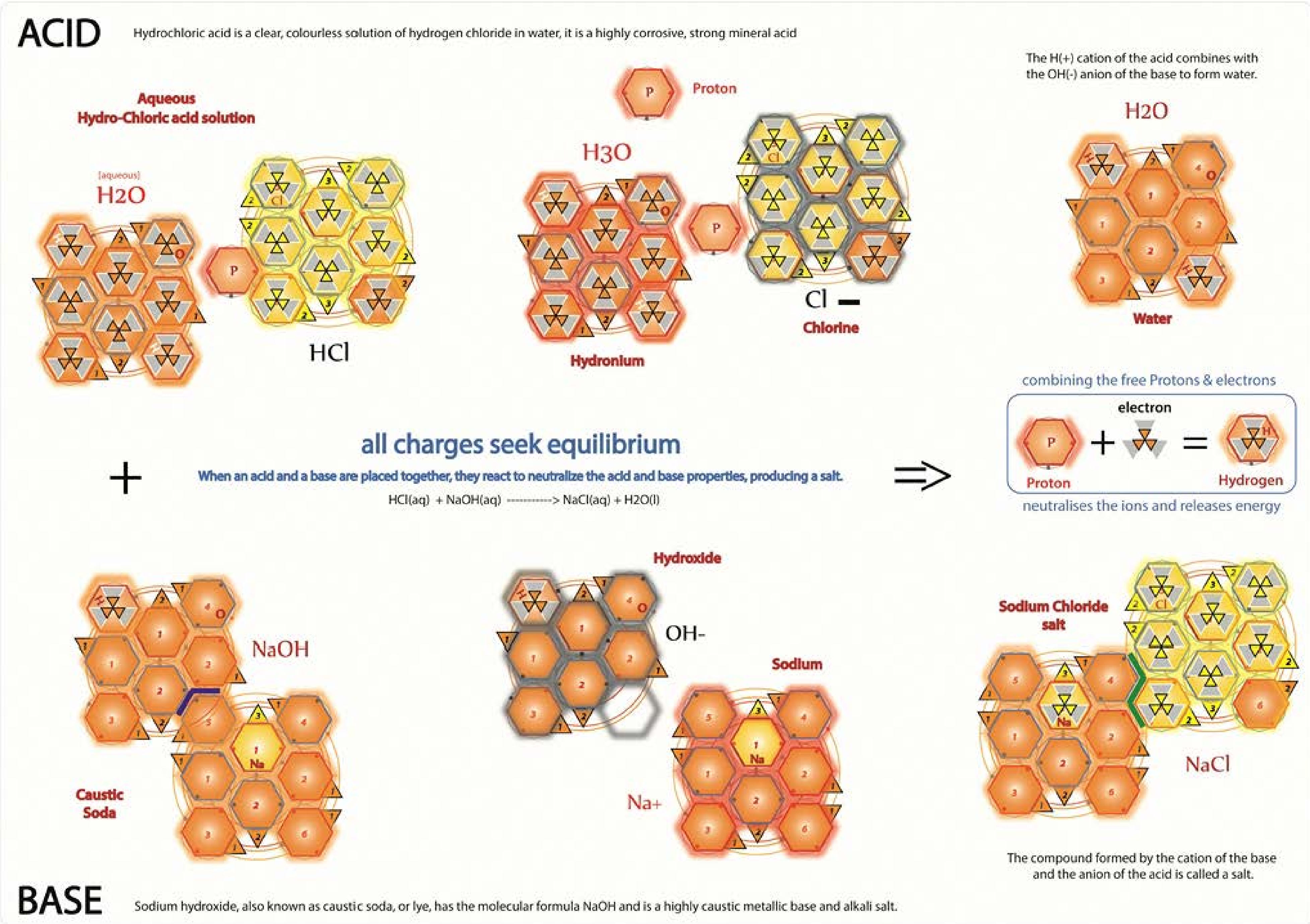
The siginificance is that sub-orbit 8 is the middle sub-orbit (of 16 total sub-orbits possible)







Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Geometric Molecular Topology

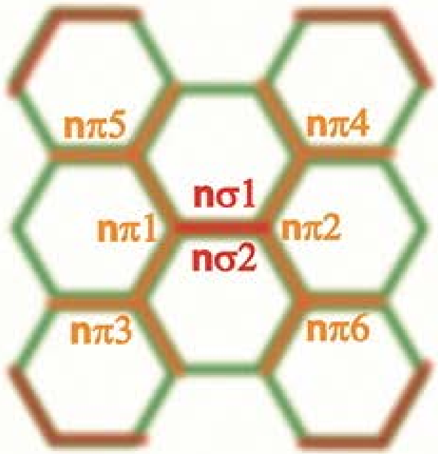
Molecules are most often held together with covalent bonds involving single, double, and/or triple bonds, where a "bond" is a pair of electrons shared between elements as they seek equilibrium (another method of bonding is ionic bonding and involves a positive cation and a negative anion).

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 flourine 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



Oxygen

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

All molecules seek KEM'ical charge and energy equilibrium

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

by bonding together and forming larger complex molecules

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

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

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.

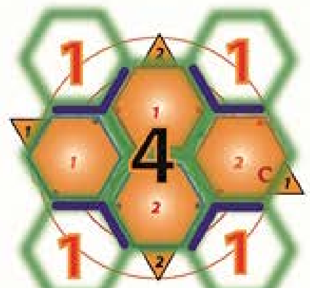
Most commonly, atoms will expand their octets to contain a total of five or six electron pairs, in total. In theory, it is possible to expand beyond those number.

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.

Nitrogen



Carbon

Copyright ABRAHAM [2008] - All rights reserved

Hydrogen bonds

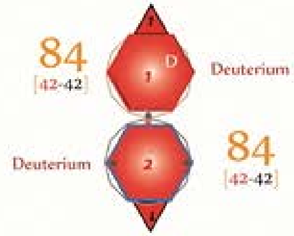
48
[24-24]

H

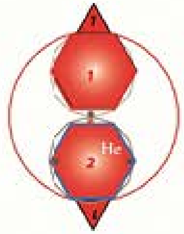
96
[48-48]

1 Proton
1 electron

Hydrogen is a 'free radical' atom



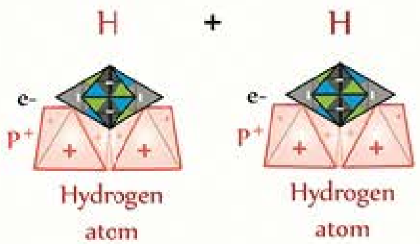
H2 has a smaller s-orbital [lower energy level] compared to Helium



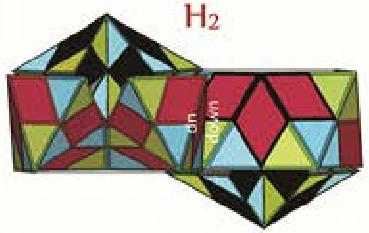
168
[84-84]

2 Protons
2 Neutrons
2 electrons

Deuterium is the building block of elements

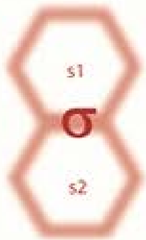


Hydrogen atoms → form Covalent bonds

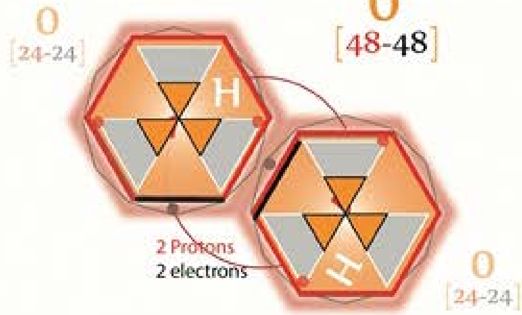


Hydrogen, bound mostly to carbon and nitrogen, is part of almost every molecule in your body: DNA, proteins, sugars, fats.
Hydrogen bonds - which form between atoms that "share" a hydrogen atom, is one of the most important interactions that makes biological molecules behave as they do.

Hydrogen bonds are sigma bonds



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



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

Copyright ABRAHAM [2008] - All rights reserved

504
[252-252]

Carbon Compounds

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

CO

1,176
[588-588]

Carbon Monoxide Molecule

[He] 2s2 2p2

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.

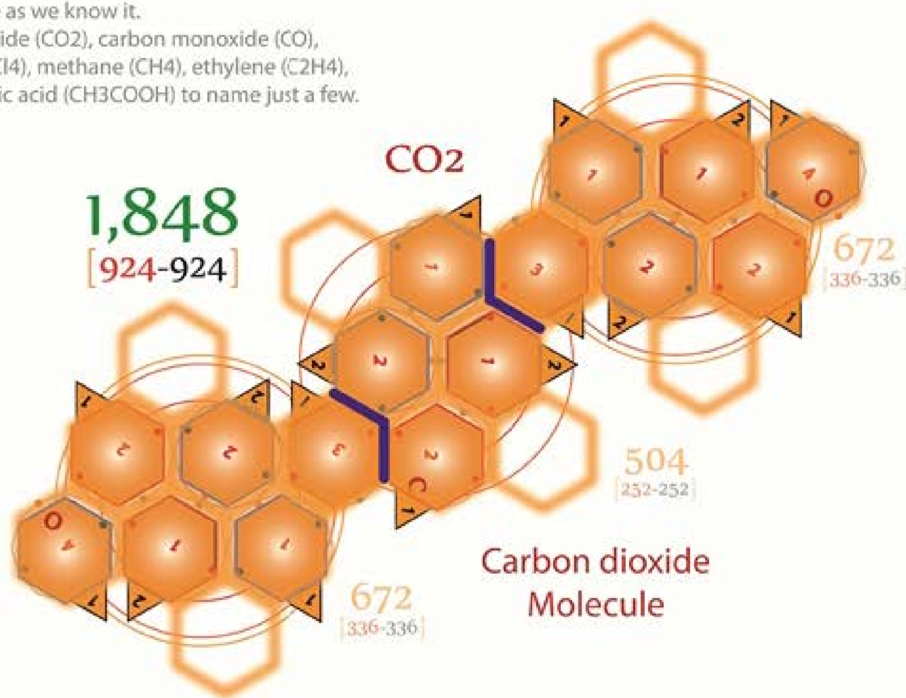
Acetylene Molecule

C2H2

1,104
[552-552]

1,848
[924-924]

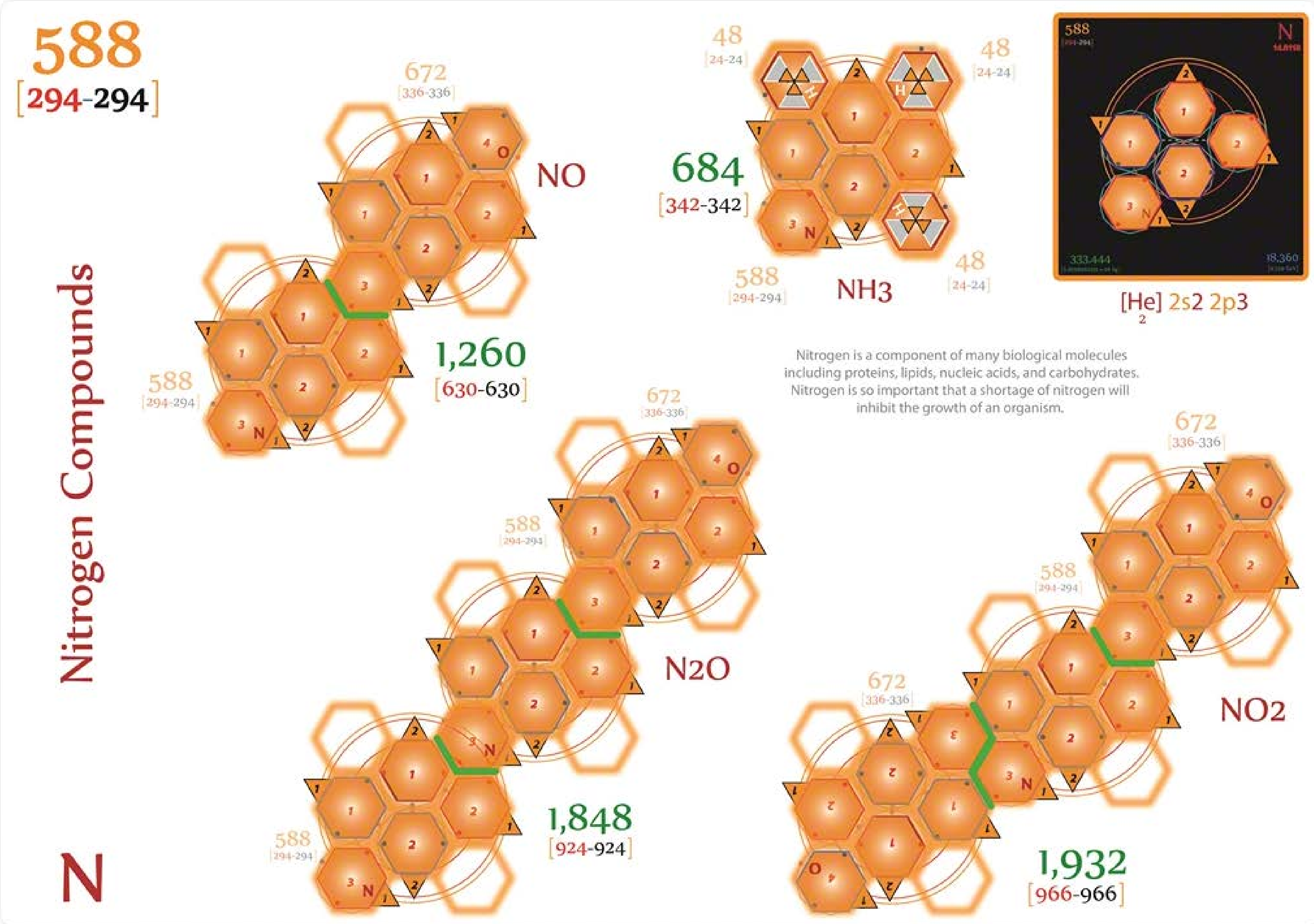
CO2



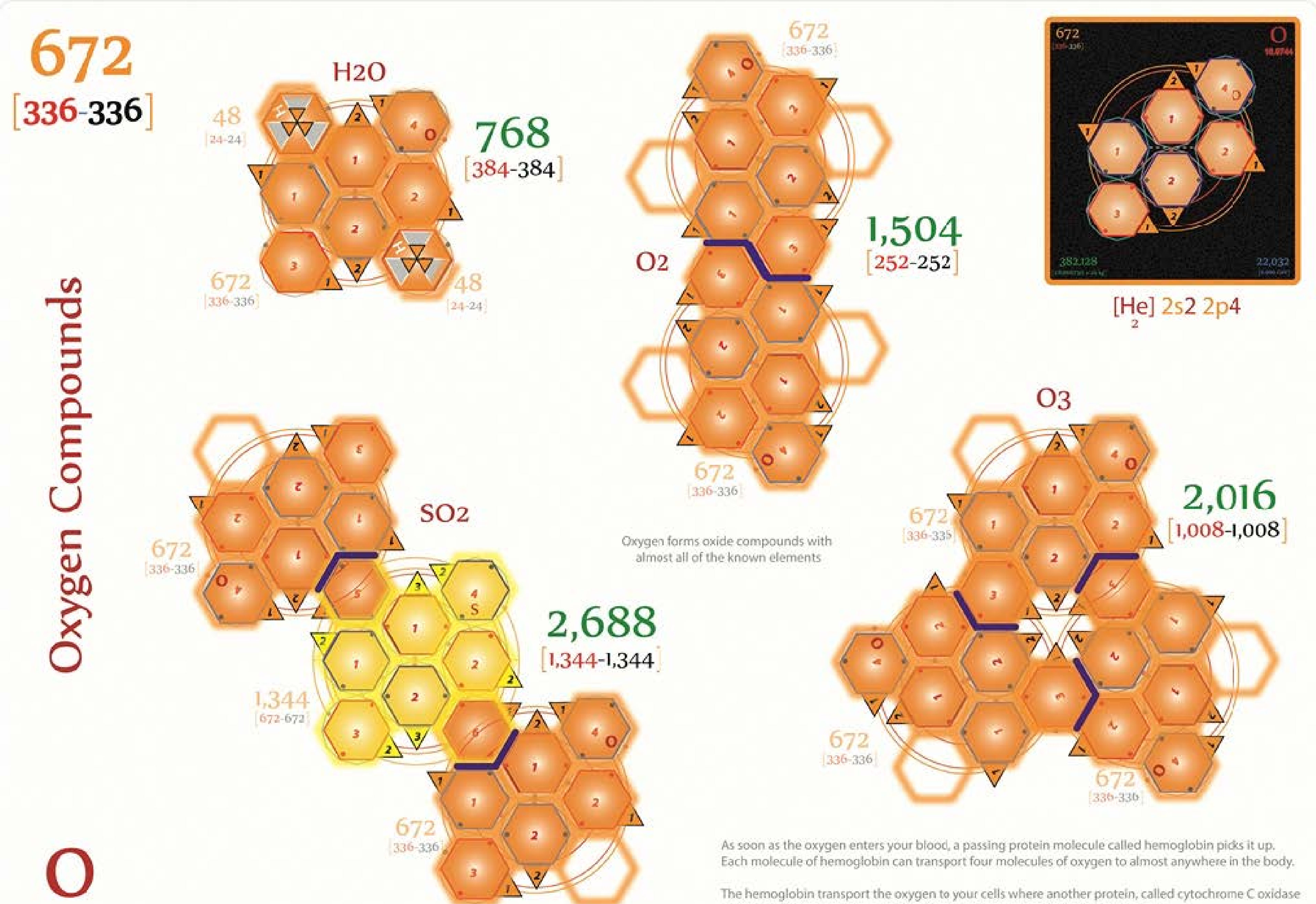
Carbon dioxide Molecule

C

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


588
[294-294]
Nitrogen Compounds
N
672
[336-336]
NO
588
[294-294]
1,260
[630-630]
48
[24-24]
684
[342-342]
588
[294-294]
NH3
[He] 2s2 2p3
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.
N2O
1,848
[924-924]
NO2
1,932
[966-966]

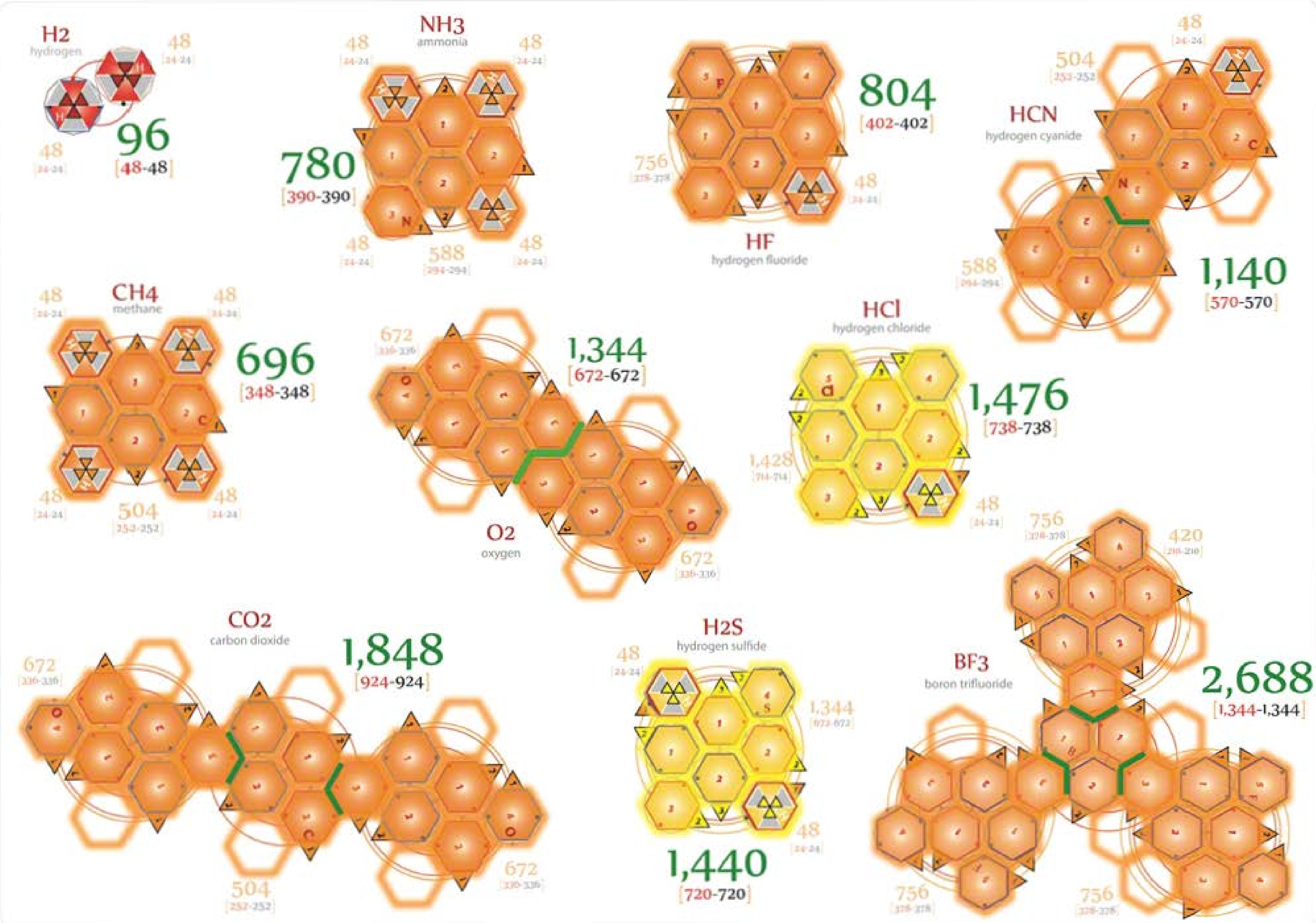
Copyright ABRAHAM [2008] - All rights reserved



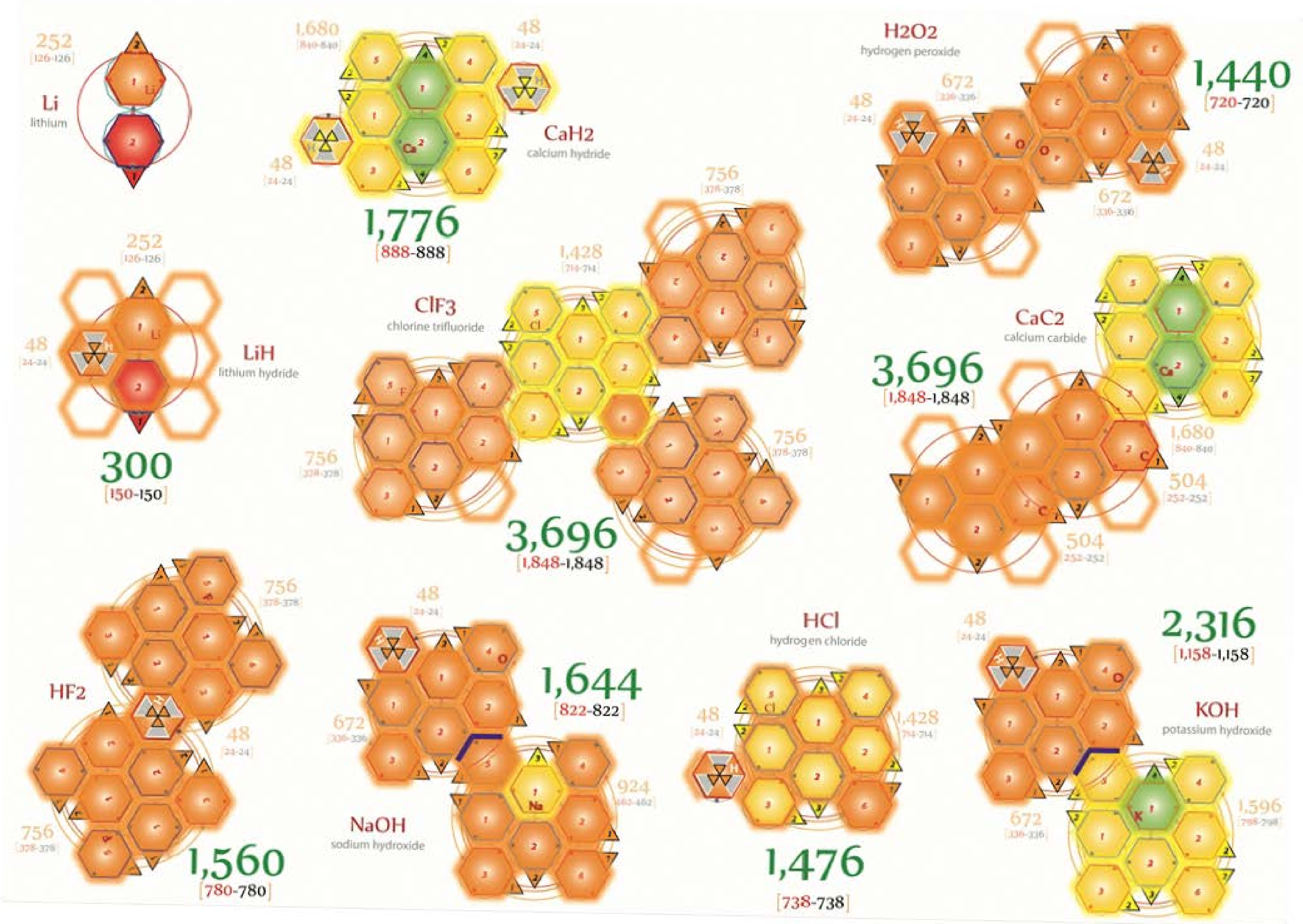
As soon as the oxygen enters your blood, a passing protein molecule called hemoglobin picks it up. Each molecule of hemoglobin can transport four molecules of oxygen to almost anywhere in the body.

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

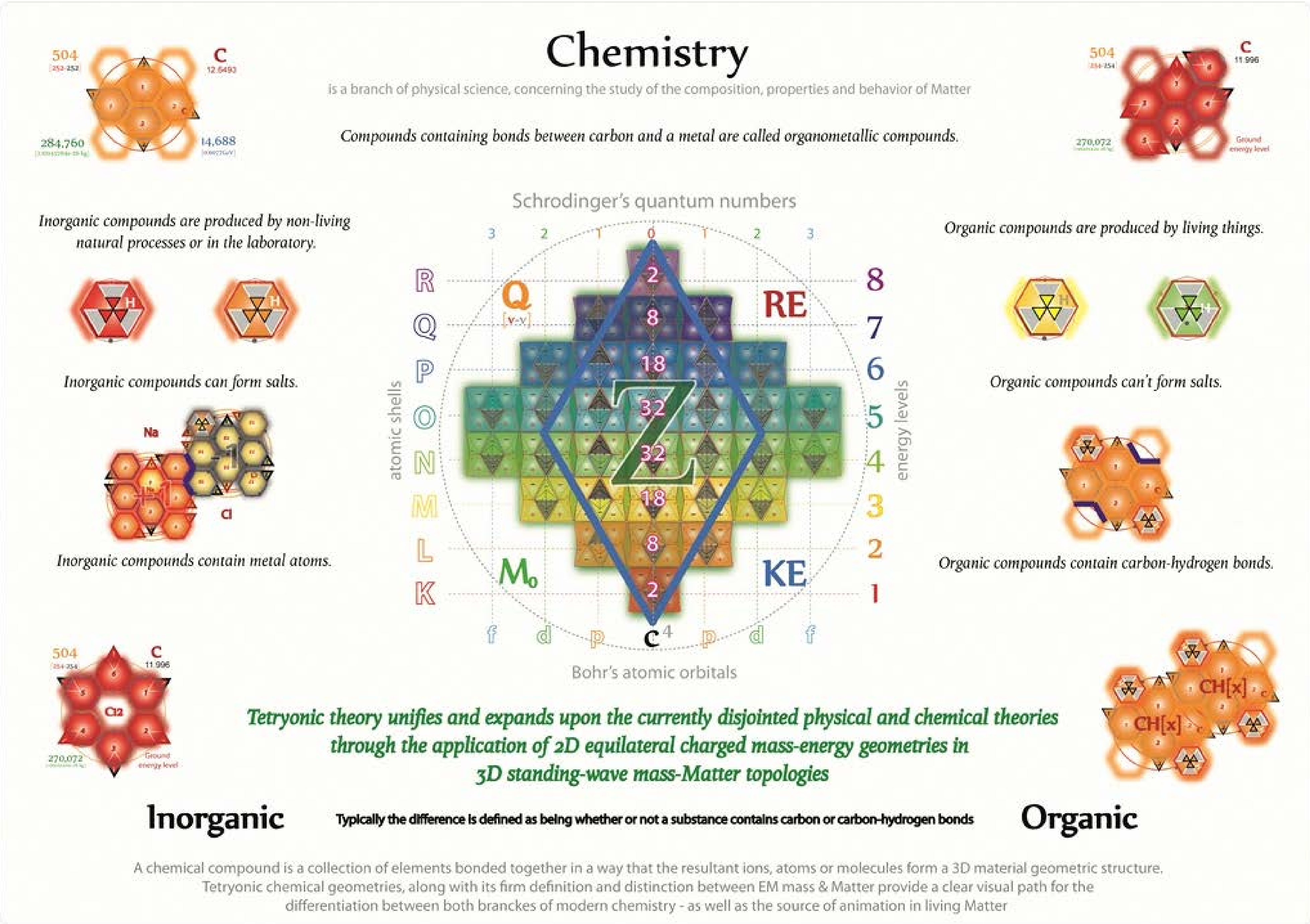
Copyright ABRAHAM [2008] - All rights reserved



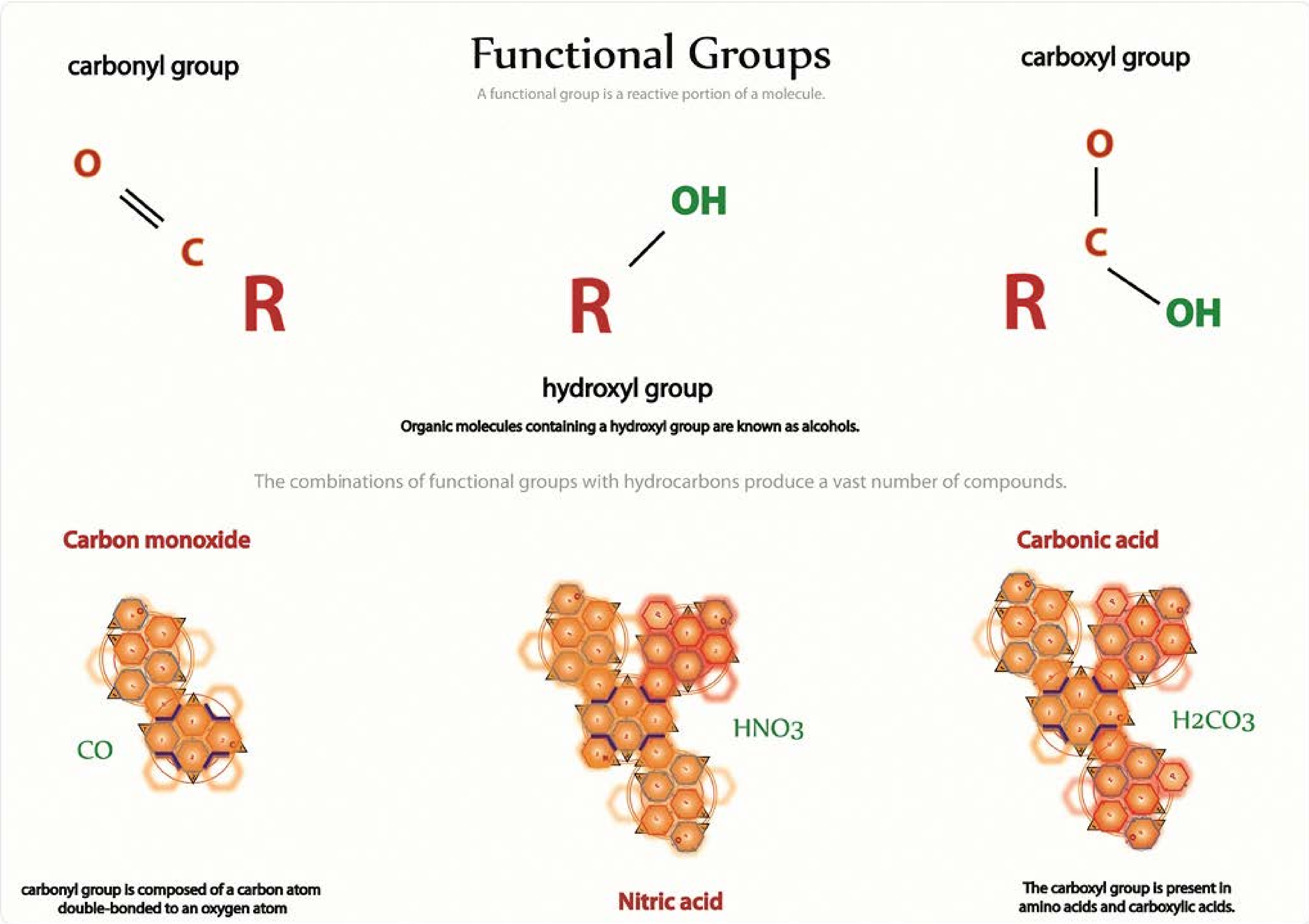
Copyright ABRAHAM [2008] - All rights reserved



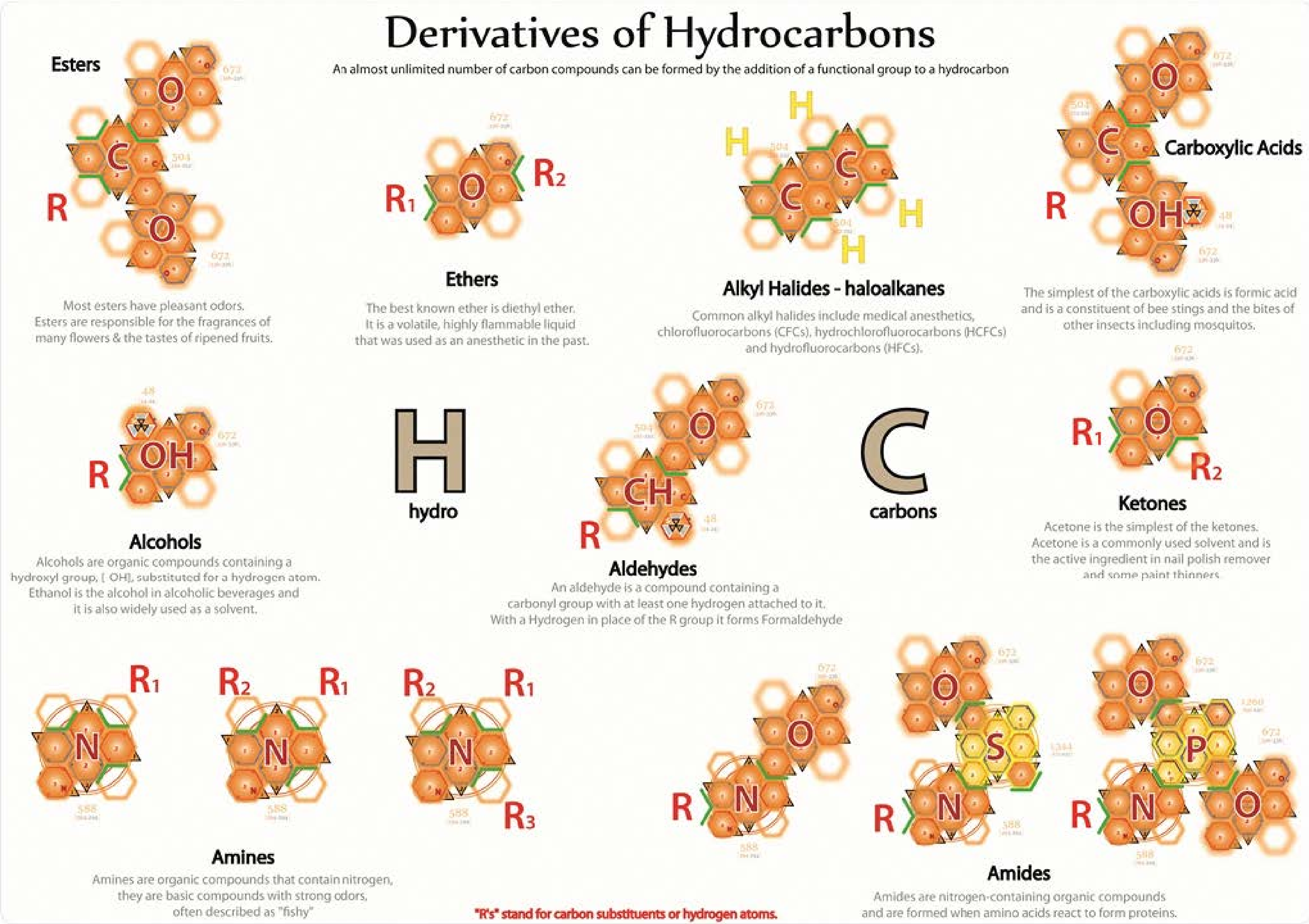
Copyright ABRAHAM [2008] - All rights reserved



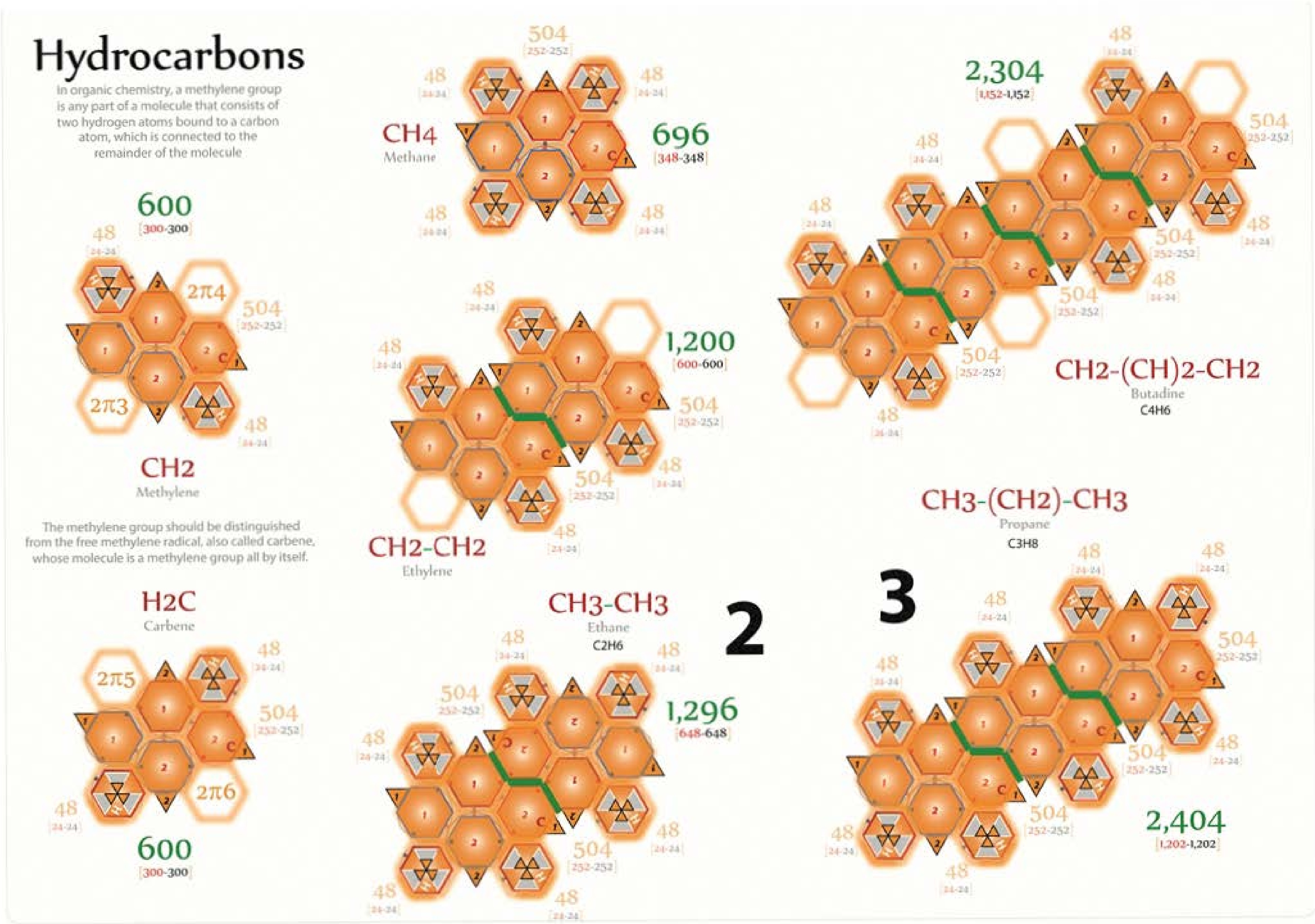
Copyright ABRAHAM [2008] - All rights reserved



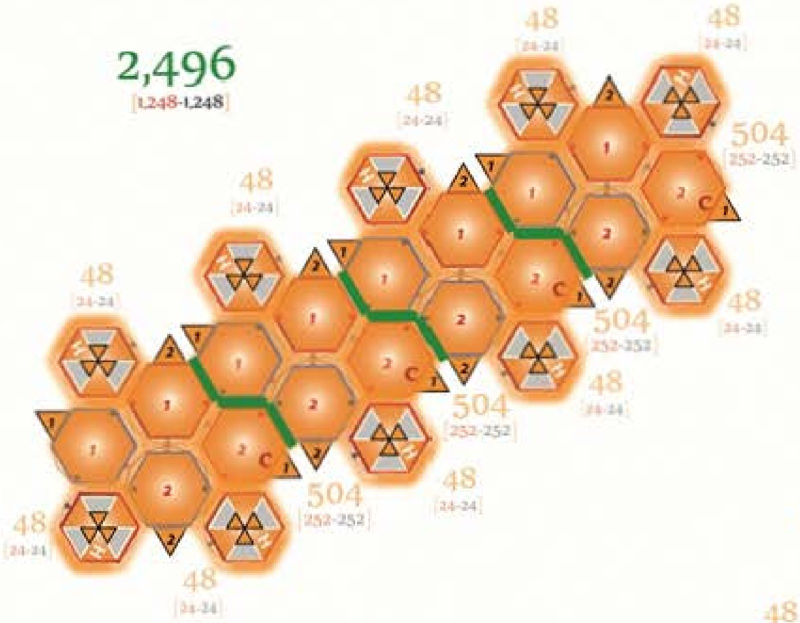
Copyright ABRAHAM [2008] - All rights reserved

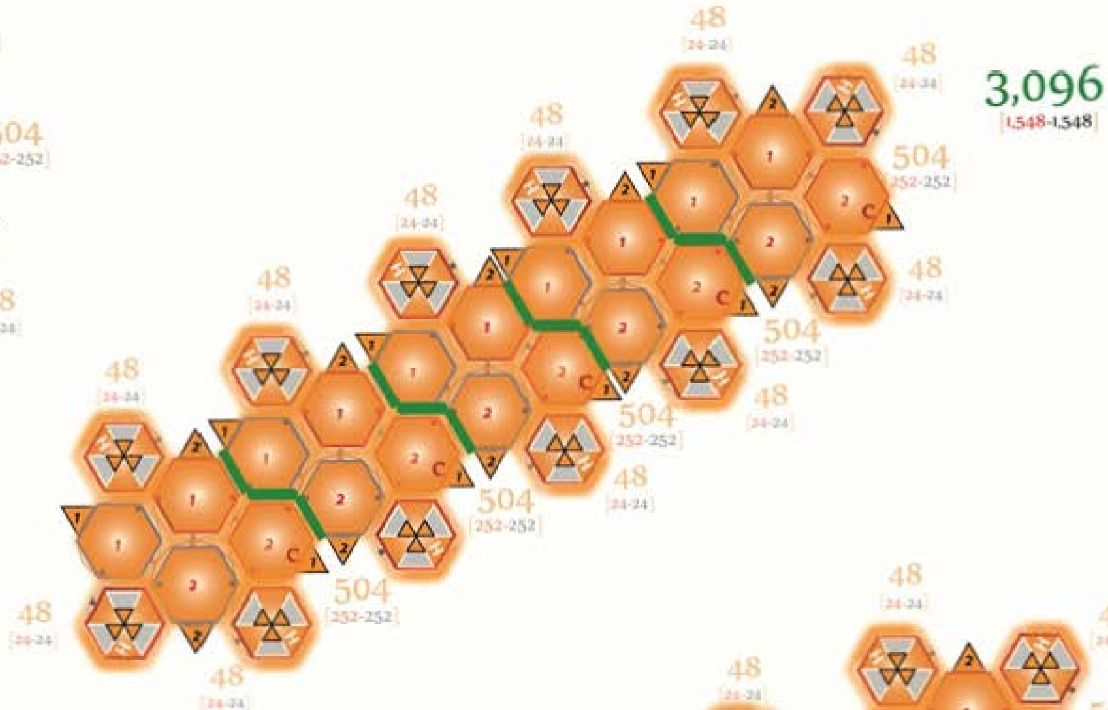


Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved





CH3-(CH2)2-CH3

Butane

C4H10

4

CH3-(CH2)3-CH3

Pentane

C5H12

5

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.

CH3-(CH2)4-CH3

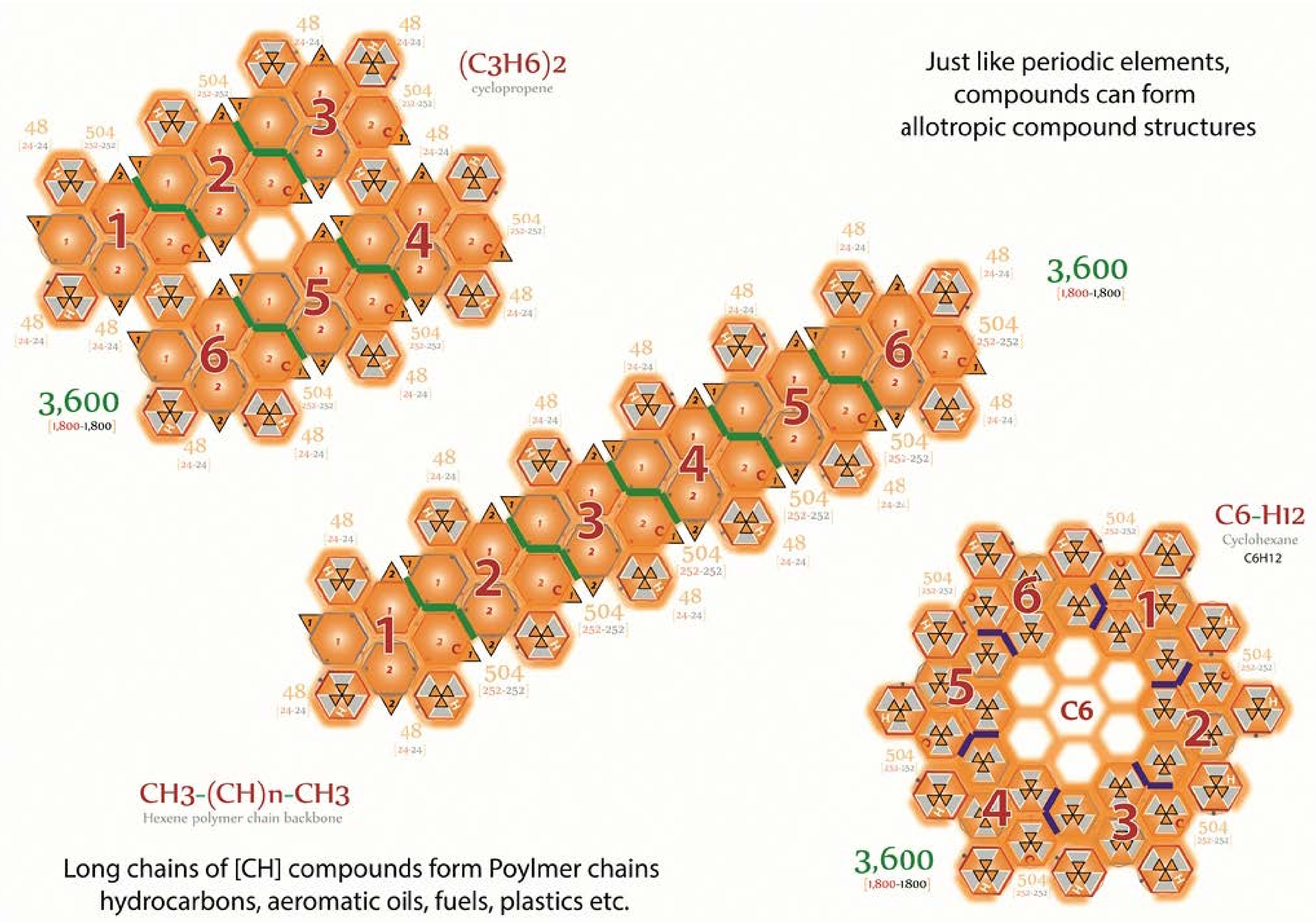
Hexane

C6H14

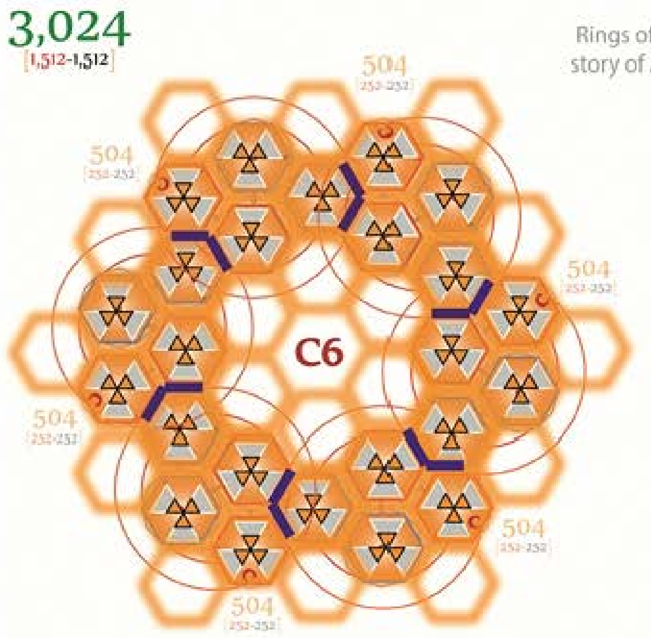
6

Copyright ABRAHAM [2008] - All rights reserved

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

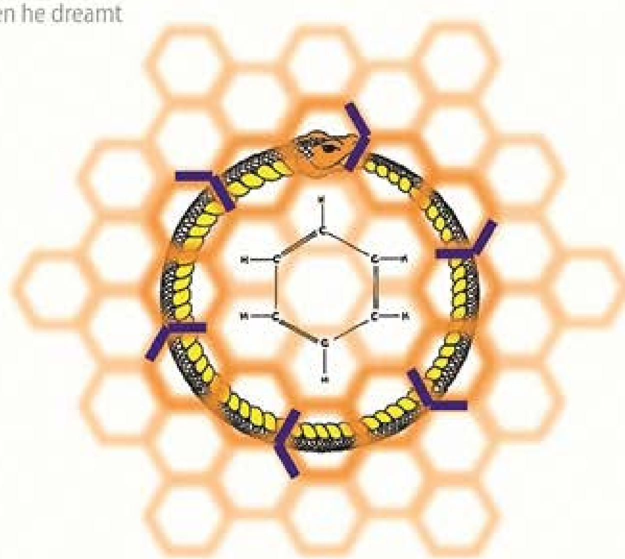


Carbon ring

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 Kekul

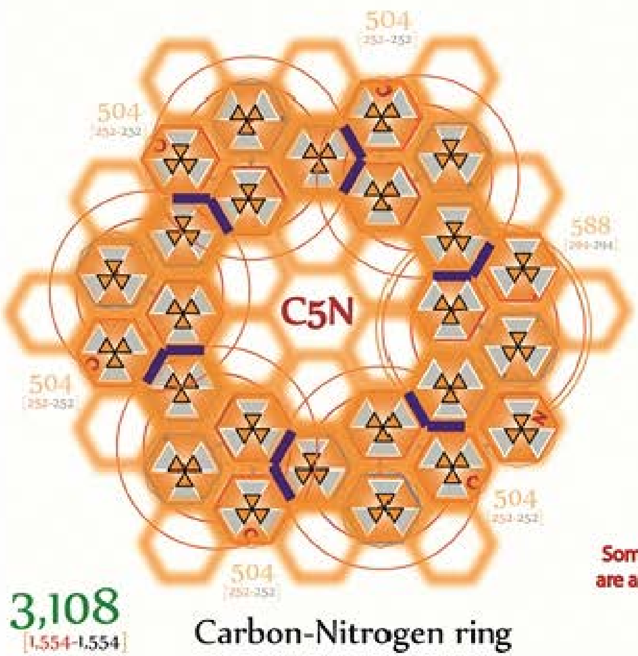
(7 September 1829 - 13 July 1896)



Organic Chemistry

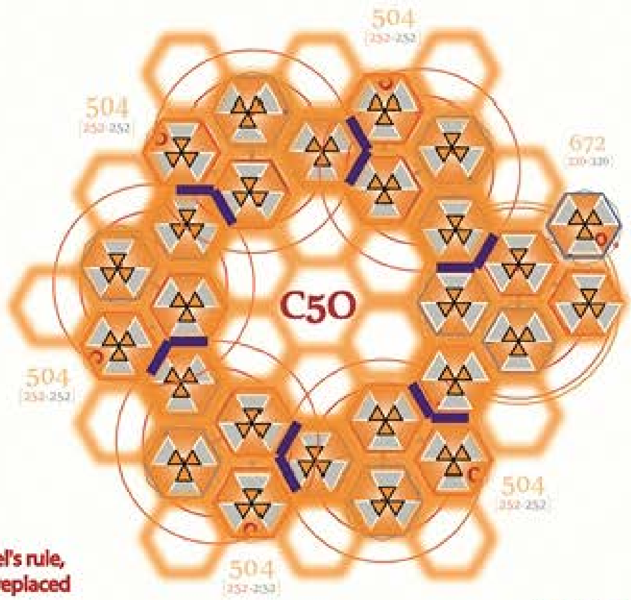
In 1865, August Kekulé presented a paper at the Académie des Sciences in Paris suggesting a cyclic structure for benzene, the inspiration for which he ascribed to a dream. However, was Kekulé the first to suggest that benzene was cyclic. Some credit an Austrian schoolteacher, Josef Loschmidt with the 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



Carbon-Nitrogen ring

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.



Carbon-Oxygen ring

Copyright ABRAHAM [2008] - All rights reserved

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.

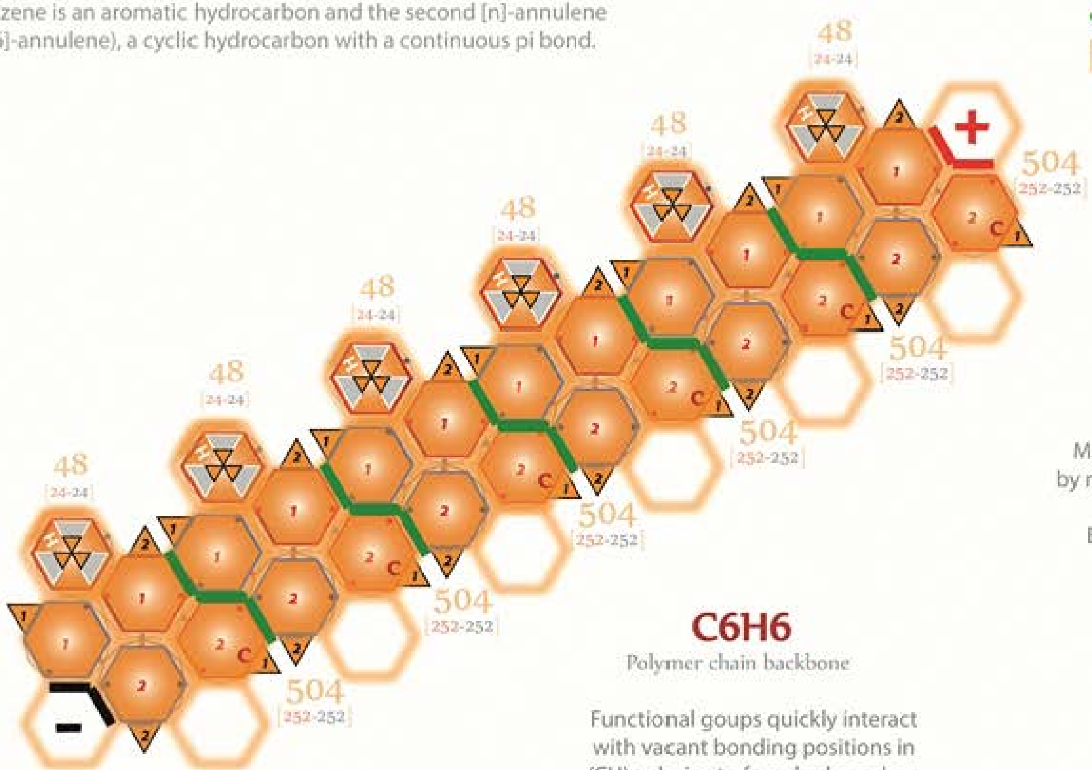
Benzene is an aromatic hydrocarbon and the second [n]-annulene ([6]-annulene), a cyclic hydrocarbon with a continuous pi bond.

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



C6H6
Polymer chain backbone

Functional goups quickly interact with vacant bonding positions in (CH)n chains to form hydrocarbon compounds

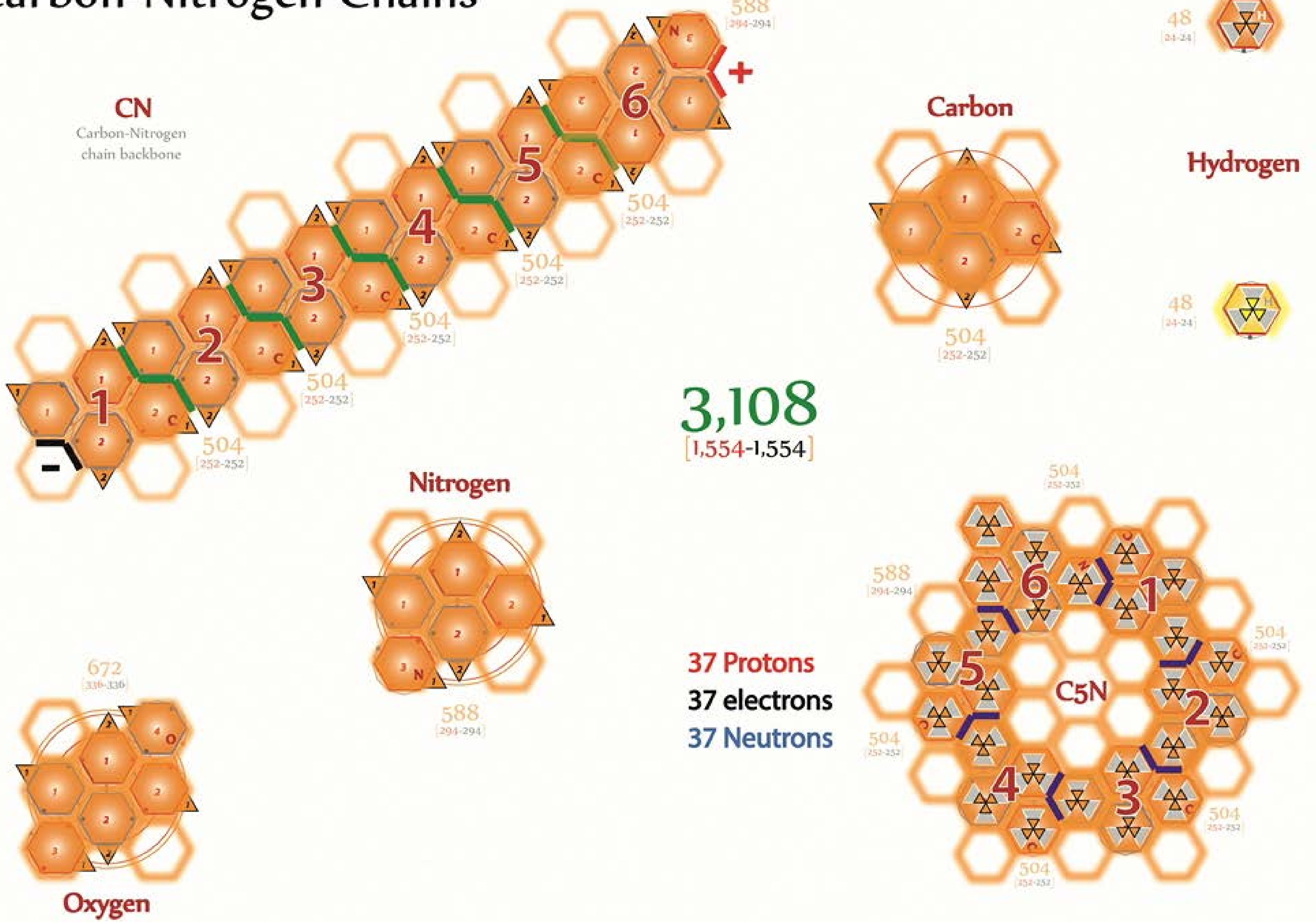
Many important additional chemical compounds are derived from benzene by replacing one or more of its hydrogen atoms with another functional group.

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.

Copyright ABRAHAM [2008] - All rights reserved

Carbon-Nitrogen Chains

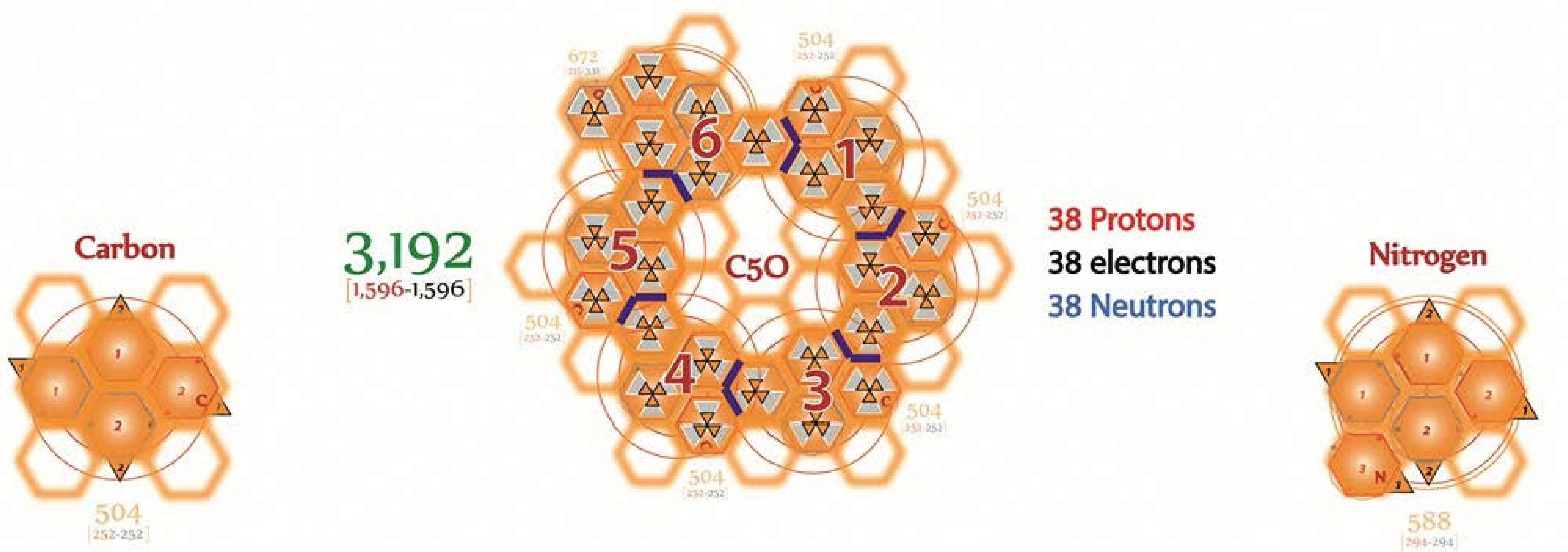


Copyright ABRAHAM [2008] - All rights reserved

Carbon-Oxygen Chains

Heterocyclic Rings

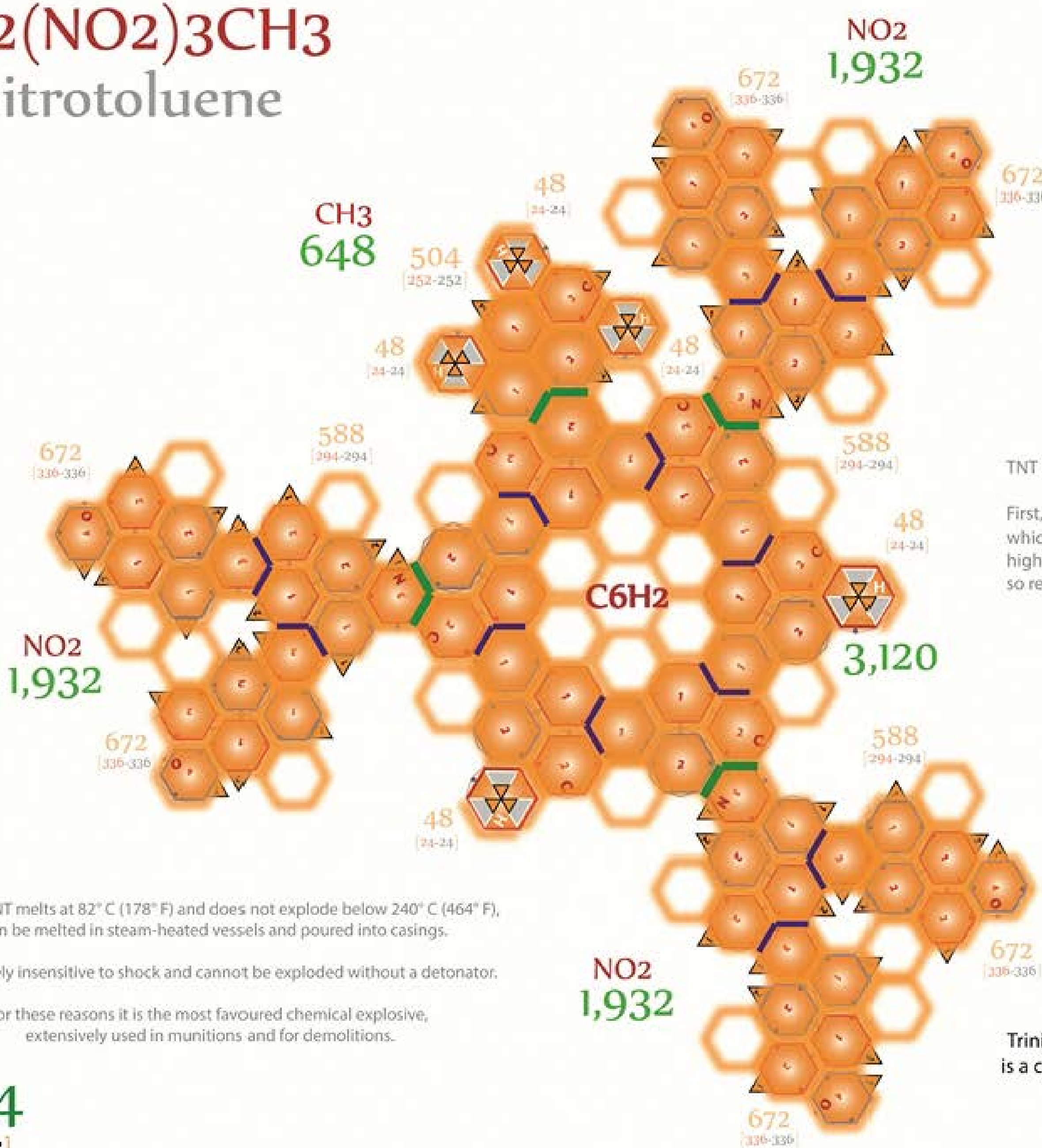
Tetrahydropyran is the organic compound consisting of a saturated six-membered ring containing five carbon atoms and one oxygen atom.



Copyright ABRAHAM [2008] - All rights reserved

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.

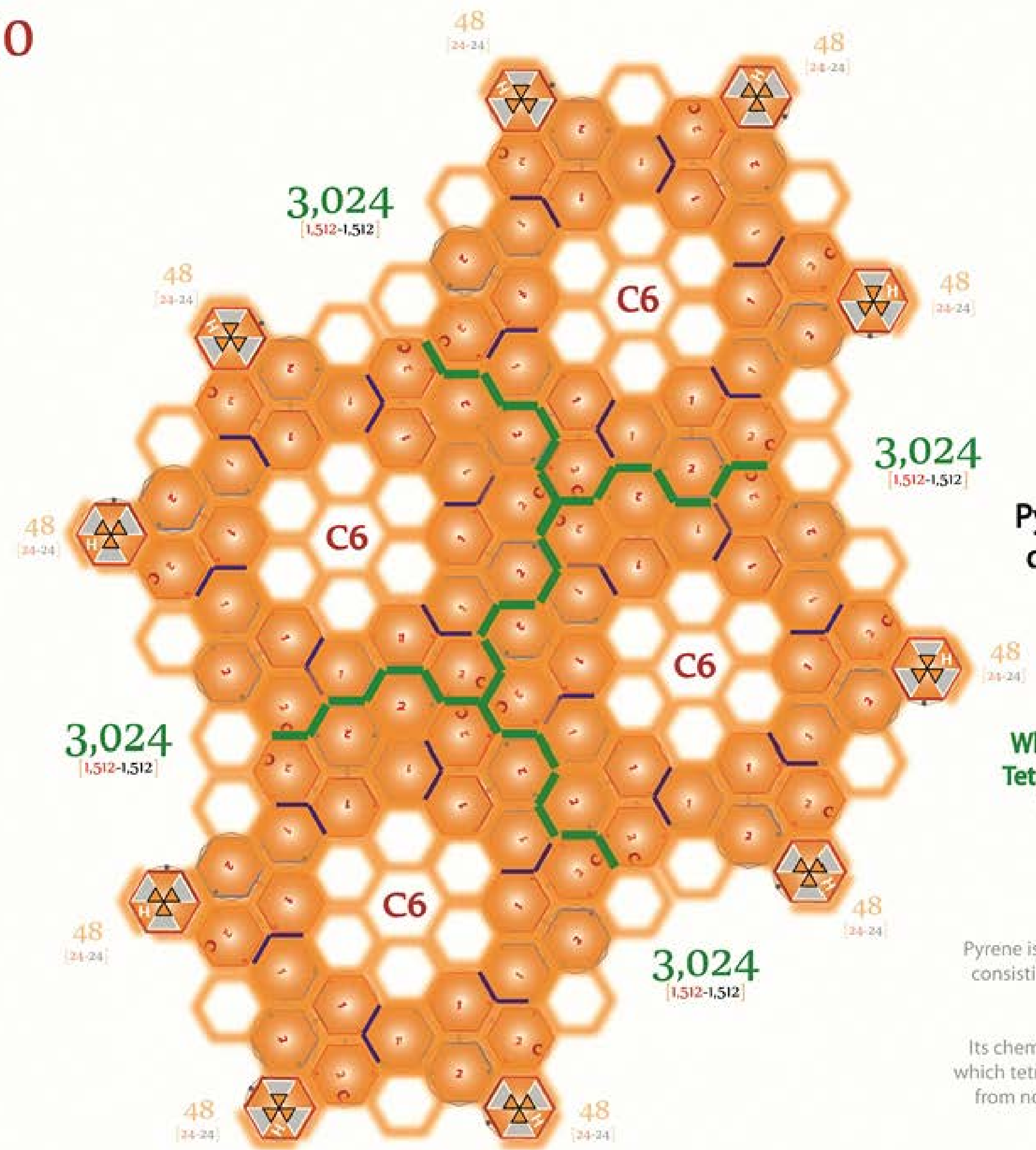
For these reasons it is the most favoured chemical explosive, extensively used in munitions and for demolitions.

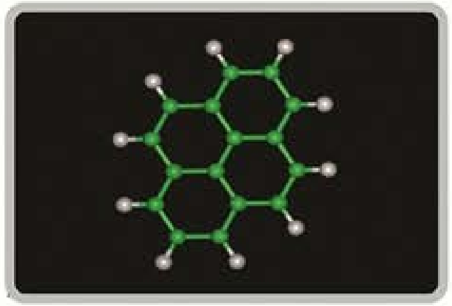
Trinitrotoluene, or more specifically, 2,4,6-trinitrotoluene, is a chemical compound with the formula C6H2(NO2)3CH3

9,564
[4,782-4,782]

Copyright ABRAHAM [2008] - All rights reserved

(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 chemcial 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.

12,576
[6,288-6,288]

Four cyclic carbon rings cannot be formed with only 16 C-atoms

Copyright ABRAHAM [2008] - All rights reserved

Ammonium Nitrate

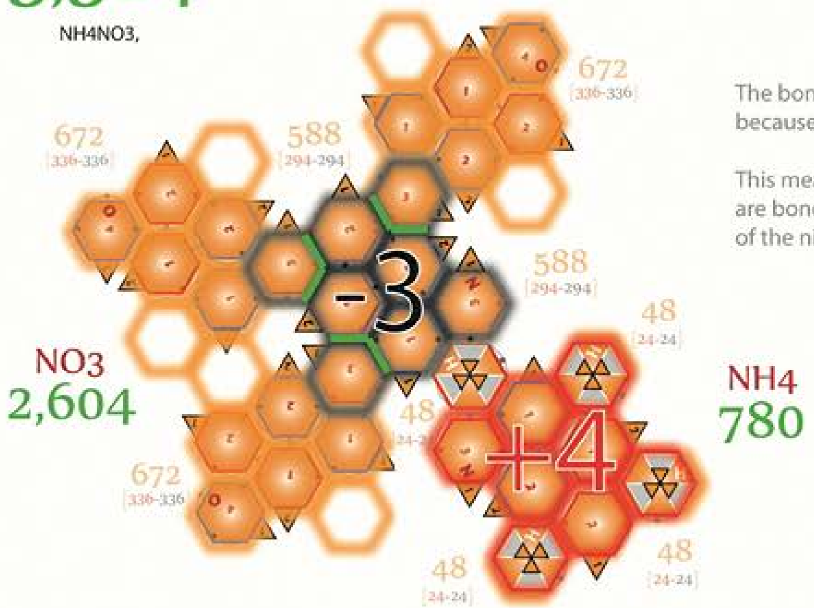
3,384

$NH4NO3,$

Ammonium nitrate is composed of two polyatomic ions:

1) Ammonium Ion (NH4+)
2) Nitrate Ion (NO3-)

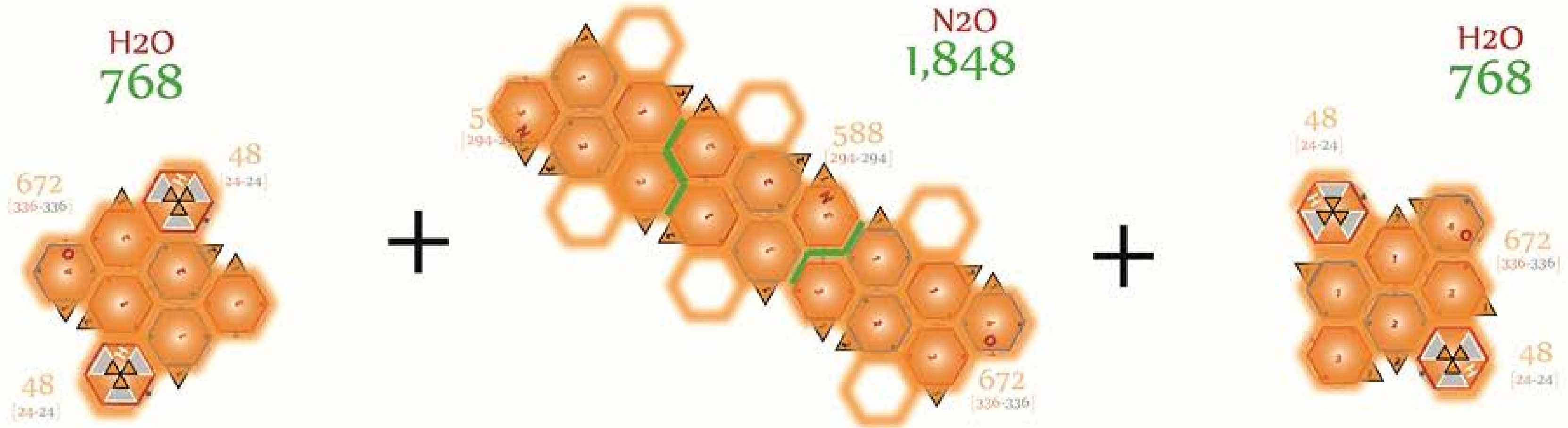
The bond between these ions is an ionic bond meaning the ammonium ion transfers an electron to the nitrate ion.



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

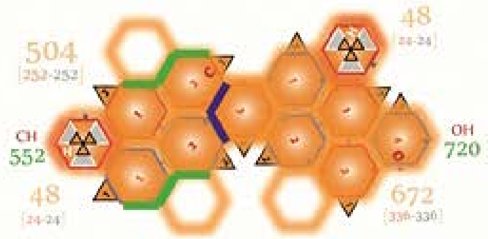
Ammonium nitrate decomposes into the gases nitrous oxide and water vapor when heated (non-explosive reaction); however, ammonium nitrate can be induced to decompose explosively by detonation.



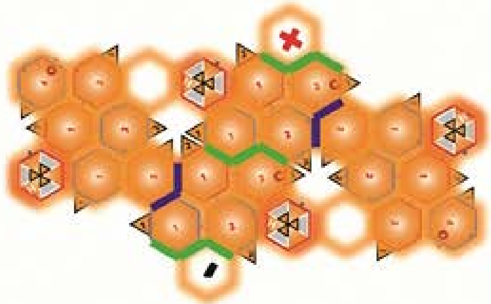
Copyright ABRAHAM [2008] - All rights reserved

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 Cm(H2O)n



Monosaccharides



Disaccharides

Oligosaccharides

Polysaccharides

Ribose

Gluclose

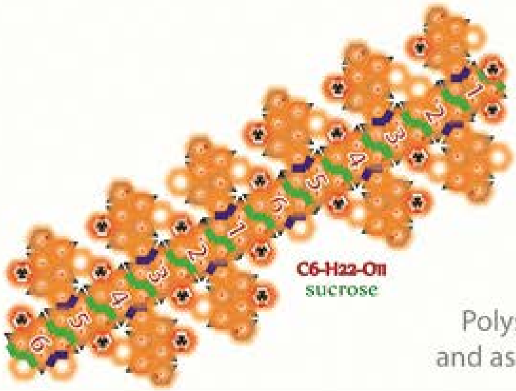
Lactose

$$C_m(H_2O)_n$$

Fructose

Sucrose

Deoxyribose



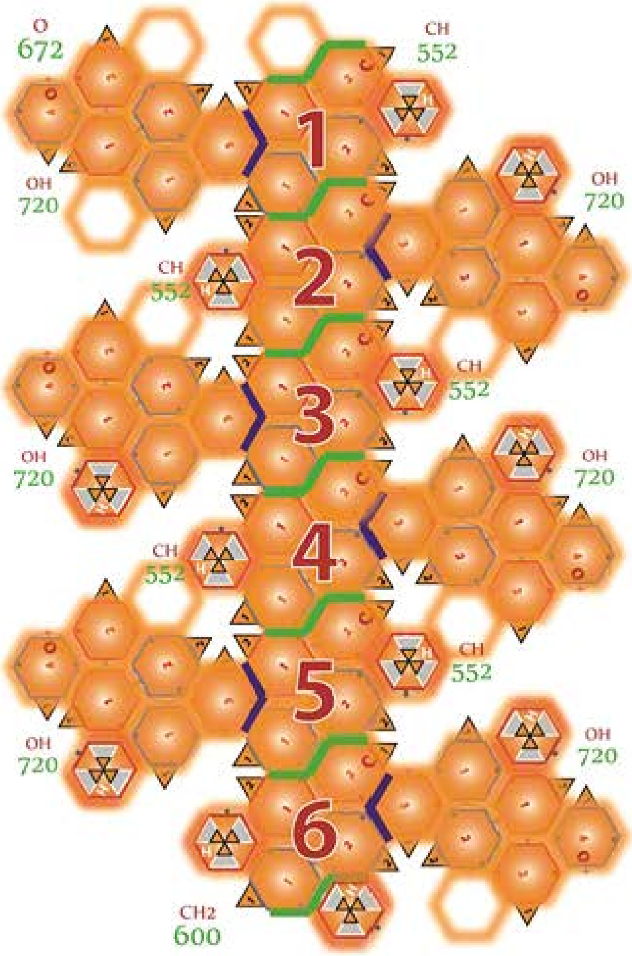
Carbohydrates perform numerous roles in living organisms. Polysaccharides serve for the storage of energy (e.g., starch and glycogen), and as structural components (e.g., cellulose in plants and chitin in arthropods)

Copyright ABRAHAM [2008] - All rights reserved

Monosaccharides

Monosaccharides are the simplest carbohydrates in that they cannot be hydrolyzed to smaller carbohydrates

The Carbon nuclei in Monosaccharides join together to form chains of biologically important carbohydrates



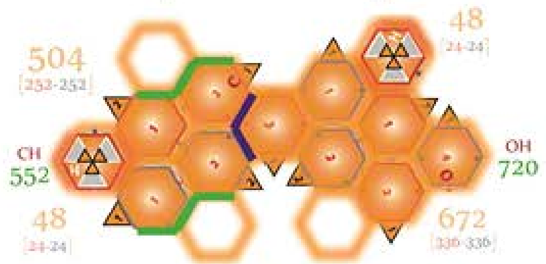
C(H2O)6

D-glucose

C6-H12-O6

1,272

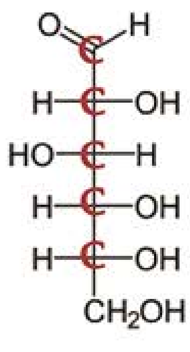
[636-636]



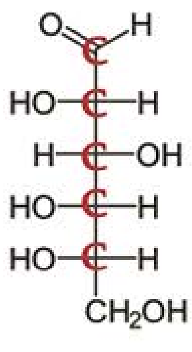
C(H2O)

The general chemical formula of an unmodified monosaccharide is (C•H2O) n, literally a "carbon hydrate."

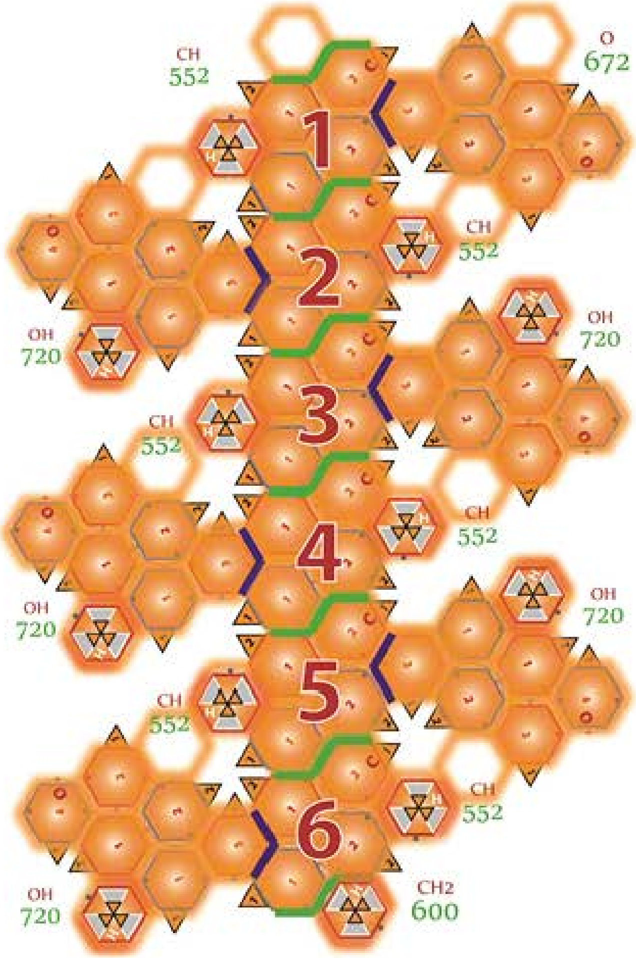
CH 552 — CH-OH — OH 720



D-Glucose



L-Glucose

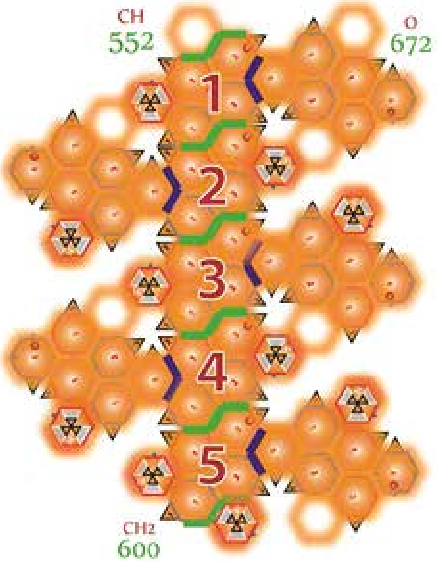


C(H2O)6

L-glucose

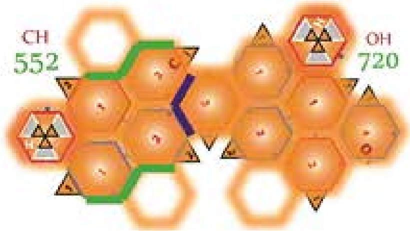
C6-H12-O6

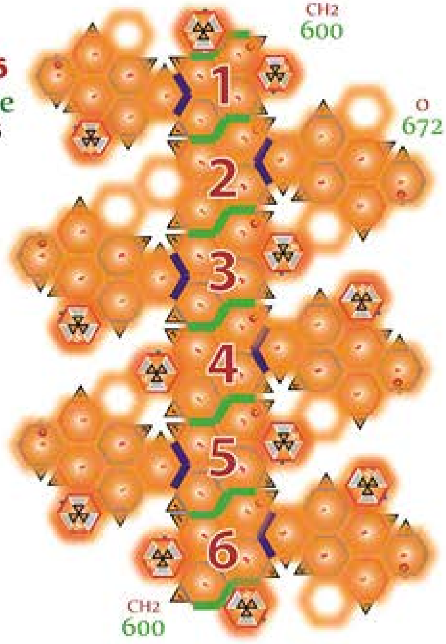
Copyright ABRAHAM [2008] - All rights reserved



$C(H_2O)_5$
ribose
C5-H10-O5

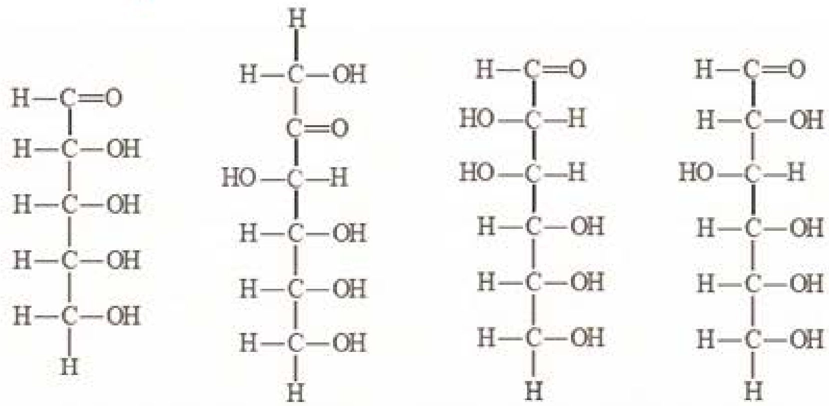
C(H2O)n





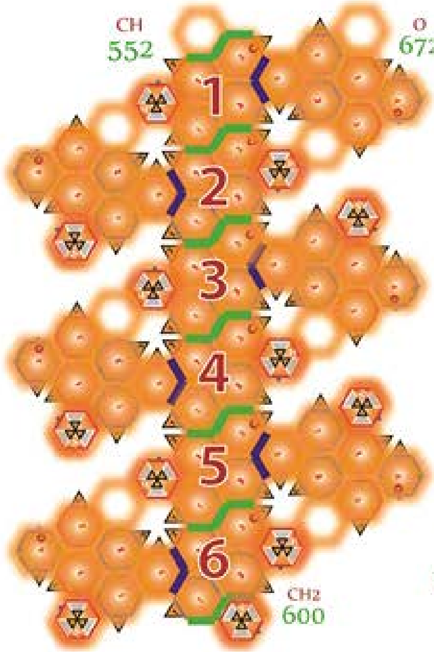
$C(H_2O)_6$
fructose
C6-H12-O6

Major Monosaccharides

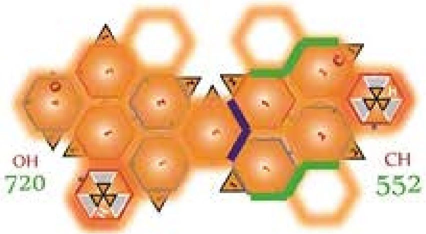


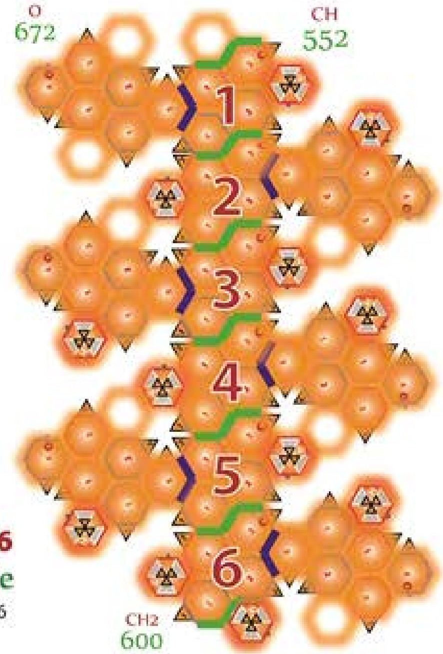
ribose fructose mannose glucose

D D & L sugars are chiral, mirror images of one another and have the same name. **L**



$C(H_2O)_6$
mannose
C6-H12-O6





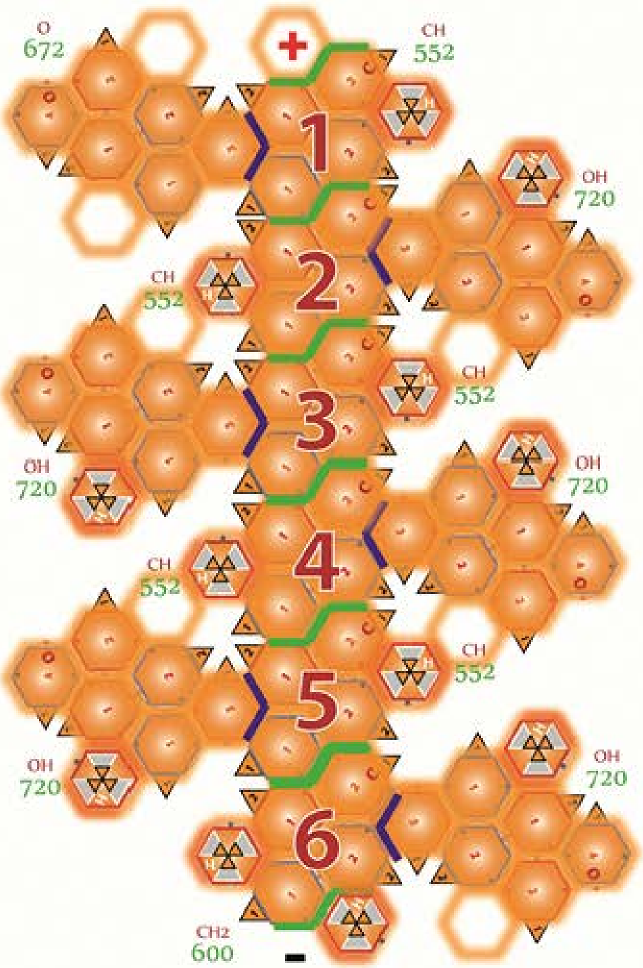
$C(H_2O)_6$
glucose
C6-H12-O6

Copyright ABRAHAM [2008] - All rights reserved

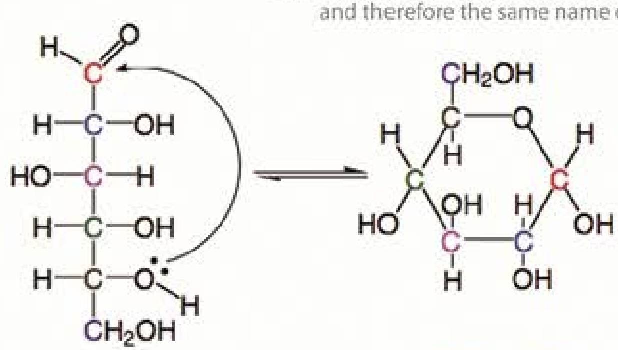
A monosaccharide often switches from the acyclic (open-chain) form to a cyclic form, through a nucleophilic addition reaction between the carbonyl group and one of the hydroxyls of the same molecule.

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
glucose
C6-H12-O6

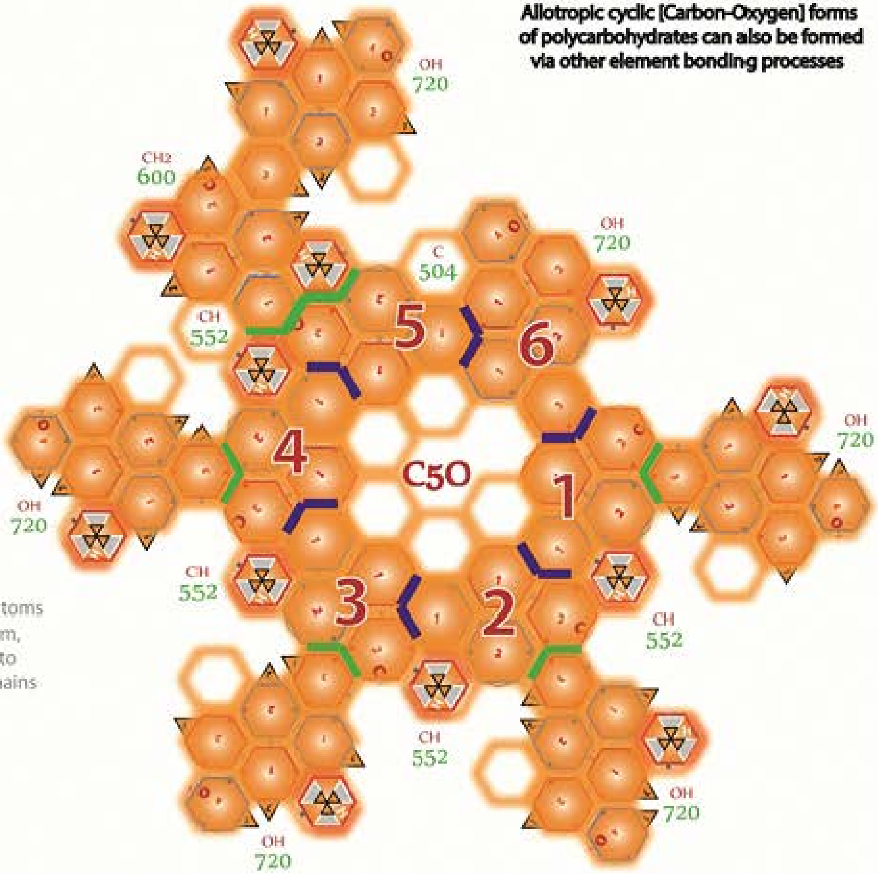


C(H2O)6
glucopyranose
C6-H12-O6

cyclic Oxygen-Carbon ring

Allotropic cyclic [Carbon-Oxygen] forms of polycarbohydrates can also be formed via other element bonding processes

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

linear saccharide chain

The Carbon nuclei in Monosaccharides chains can join together to form cyclic [Carbon-Oxygen] rings or polycarbohydrates through condensation

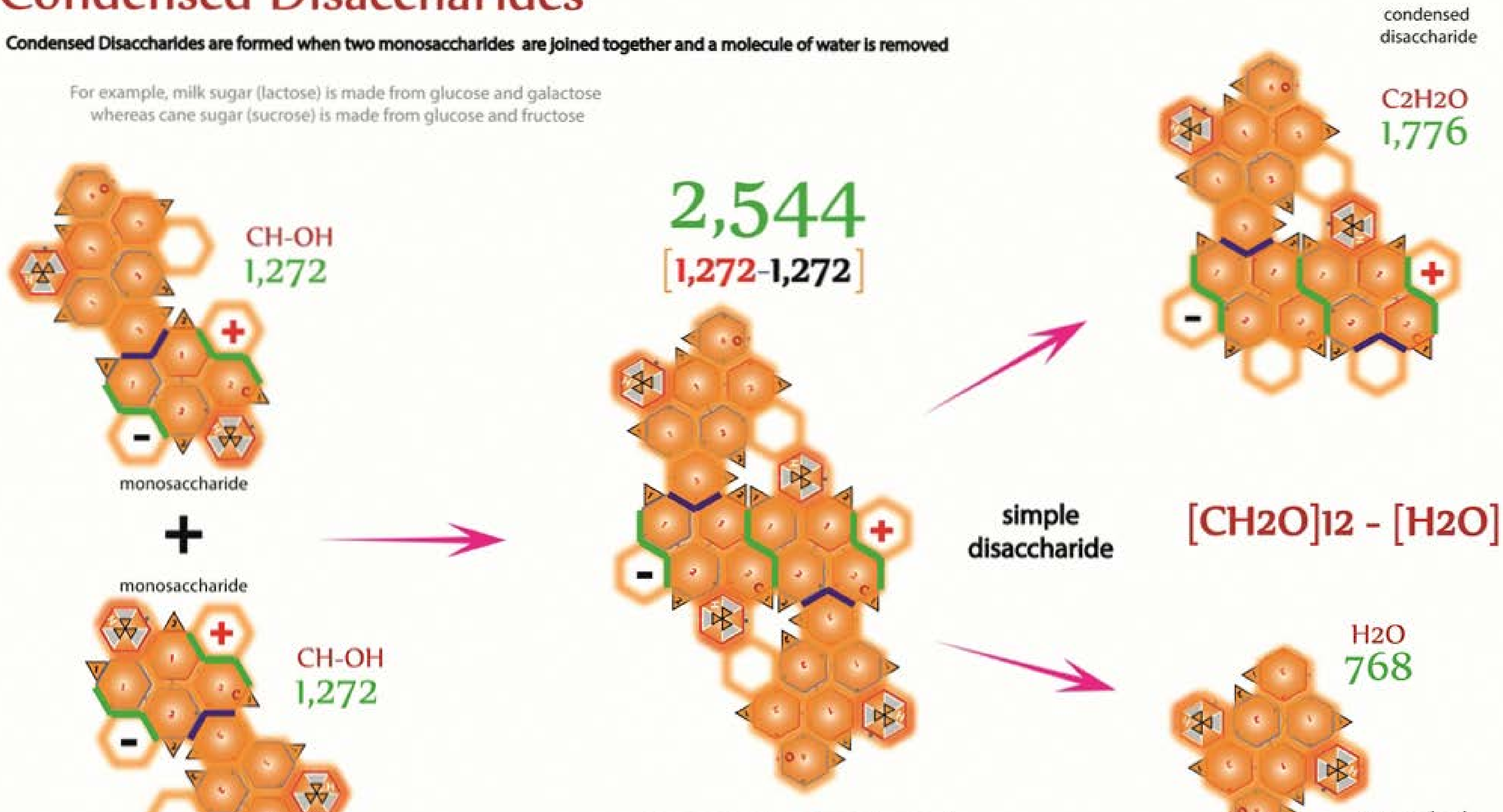
acyclic monosaccharides

Copyright ABRAHAM [2008] - All rights reserved

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



Disaccharides & condensed disacchardes
can bond together and form cyclic
polysaccharides

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.

Copyright ABRAHAM [2008] - All rights reserved

14,496

[7,248-7,248]

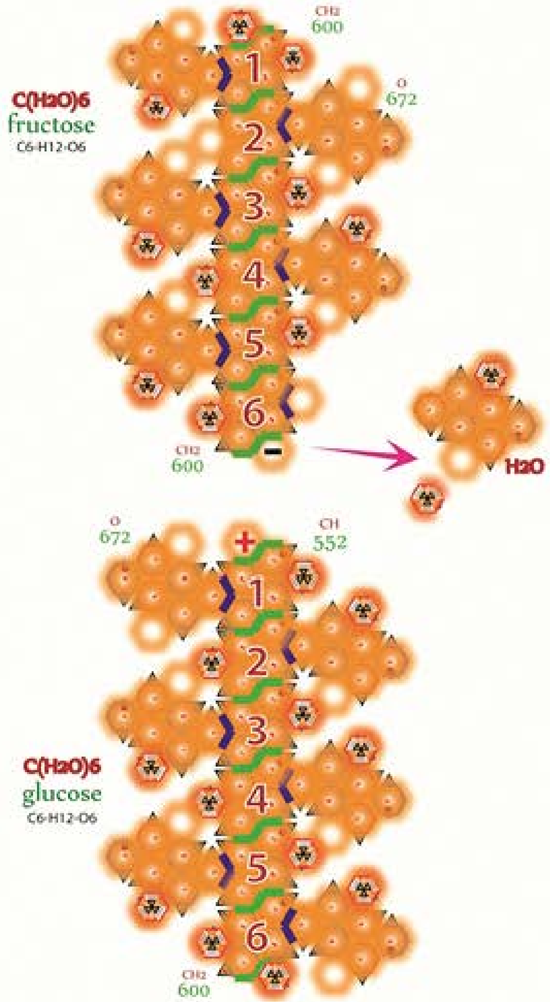
Disaccharides

Disaccharides are one of the four basic categories of carbohydrates,
(the others are monosaccharides, oligosaccharides, and polysaccharides)

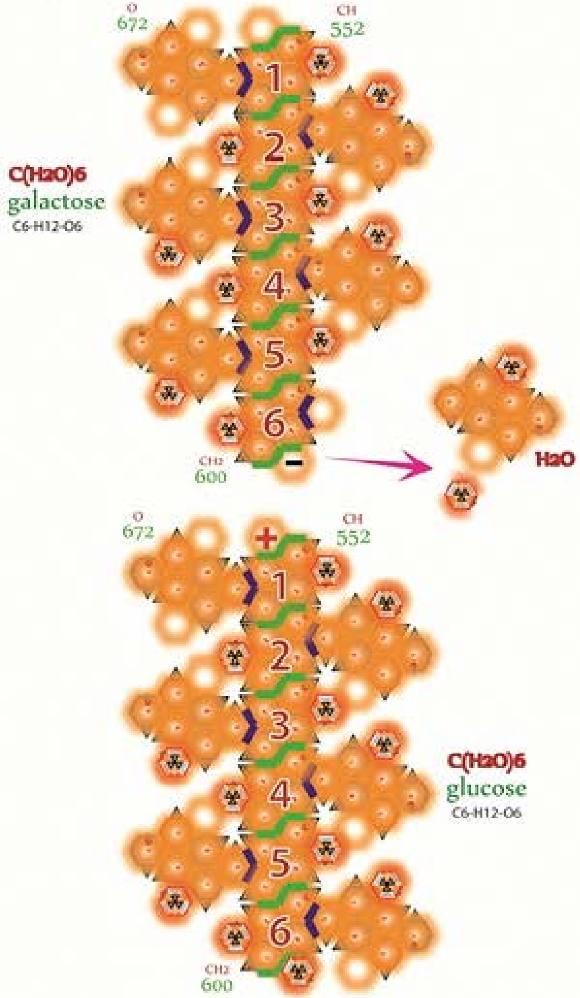
Monosaccharides, such as glucose, are the monomers out of which disaccharides are constructed.

C12-(H2O)11

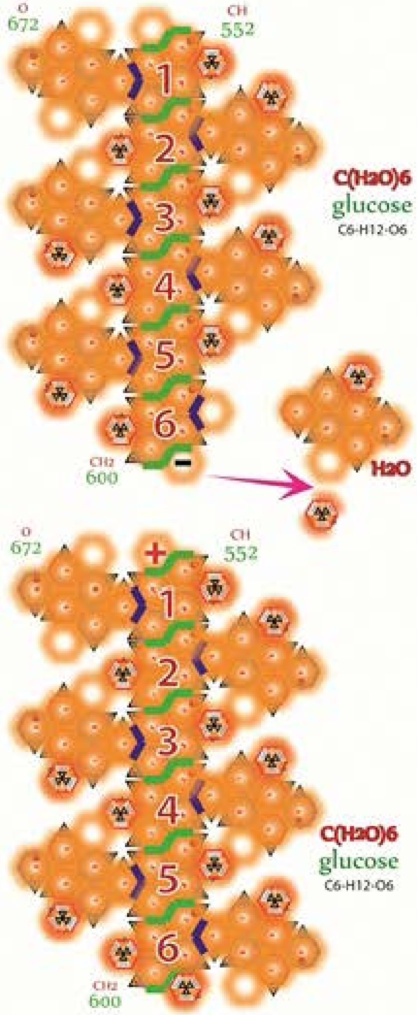
Disaccharides & condensed disaccharides can bond together and form cyclic polysaccharides



sucrose
C12-H22-O11



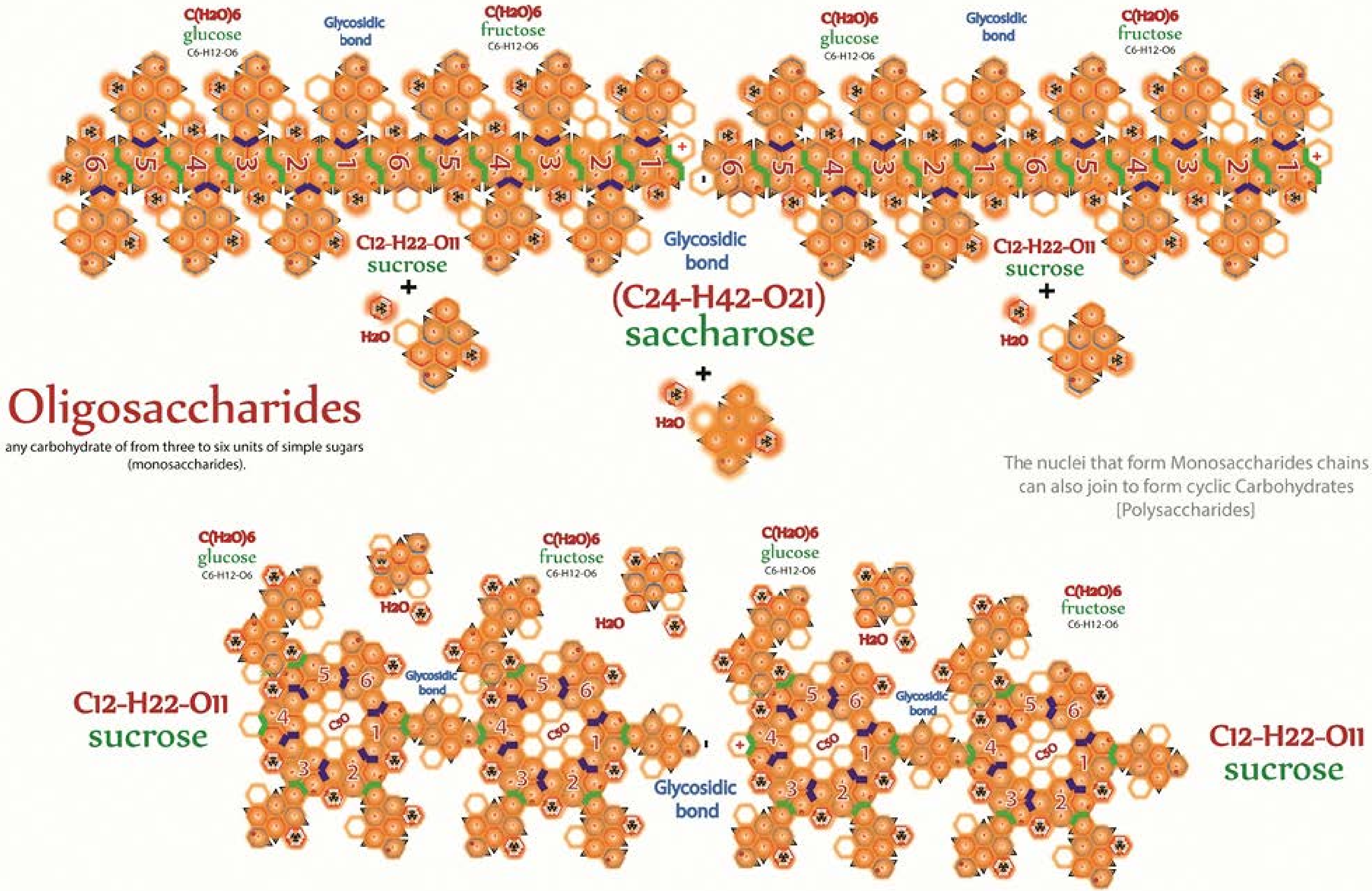
lactose
C12-H22-O11



maltose
C12-H22-O11

The general chemical formula for carbohydrates, C(H2O),
gives the relative proportions of carbon, hydrogen, and oxygen in a monosaccharide
(the proportion of these atoms are 1:2:1)-(H2O)

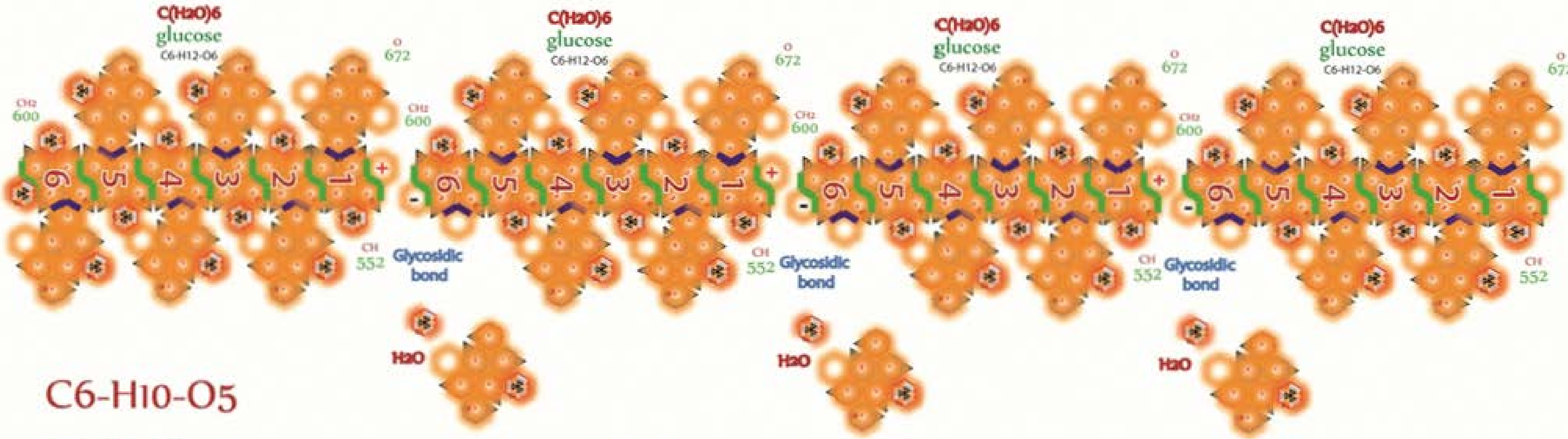
Copyright ABRAHAM [2008] - All rights reserved



An oligosaccharide is a saccharide polymer containing a small number (typically two to ten) component sugars (monosaccharides).
Oligosaccharides can have many functions; for example, they are commonly found on the plasma membrane
of animal cells where they can play a role in cell–cell recognition.

Copyright ABRAHAM [2008] - All rights reserved

Starch or amylum 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.



C6-H10-O5

6,864 n

[3,432-3,432]

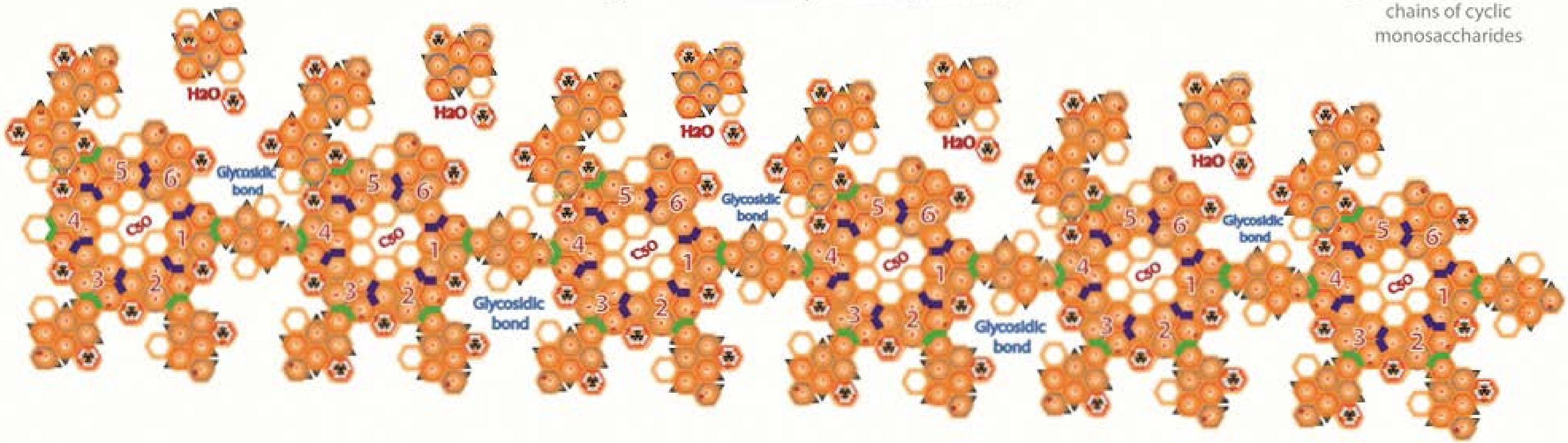
Polysaccharides

Polysaccharides have a general formula of Cx(H2O)y where x is usually a large number between 200 and 2500.

$C_x[H2O]_y$

The repeating units in a Polysaccharide polymer backbone are often six-carbon monosaccharides, their general formula can be represented as (C6-H10-O5)n

Polysaccharides are generally comprised of chains of cyclic monosaccharides



Cellulose is an organic compound with the formula (C6H10O5)n, a polysaccharide consisting of a linear chain of several hundred to over ten thousand linked D-glucose sugars.

Copyright ABRAHAM [2008] - All rights reserved

Amines

Amines are organic compounds that contain Nitrogen

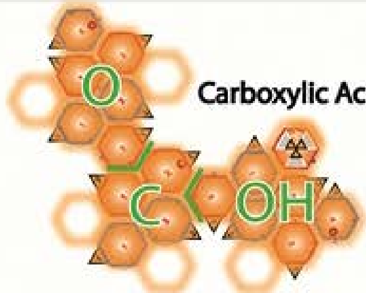
NH2-[HC-R]-COOH + NH2-[HC-R]-COOH

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.

OH + NH2 -----> NH + H2O

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

un-ionized amino acid

NH2-[HC-R]-COOH

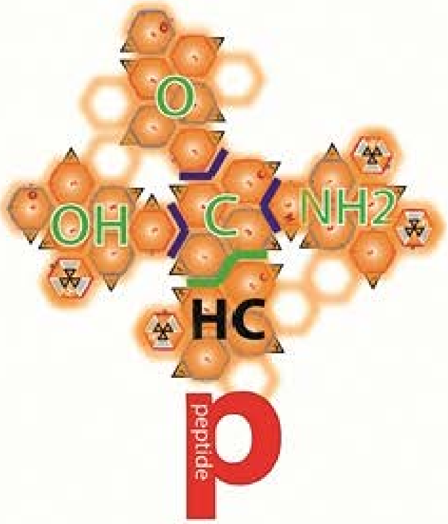
Amino acids are biologically important organic compounds made from amine and carboxylic acid functional groups, along with a side-chain specific to each amino acid

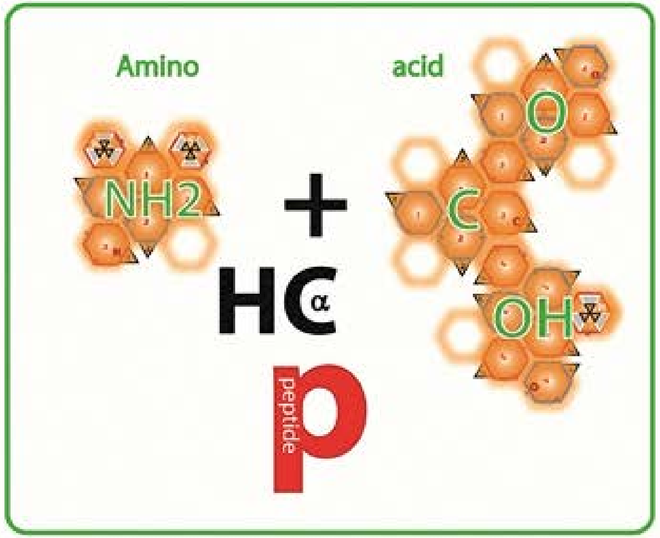
zwitterionic amino acid

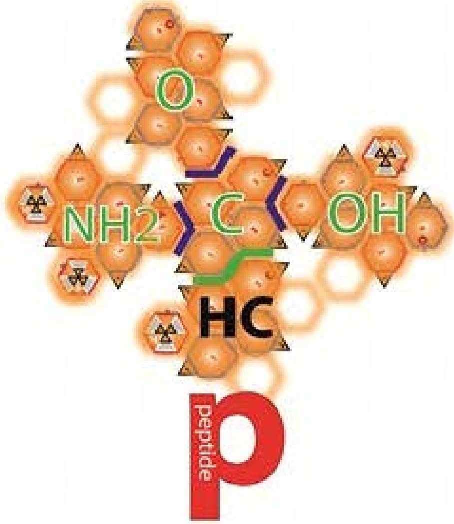
NH3-[HC-R]-COO

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

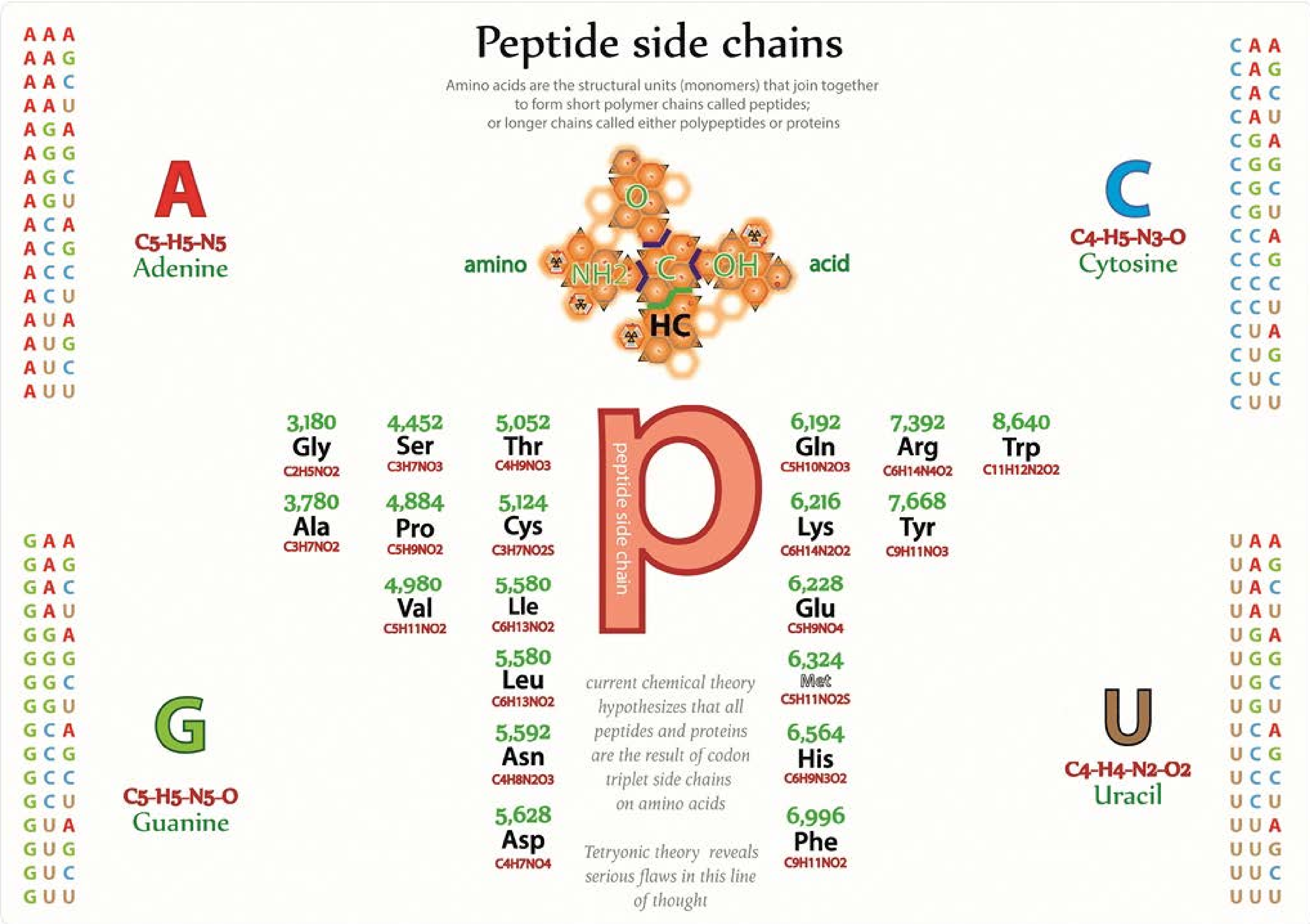


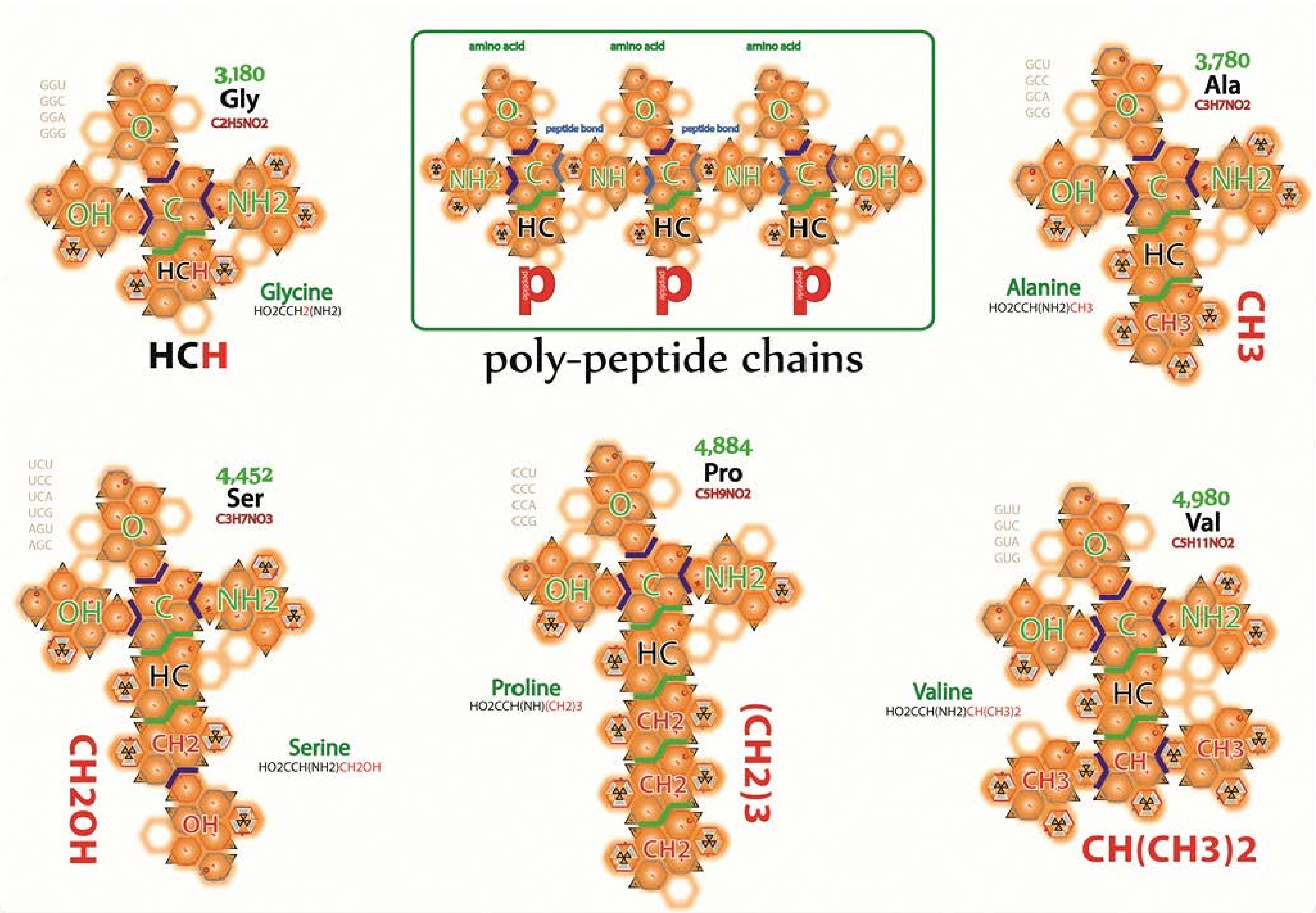




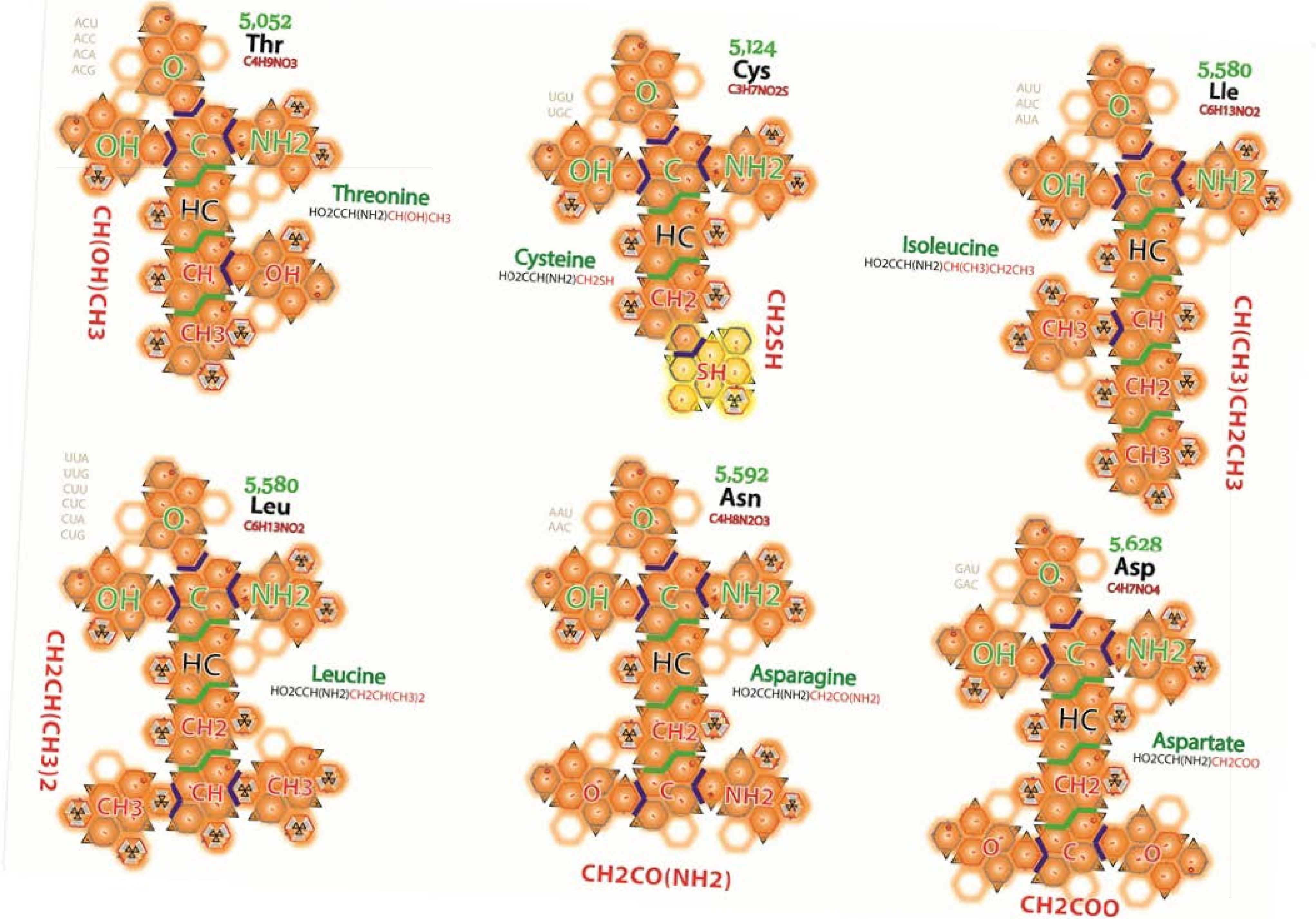
The peptide group attached to the alpha carbon distinguishes one amino acid from another
(Tetryonic theory defines these compound side-chains of atoms as peptides [p])

Copyright ABRAHAM [2008] - All rights reserved

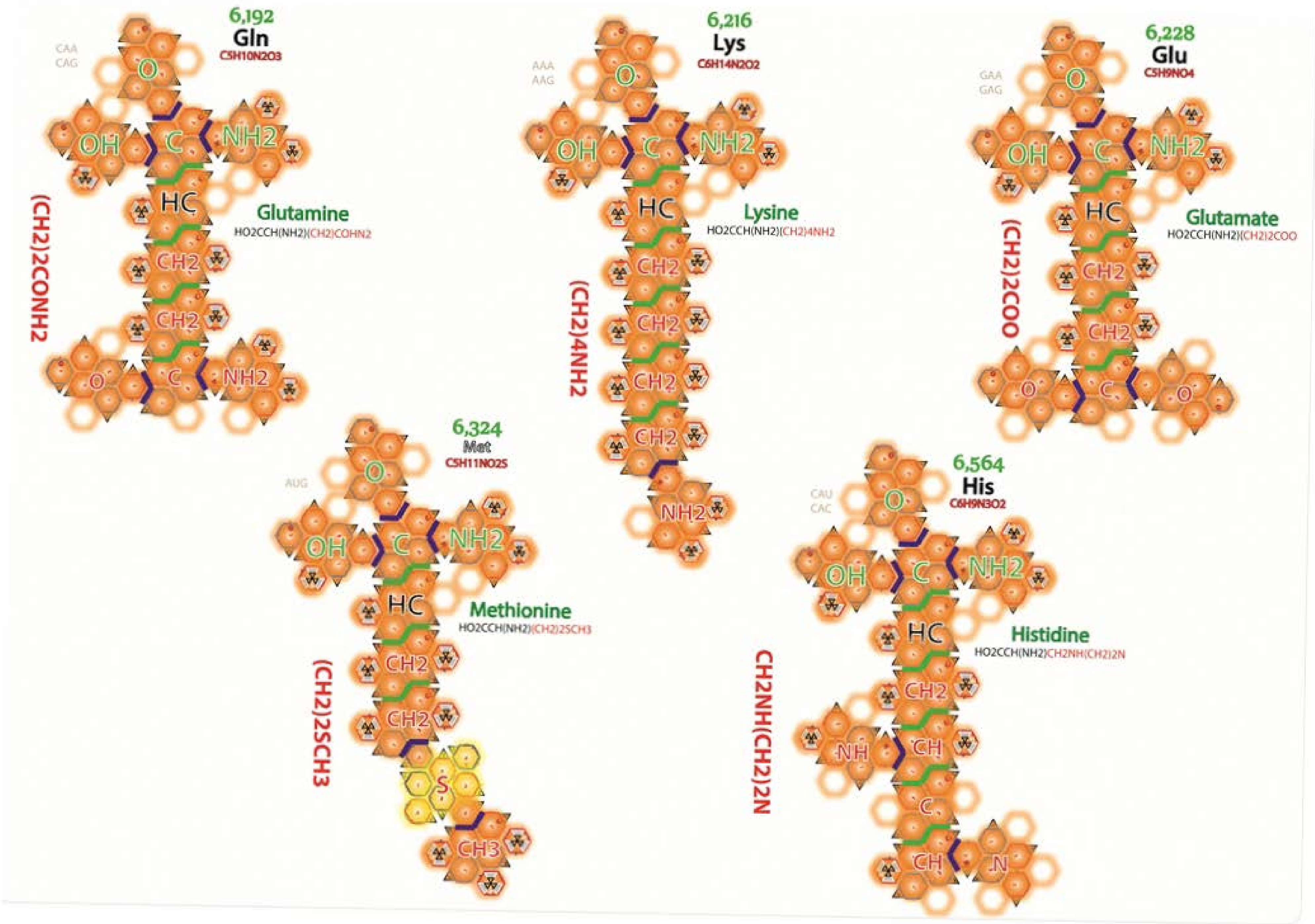



amino acid
amino acid
amino acid
peptide bond
peptide bond
poly-peptide chains
GGU
GGC
GGA
GGG
3,180
Gly
C2H5NO2
Glycine
HO2CCH2(NH2)
HCH
GCU
GCC
GCA
GCG
3,780
Ala
C3H7NO2
Alanine
HO2CCH(NH2)CH3
CH3
UCU
UCC
UCA
UCG
AGU
AGC
4,452
Ser
C3H7NO3
Serine
HO2CCH(NH2)CH2OH
CH2OH
CCU
CCC
CCA
CCG
4,884
Pro
C5H9NO2
Proline
HO2CCH(NH)(CH2)3
(CH2)3
GUU
GUC
GUA
GUG
4,980
Val
C5H11NO2
Valine
HO2CCH(NH2)CH(CH3)2
CH(CH3)2

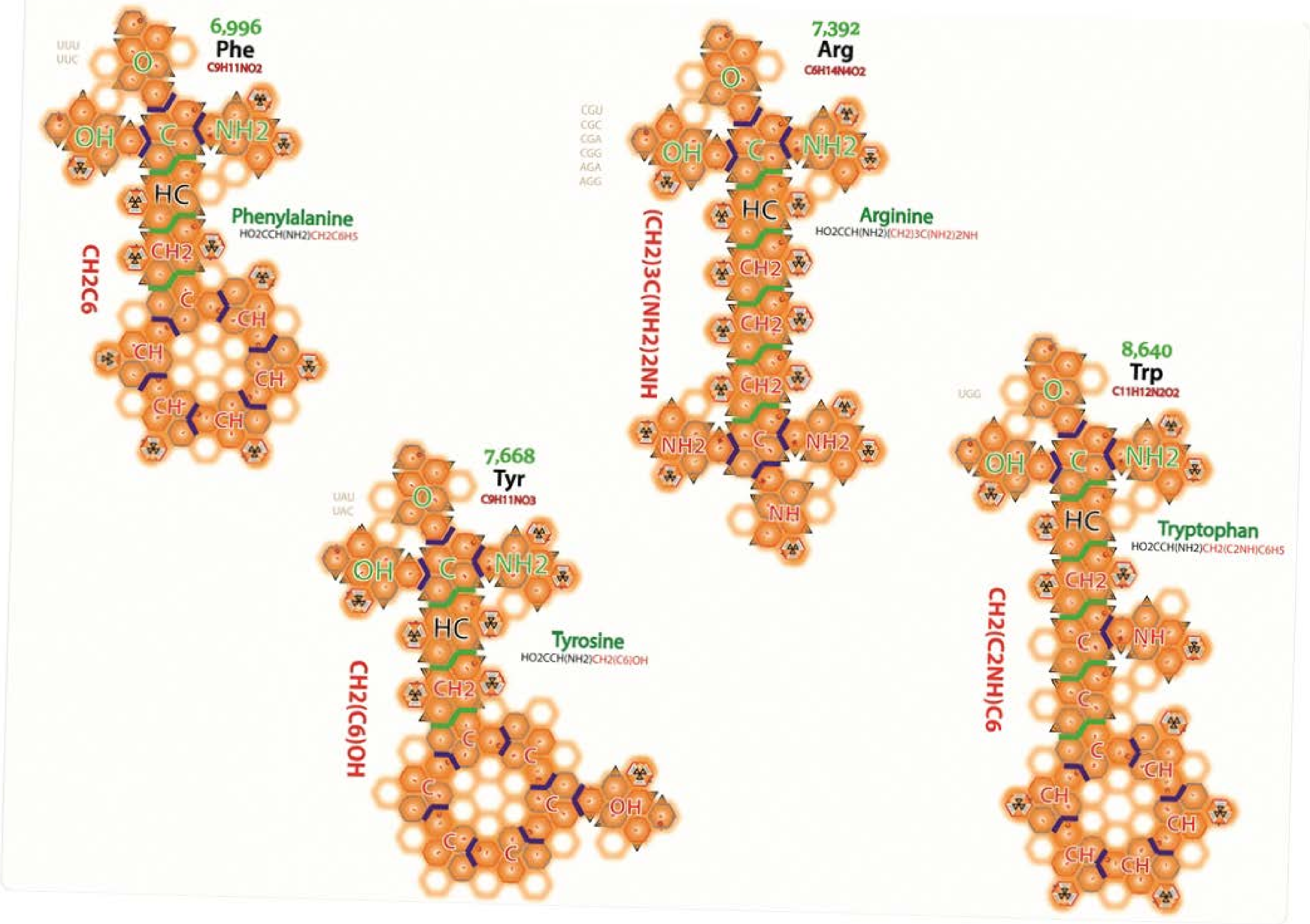
Copyright ABRAHAM [2008] - All rights reserved

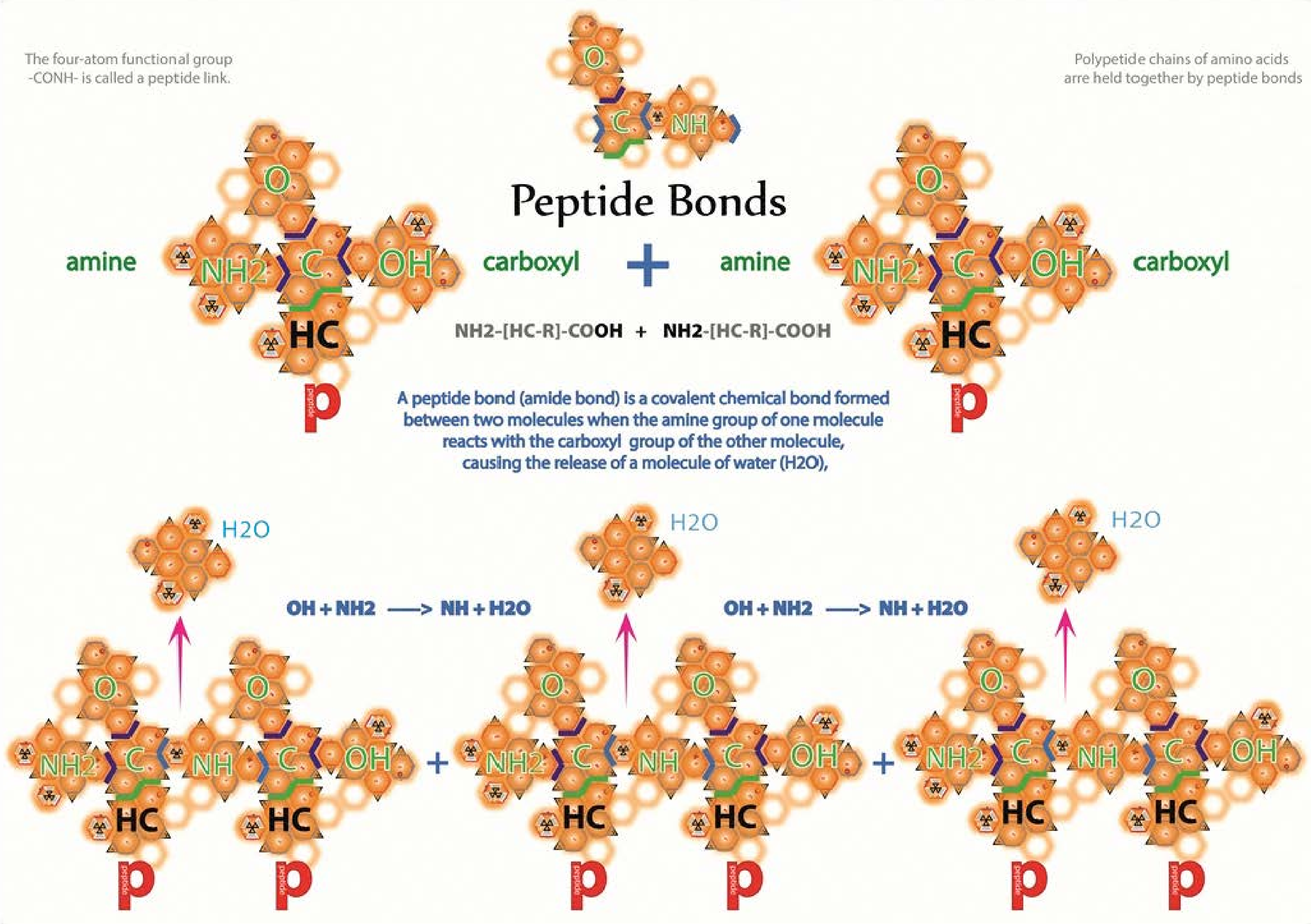


Copyright ABRAHAM [2008] - All rights reserved



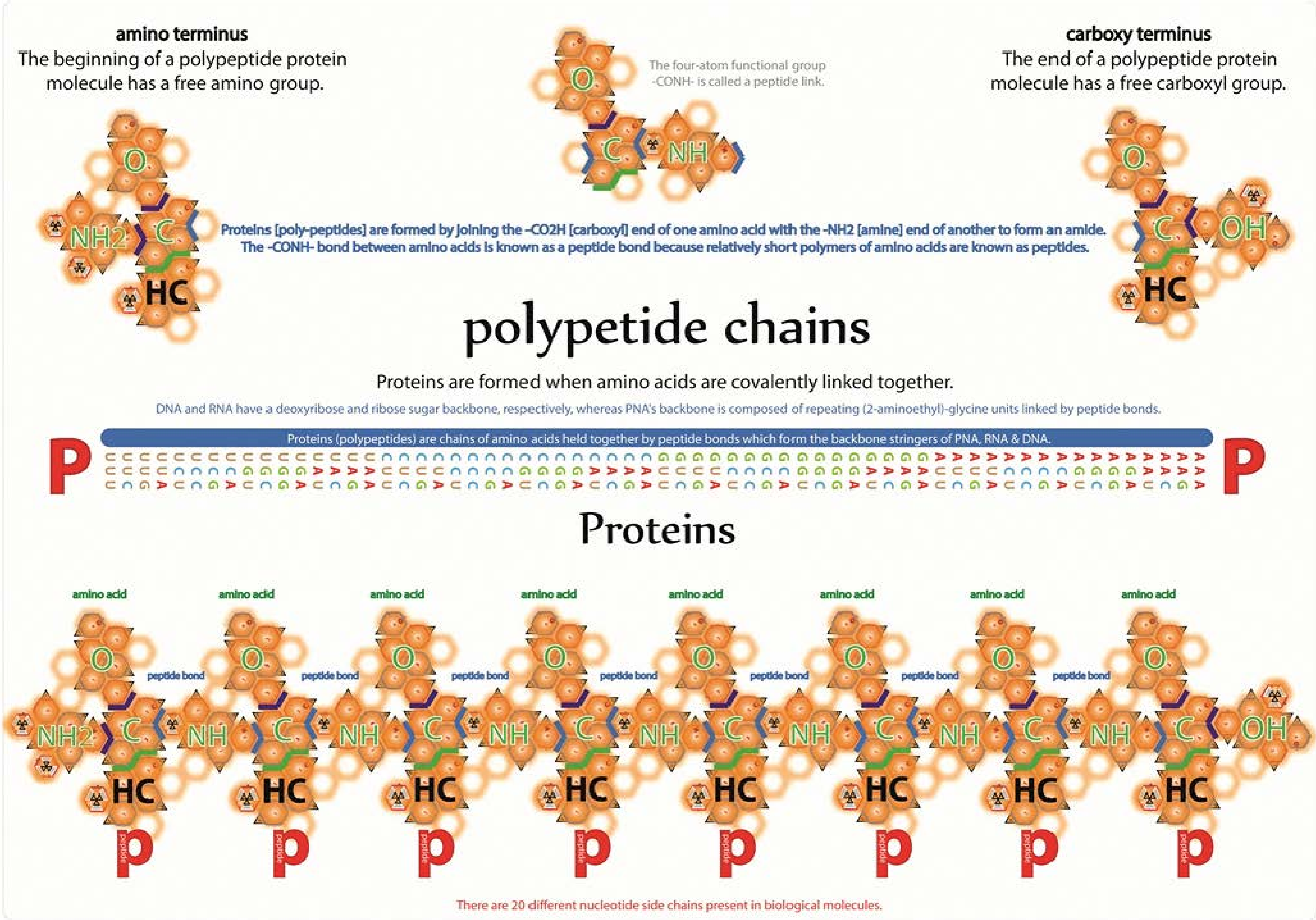
Copyright ABRAHAM [2008] - All rights reserved



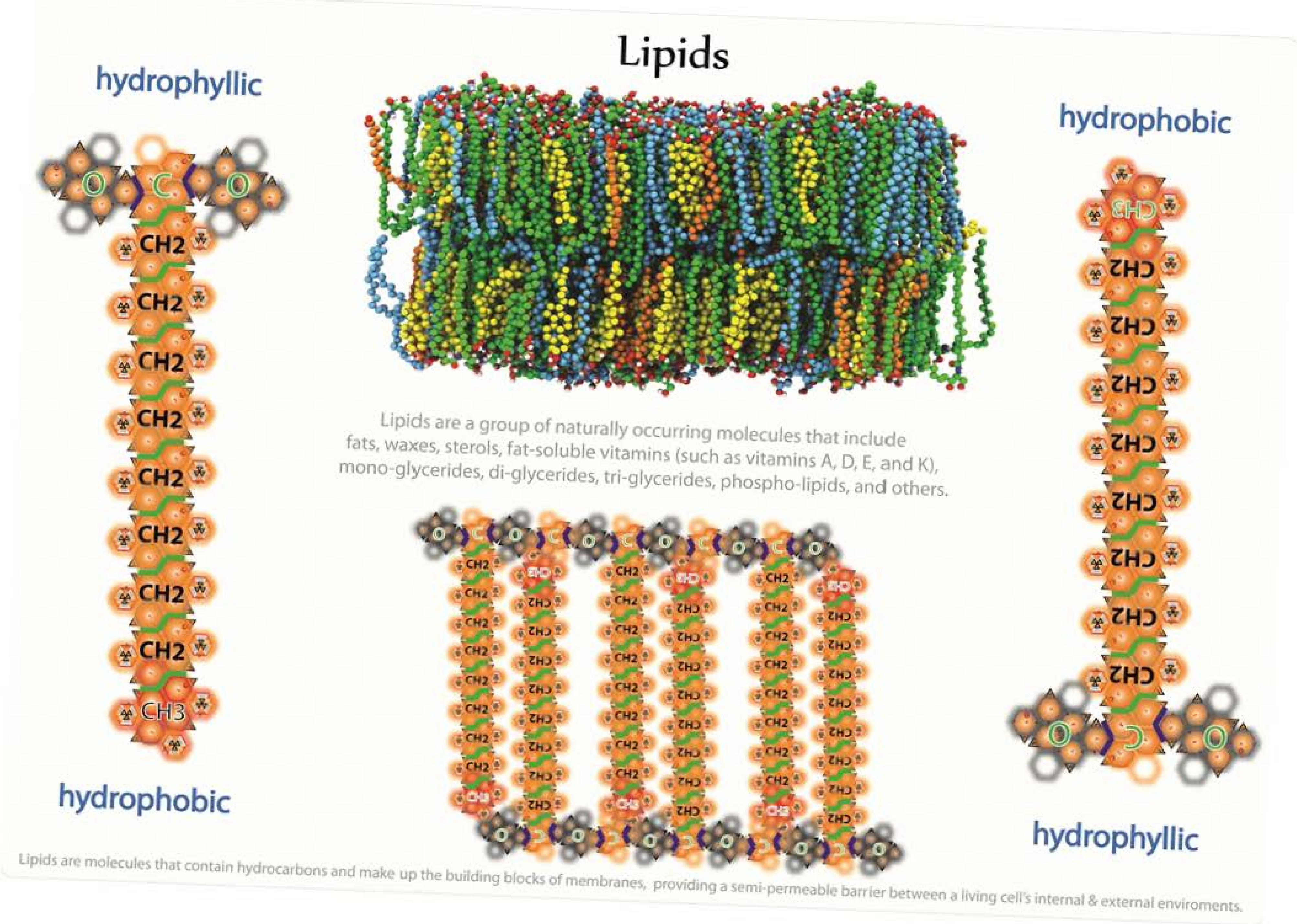


Tetryonics 59.15 - Peptide bonds

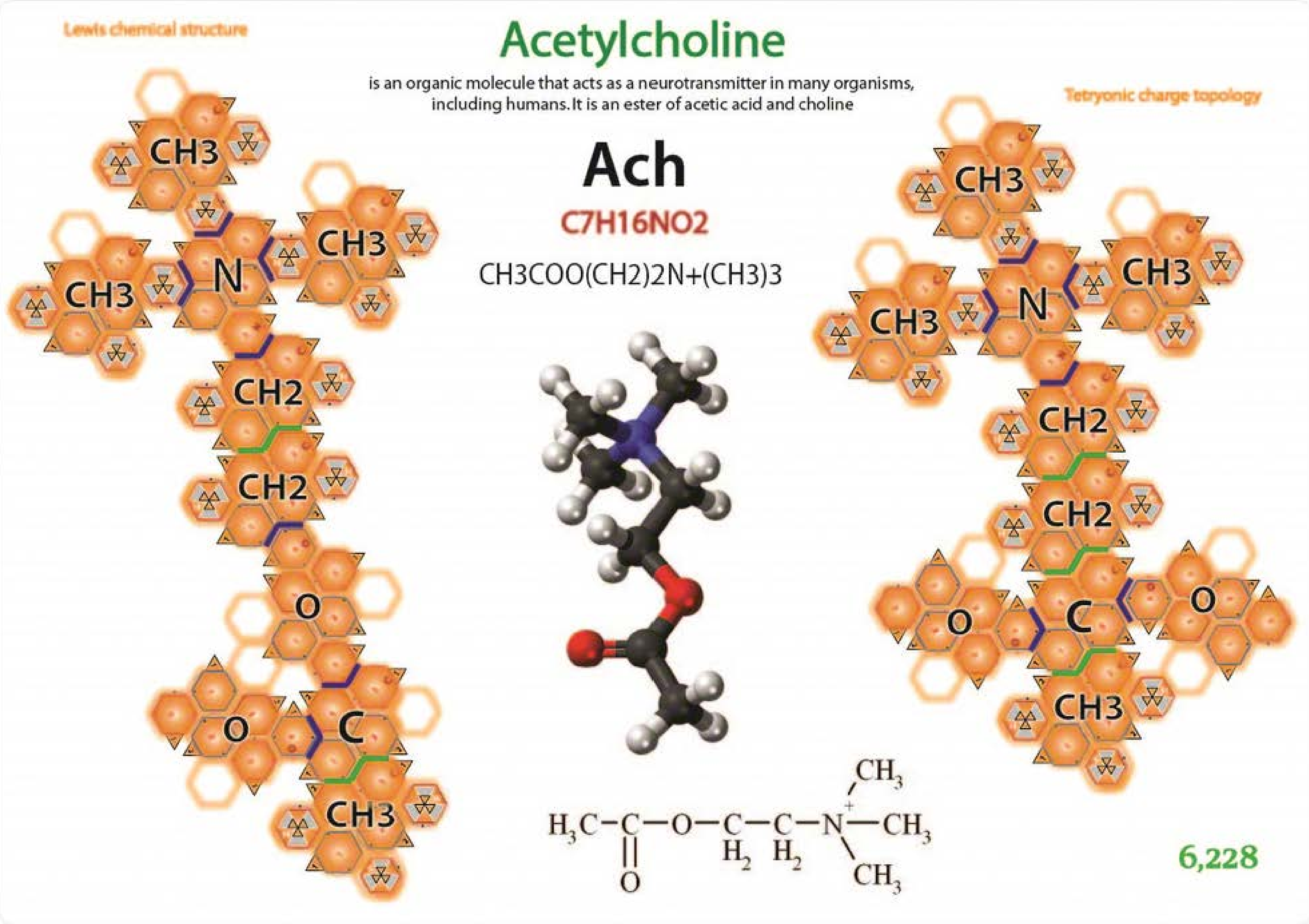
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Ribose

6,360

[3,180-3,180]

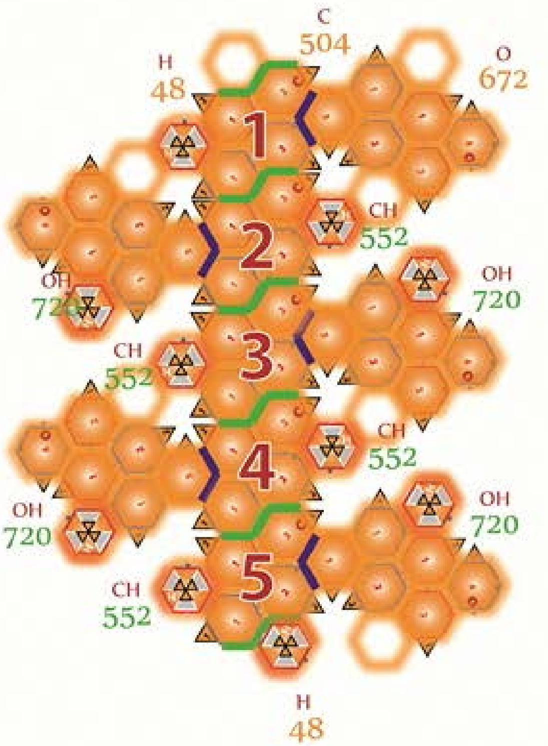
C_5-H_{10}-O_5

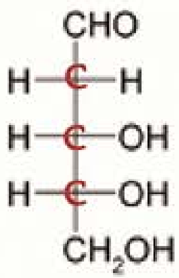
Carbohydrate compounds can form acyclic sugars

Carbohydrate compounds can also form cyclic sugars

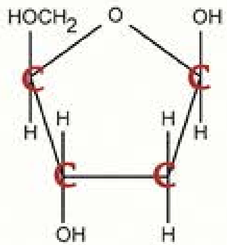
Ribose is an organic compound with the formula C5H10O5; specifically, a monosaccharide (simple sugar) with linear form H–(C=O)–(CHOH)4–H

$C(H_2O)_5$
ribose
C5-H10-O5

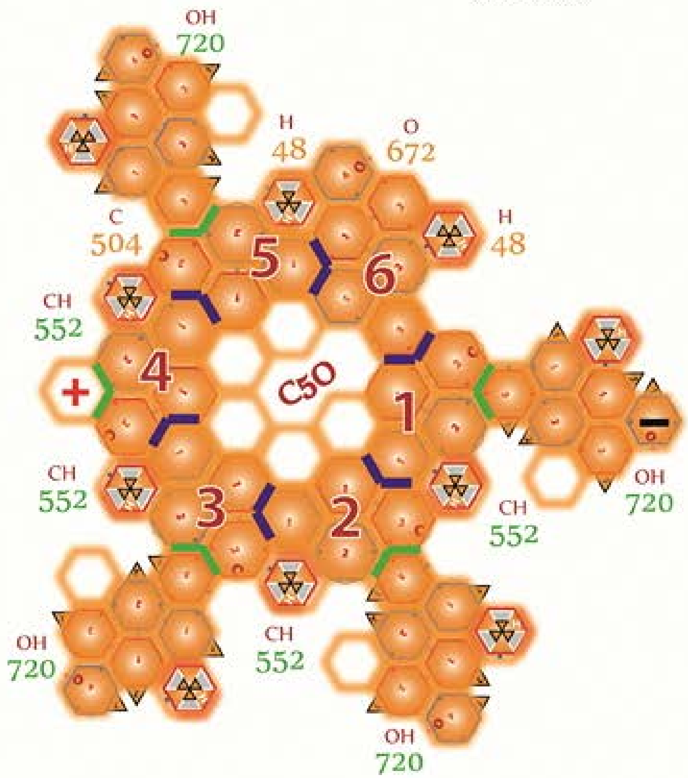




H-(CO)-(CHOH)4-H



$C(H_2O)_5$
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.

Copyright ABRAHAM [2008] - All rights reserved

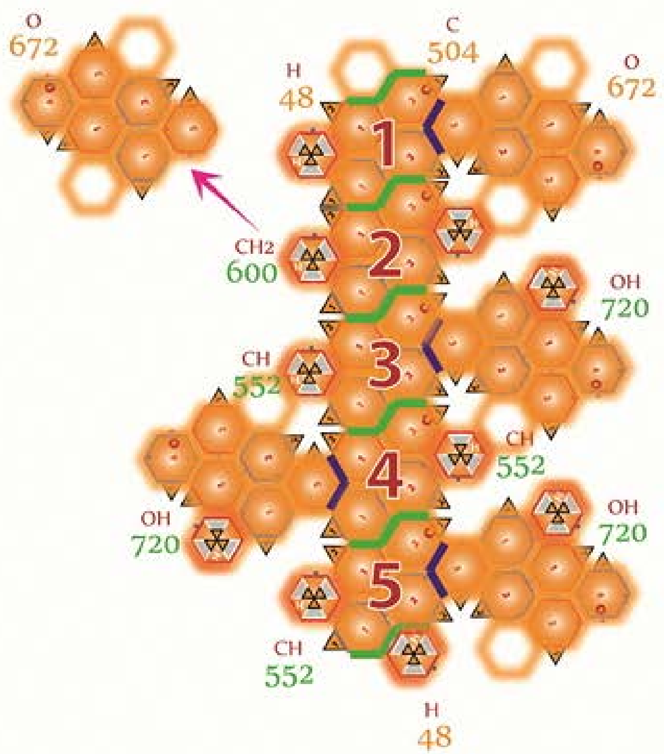
As its name indicates it is a deoxygenated sugar, meaning that it is derived from the sugar ribose by loss of an oxygen atom

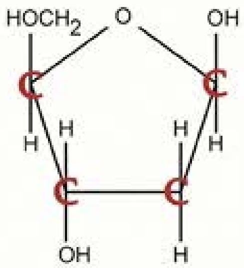
Deoxyribose

5,688
[2,844-2,844]

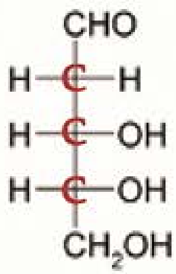
As a component of DNA, 2-deoxyribose derivatives have an important role in biology

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

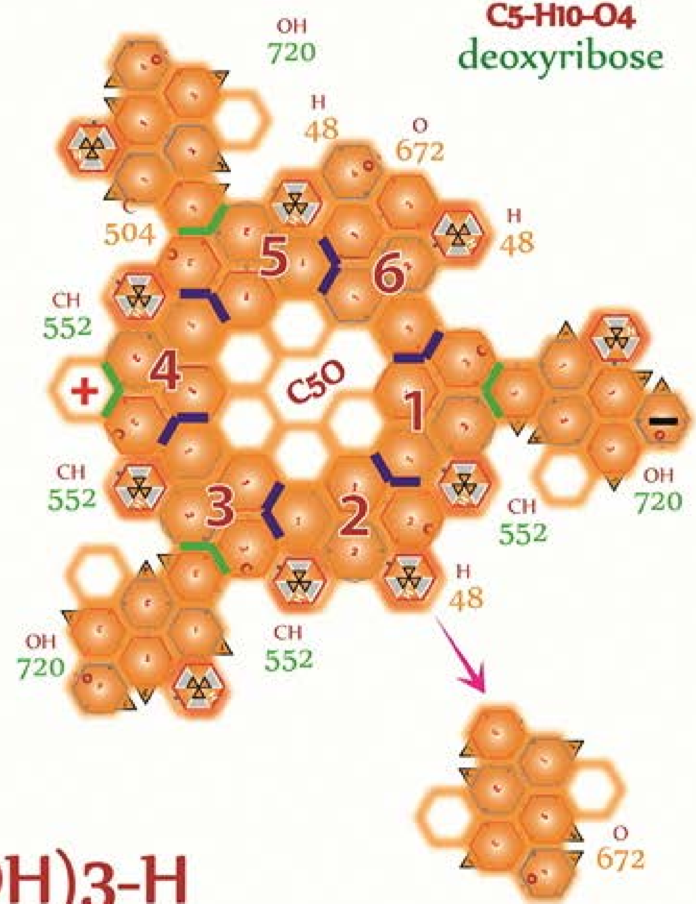




Deoxyribose, more, precisely 2-deoxyribose, is a monosaccharide



C5-H10-O4
deoxyribose



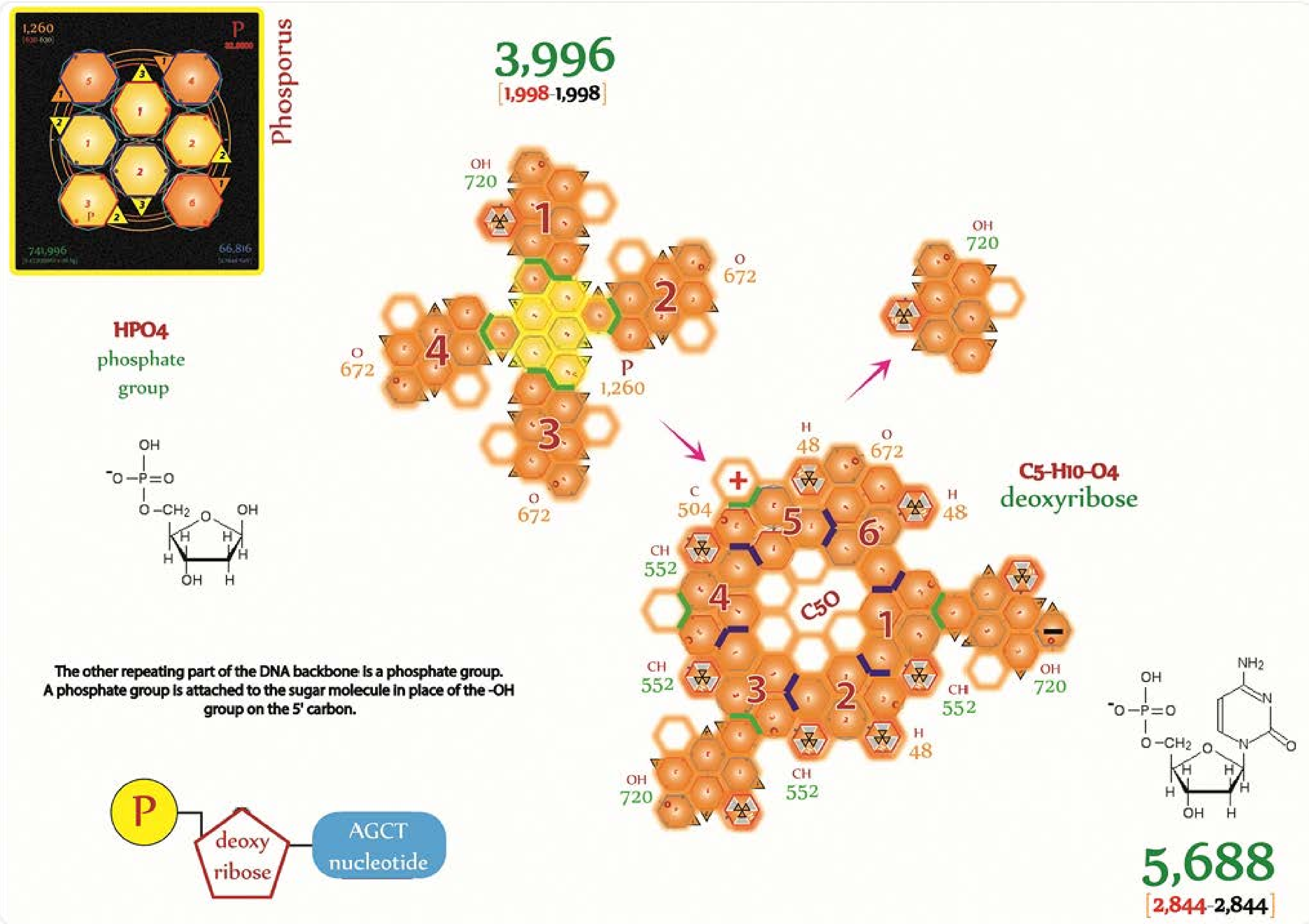
C5-H10-O4
deoxyribose

H-(CO)-(CH2)-(CHOH)3-H

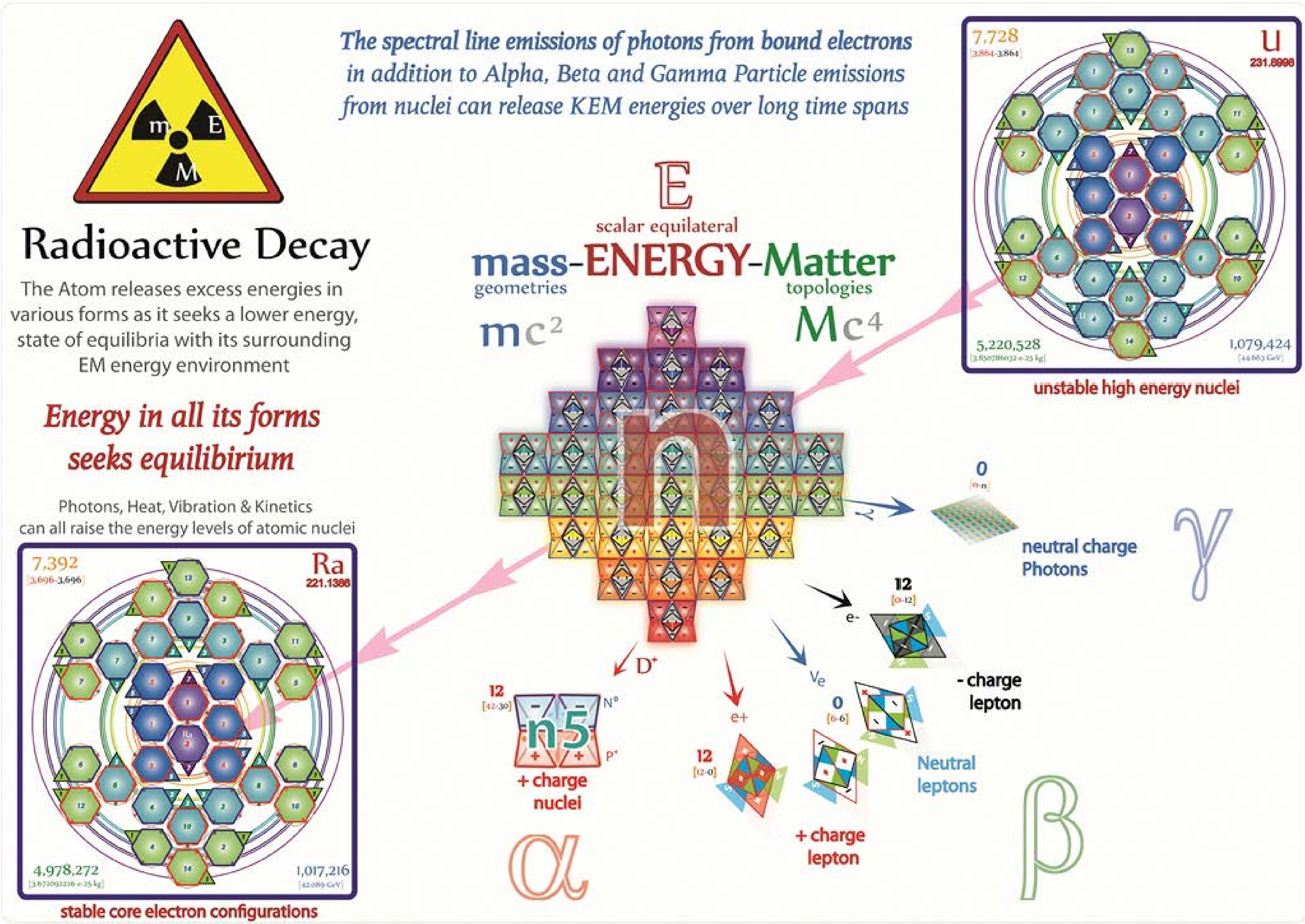
Hermann Emil Fischer won the Nobel Prize in Chemistry (1902) for his work in determining the structure of the D-aldohexoses.

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

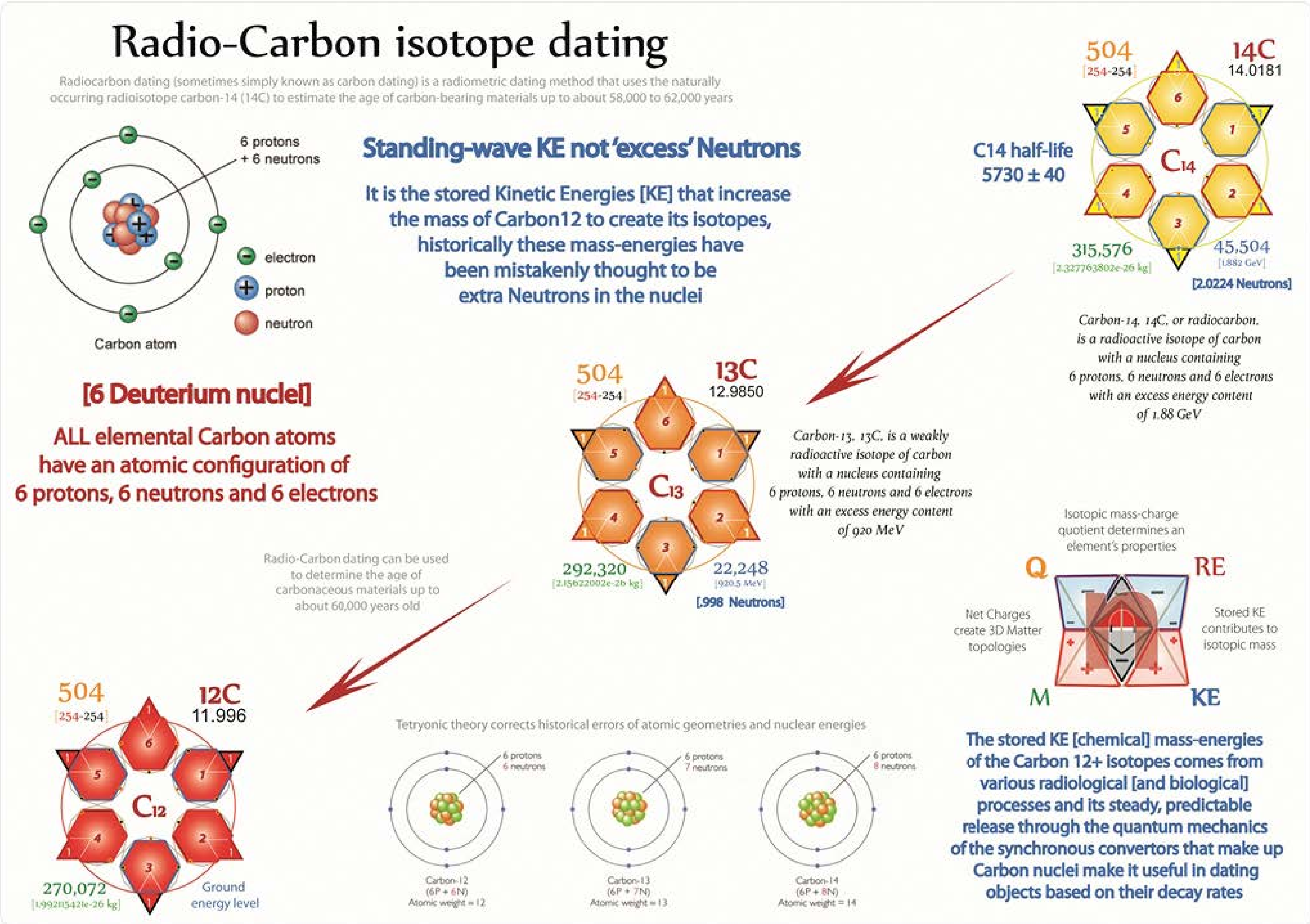
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



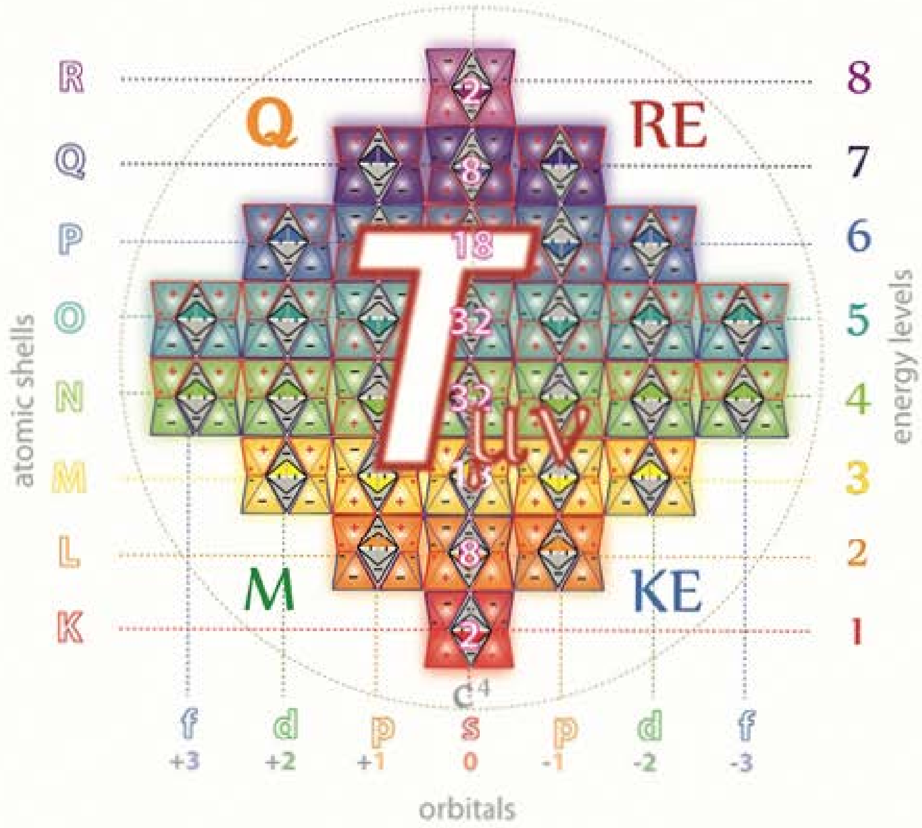
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Radioactive Isotopes

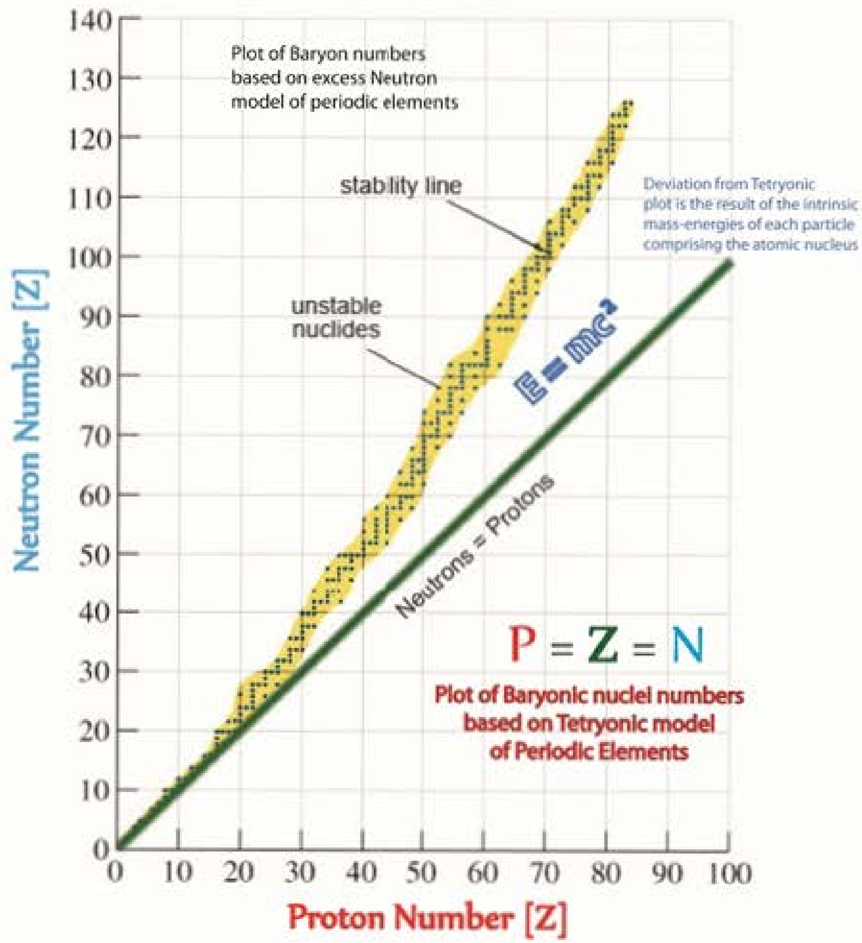
Where the elementary nuclei's Deuteron energy levels are raised from their ground levels radioactive isotopes are created



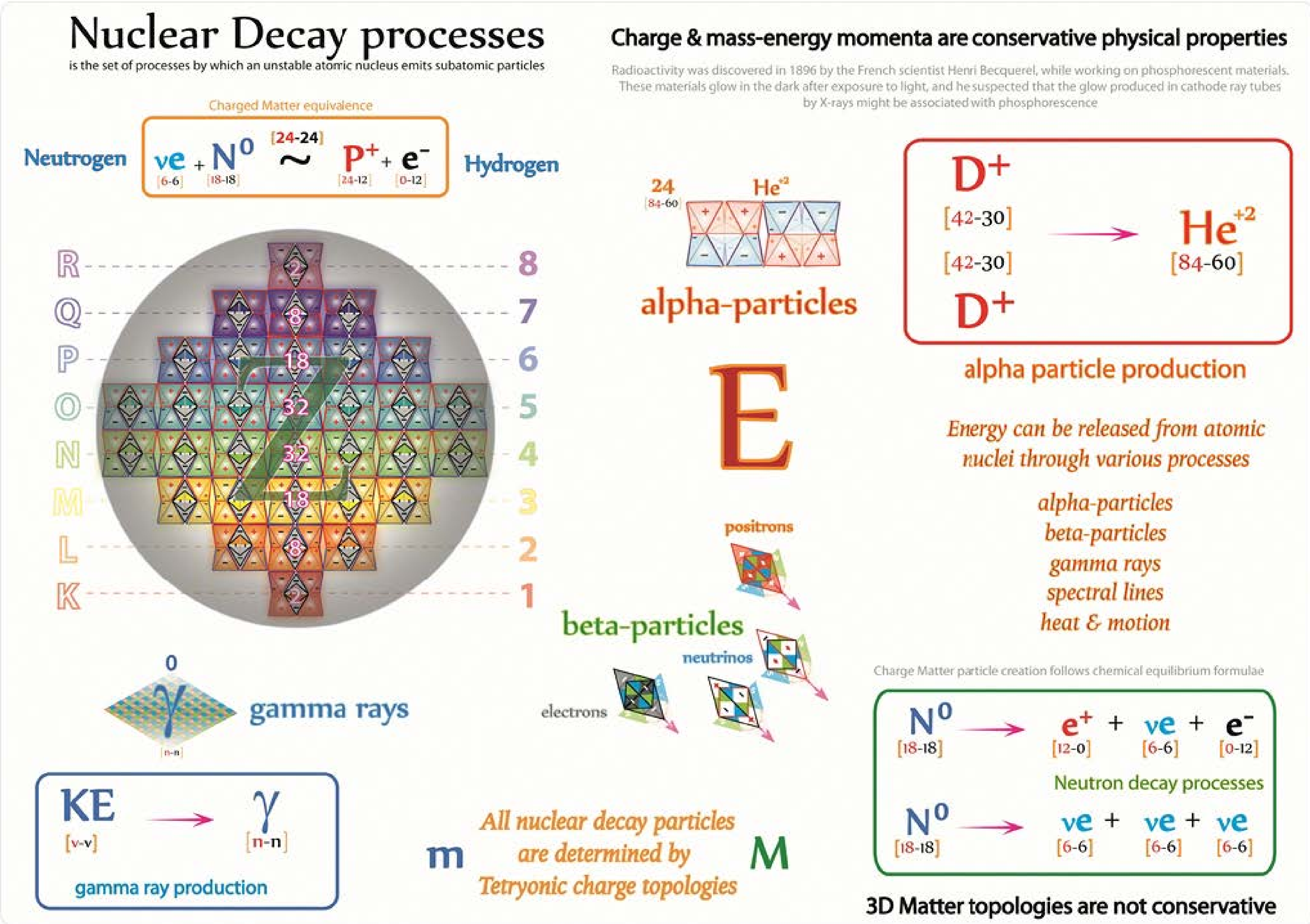
Each periodic element is comprised of an EQUAL number of Protons, Neutrons & electrons that form each element's unique 2D mass-energy geometries & 3D Matter topology and contribute to its observed properties

The $\frac{\text{mass}}{c^2}$ ~ $\frac{\text{energy}}{c^4}$ content of Matter

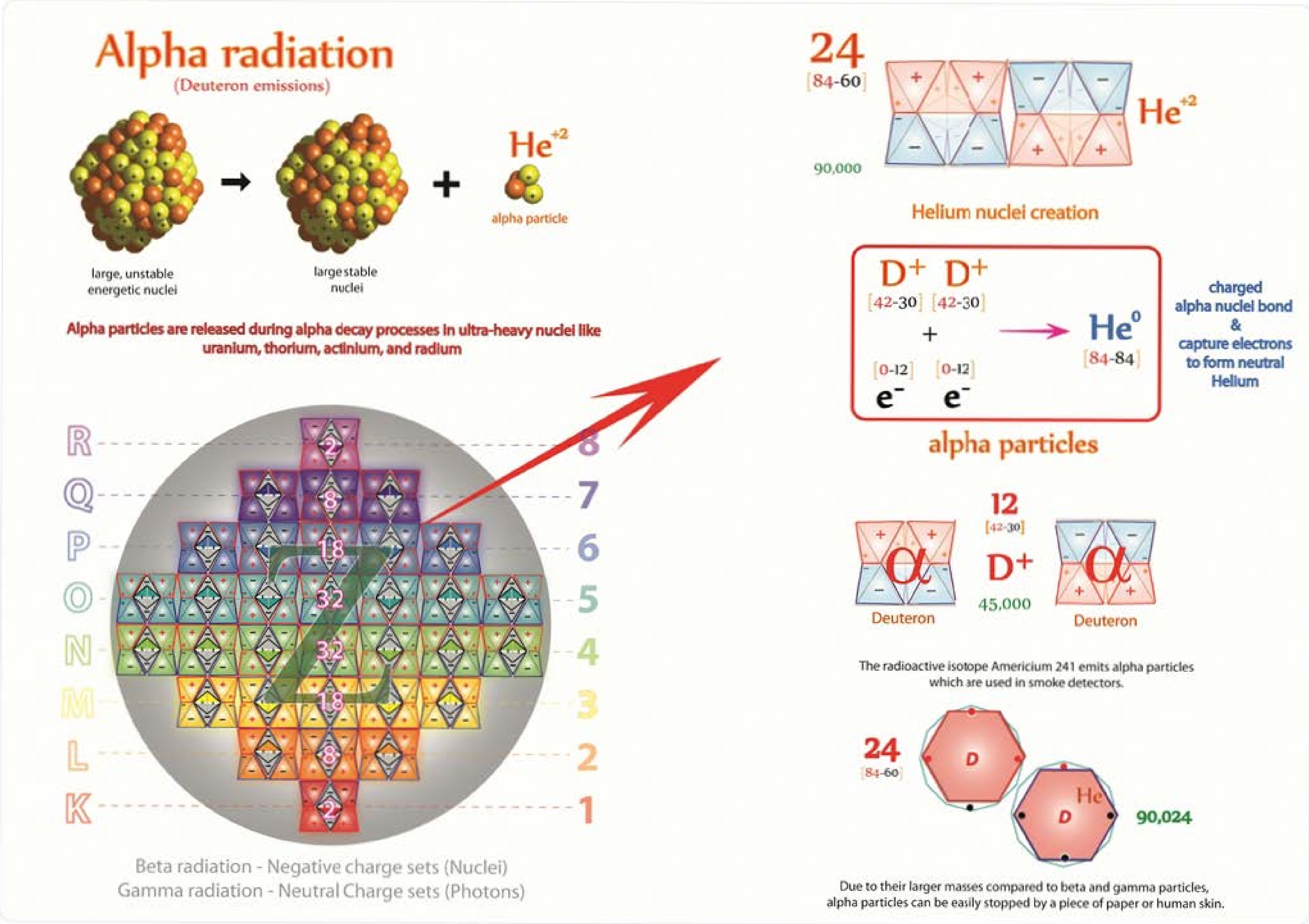
Einstein's relativistic stress energy tensor models mass-energy-Matter as a nebulous energy-momenta density-pressure gradient



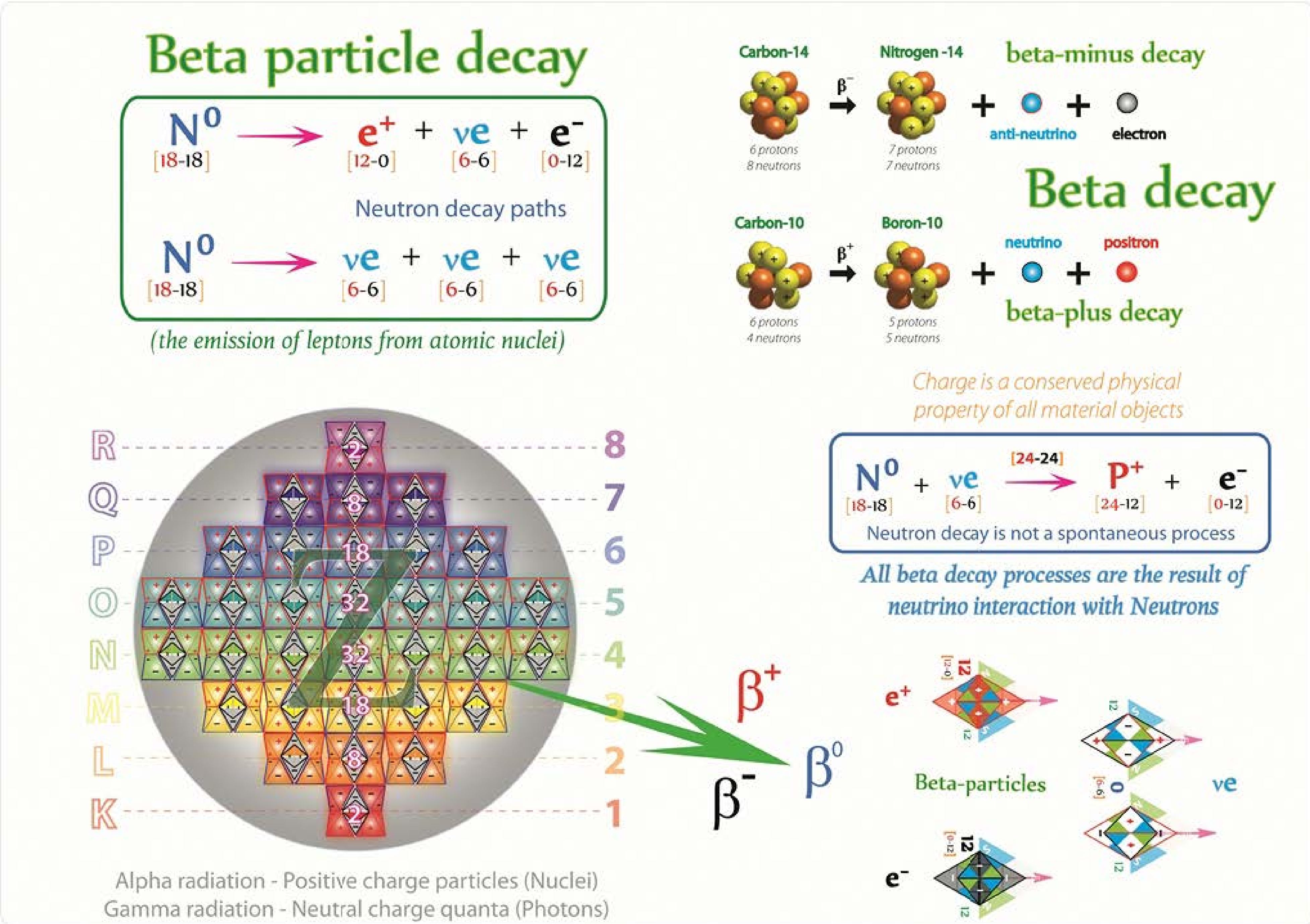
Tetryonic theory redefines the relativistic stress energy tensor [$T_{\mu\nu}$] into a geometric measure of the charged 2D electromagnetic mass-energies & 3D Matter topologies within any spatial co-ordinate system


Nuclear Decay processes
is the set of processes by which an unstable atomic nucleus emits subatomic particles
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
Charged Matter equivalence
Neutrogen
ve [6-6] + N0 [18-18] ~ [24-24] P+ [24-12] + e- [0-12]
Hydrogen
R Q P O N M L K
8 7 6 5 4 3 2 1
2 8 18 32 32 18 8 2
Z
24 [84-60]
He+2
alpha-particles
D+ [42-30]
D+ [42-30]
He+2 [84-60]
alpha particle production
E
Energy can be released from atomic nuclei through various processes
alpha-particles
beta-particles
gamma rays
spectral lines
heat & motion
positrons
beta-particles
neutrinos
electrons
0
γ
[n-n]
gamma rays
KE [v-v] → γ [n-n]
gamma ray production
m
All nuclear decay particles are determined by Tetryonic charge topologies
M
Charge Matter particle creation follows chemical equilibrium formulae
N0 [18-18] → e+ [12-0] + ve [6-6] + e- [0-12]
Neutron decay processes
N0 [18-18] → ve [6-6] + ve [6-6] + ve [6-6]
3D Matter topologies are not conservative

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

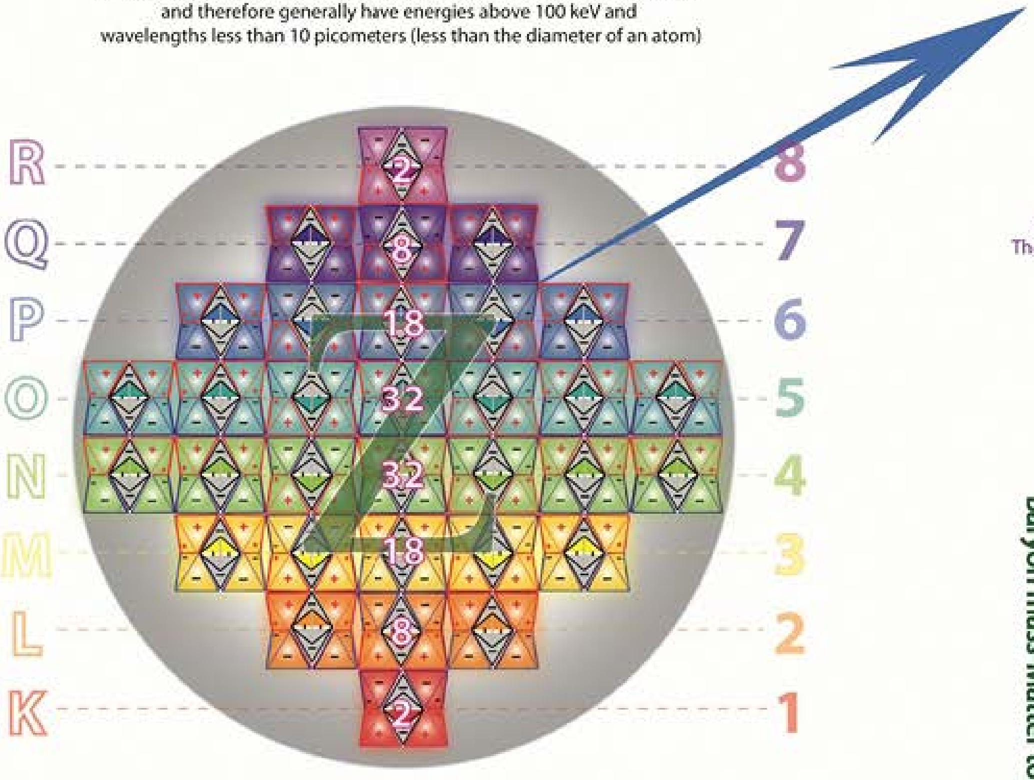
Gamma Radiation

(high energy photon emission)

Natural sources of gamma rays on Earth include gamma decay from naturally occurring radioisotopes, and secondary radiation from atmospheric interactions with cosmic ray particles.

$\lambda[f]$ *All ejected gamma ray photons are neutral energy quanta sets [photons / EM waves]* $[f]\lambda$

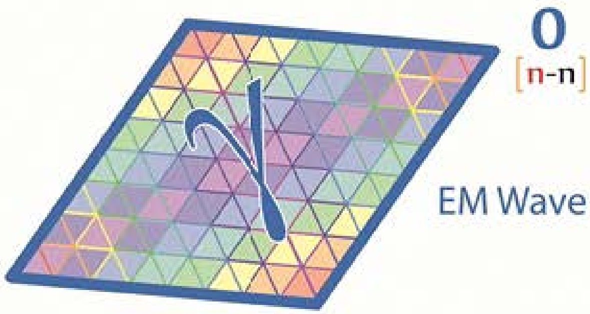
Gamma rays typically have frequencies above 10 exahertz (or >10^19 Hz), and therefore generally have energies above 100 keV and wavelengths less than 10 picometers (less than the diameter of an atom)



Alpha radiation - Positive charge particles (nuclei)
Beta radiation - Negative charge particles (leptons)

gamma rays

Gamma decay produces rays with energies of only a few hundred keV, and almost always less than 10MeV



EM Field — Planck quanta

$$2\pi\left[\left[\varepsilon_0\mu_0\right].\left[m\Omega v^2\right]\right]$$

Photons — ElectroMagnetic — mass — velocity

Gamma rays are a form of ionizing radiation, and they have very good penetrating power. They result from the release of atomic energies and will cause biological damage to living tissue.

$$2hv = E = hf$$

Care must always be taken to distingush between charged Planck quanta [v] and photons [f]

gamma ray bursts

Baryon mass-Matter topology

N^0 [18-18] → [2.25 e23] [v-v]

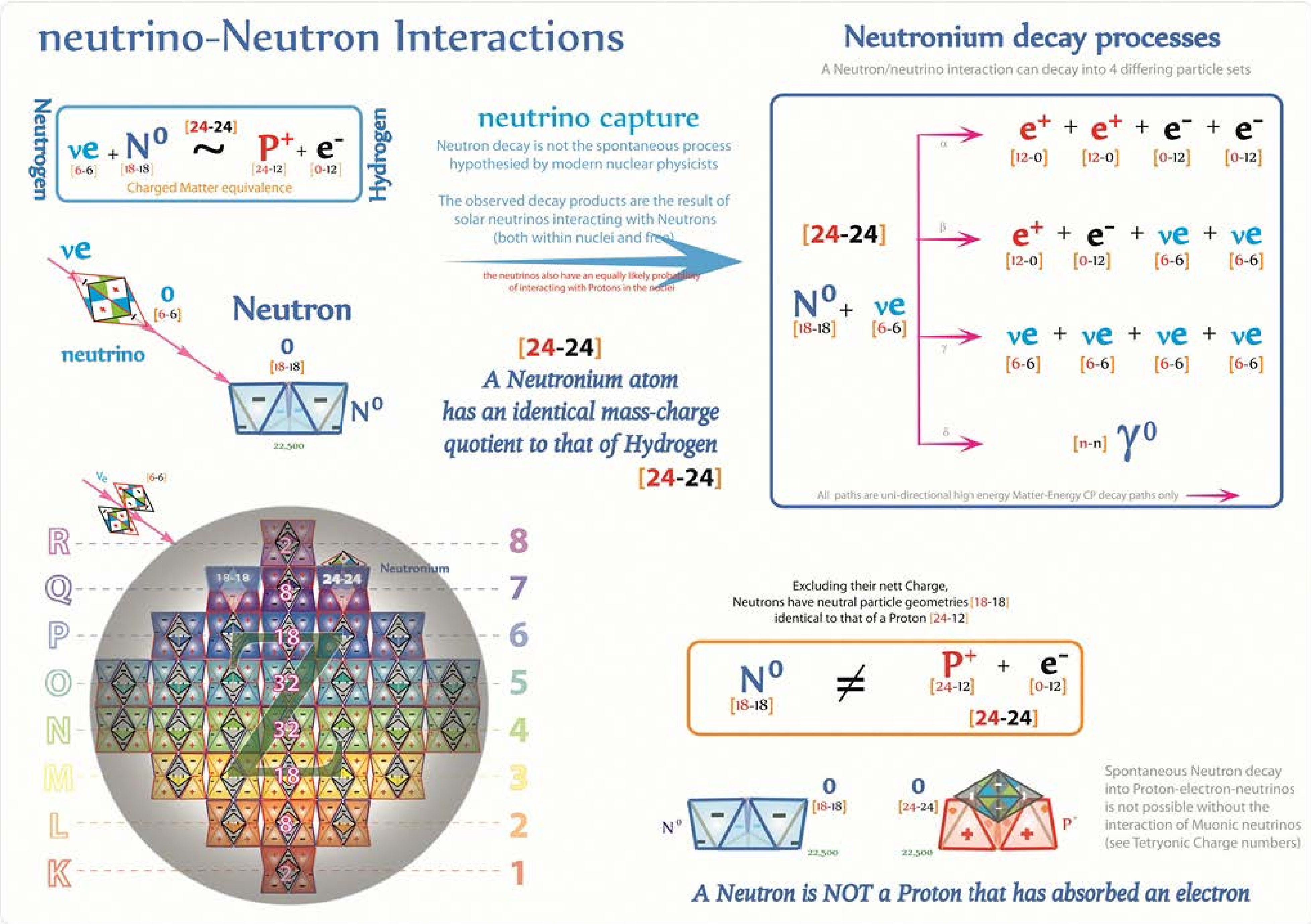
$$E = 2mc^2 = hf$$

930 MeV — 930 MeV

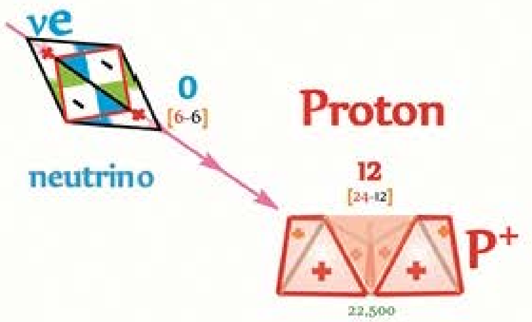
gamma ray mass-energy geometry

are the result of the stored KEM mass-energies of Matter topologies being released as mass-energy momenta geometries

Copyright ABRAHAM [2008] - All rights reserved



neutrino-Proton Interactions



neutrino capture

Neutron decay is not the spontaneous process hypothesied by modern nuclear physicists

The observed decay products are the result of solar neutrinos interacting with Neutrons (both within nuclei and free)

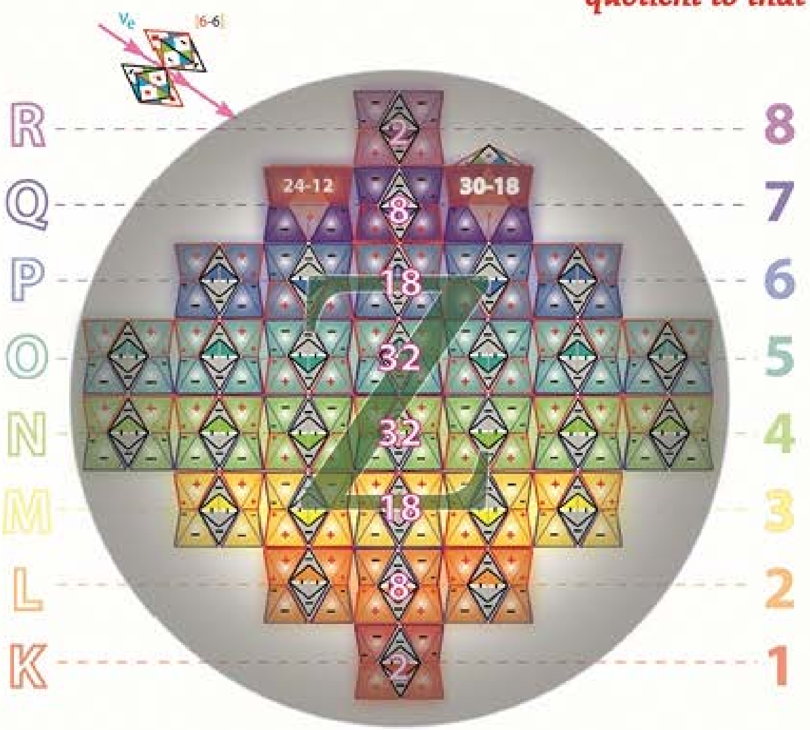
the neutrinos also have an equally likely probability of interacting with Neutrons in the nuclei

Although very weakly interacting, neutrinos can still be attracted to and bind to Protons via their negative charge fascia

[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

[30-18]

P^+ [24-12] + ve [6-6]

α → N^0 [18-18] + e^+ [12-0]

β → e^+ [12-0] + e^+ [12-0] + e^- [0-2] + ve [6-6]

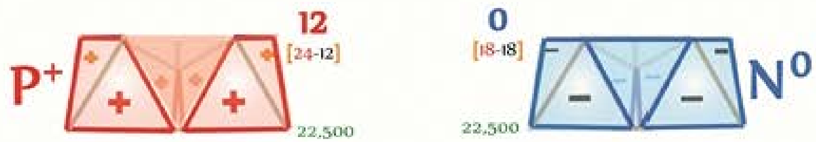
γ → ve [6-6] + ve [6-6] + ve [6-6] + e^+ [12-0]

δ → [n-n] γ^0 + e^+ [12-0]

All paths are uni-directional high energy Matter-Energy CP decay paths only

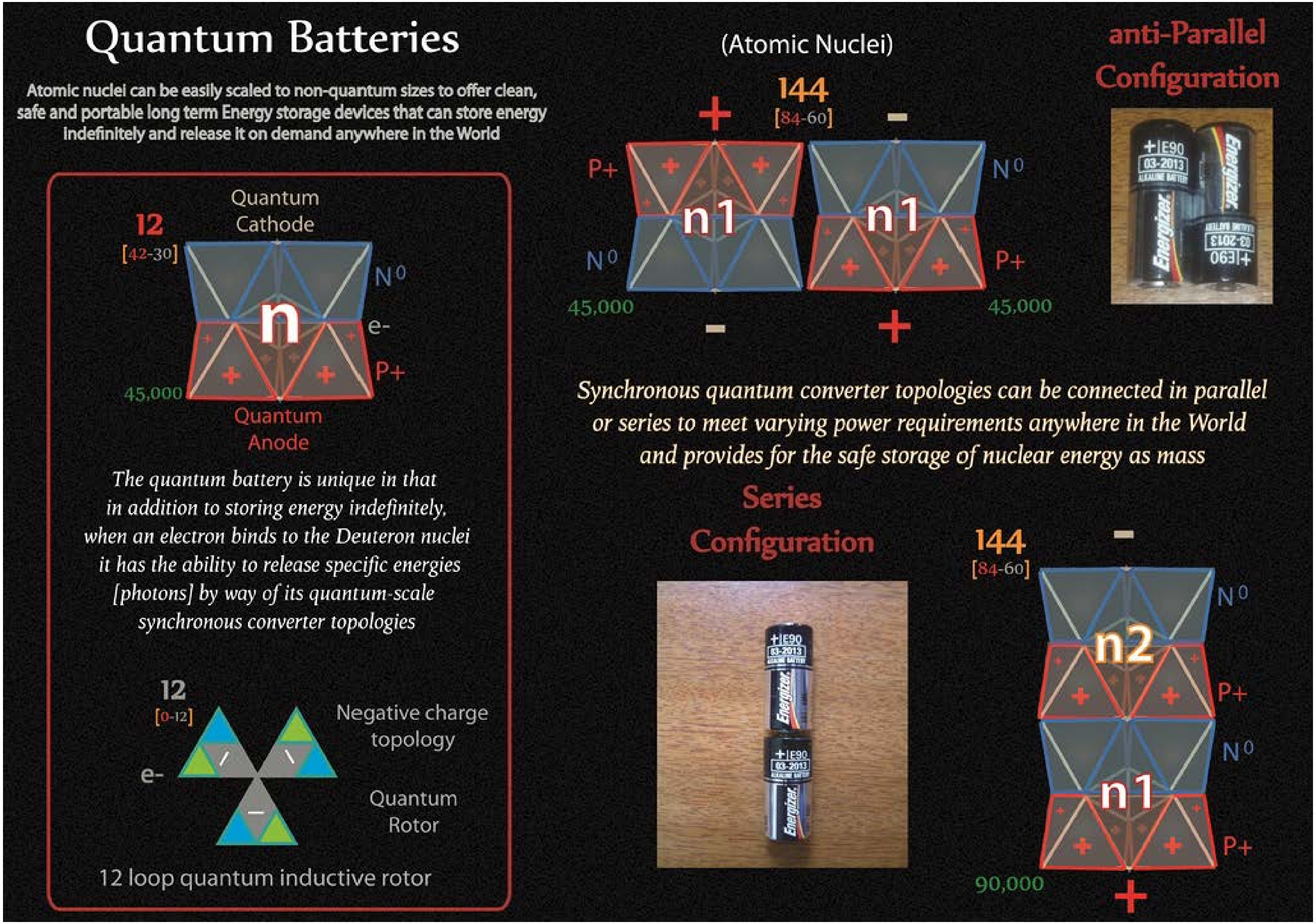
If they exist, Proton-neutrino particle couplings would function in a manner identical to that of Proton-electron couplings and could be detected by the anomalous spin measurements that would result

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)

Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved

Quantum synchronous Converters

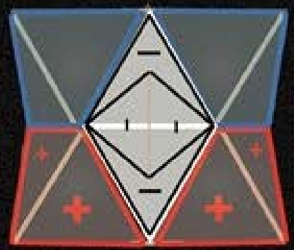
Energy can be stored in macro-scaled quantum converters as mass

The electron has a charged Tetryonic Matter topology that is electrically equivalent to a 6 loop inductive rotor

Energy

$$\frac{12\pi}{c^4}\left[\left[\overset{\text{Planck quanta}}{m\Omega v^2}\right]\right]_{n1}^{n8}$$

momenta



Matter is radiant EM energy in a standing-waveform

Nuclei

Energy

$$\frac{72\pi}{c^4}\left[\left[\overset{\text{Planck quanta}}{m\Omega v^2}\right]\right]_{n25}^{n32}$$

momenta

Building on the charged topology of Deuterium nuclei, scaled electromechanical quantum converters can be manufactured to provide efficient electrical mass-energy storage & distribution devices

Deuterons

Energy

$$\frac{84\pi}{c^4}{}^{n32}_{n25}\left[\left[\overset{\text{Planck quanta}}{m\Omega v^2}\right]\right]_{n1}^{n8}$$

momenta

These devices can be transported any where demand requires them worldwide with their energies stored in the form of mass

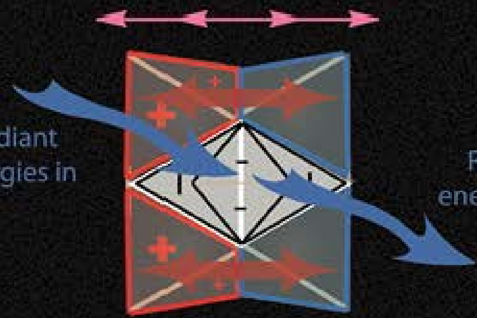
Negating the need for centralised power stations and distribution lines extending vast distances to provide power to remote communities

A quantum synchronous converter can store and release 3 forms of energy

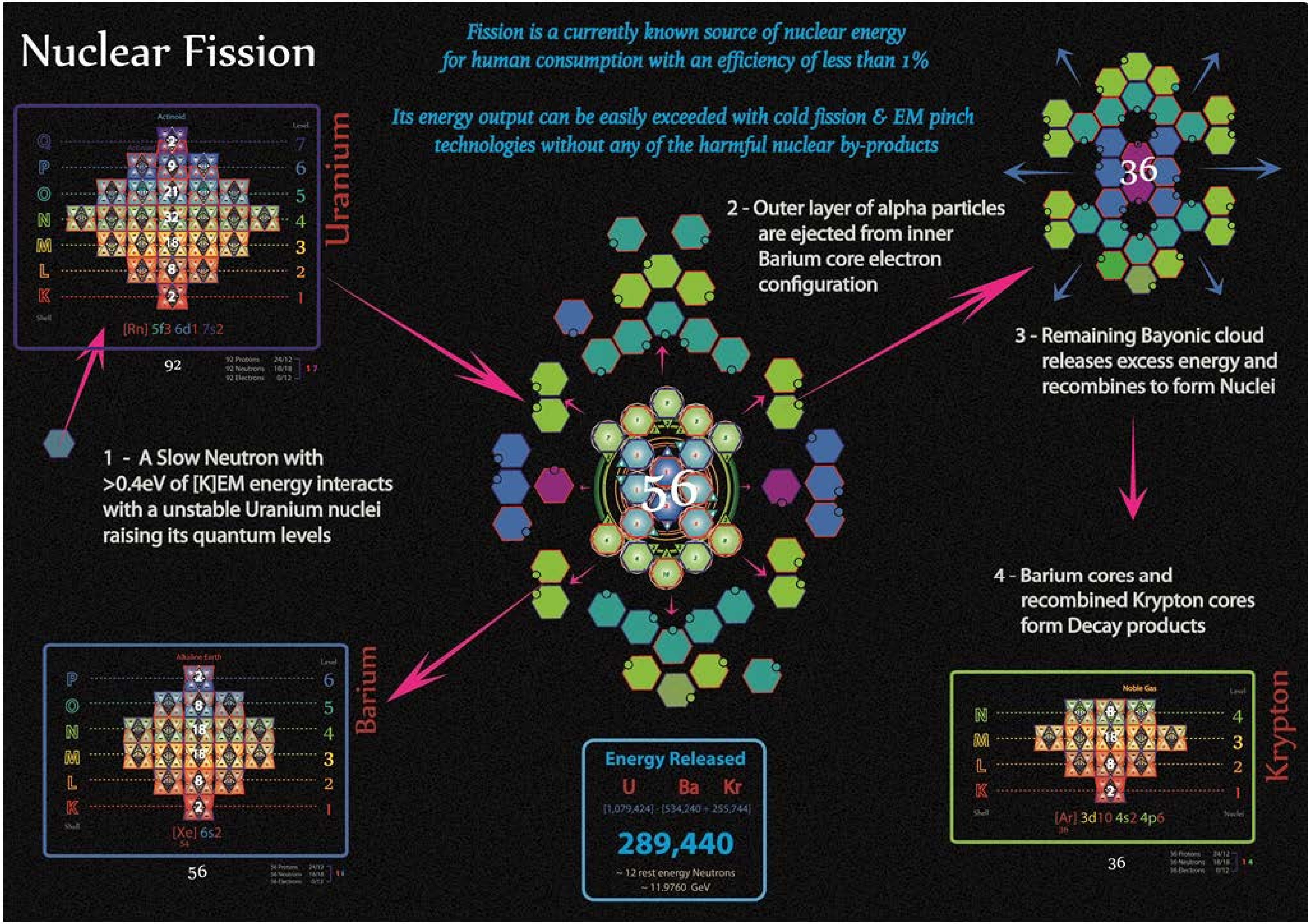
Angular Momentum (motional energy)
square root linear momentum

Radiant Energy (emission/absorption)
of photon/boson mass-energy geometries

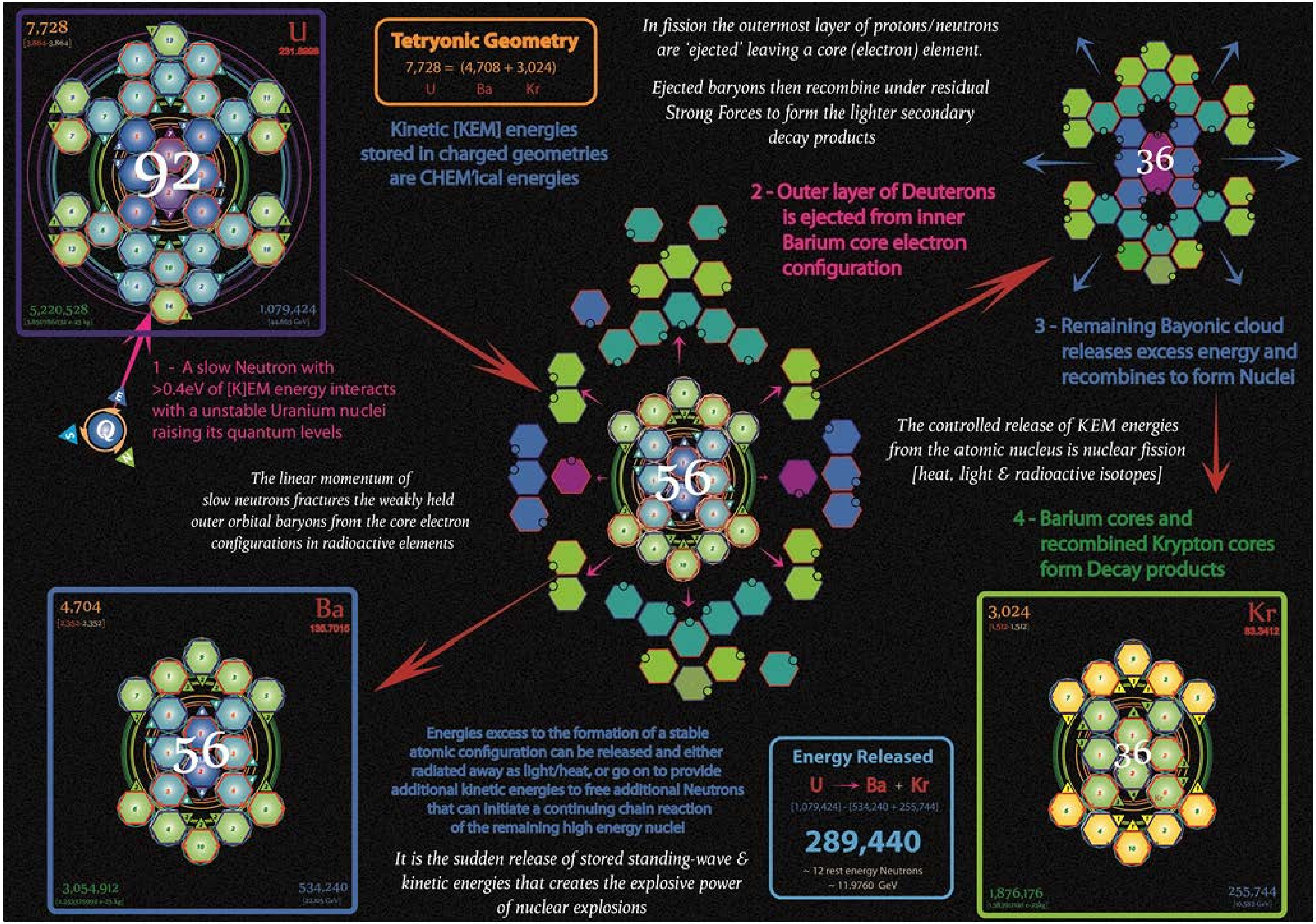
EM mass-Matter (stored masses in Matter topologies)
radiant EM mass-energies stored in standing wave Matter topologies



Leptons rotate within the Baryonic EM fields of the Nucleus

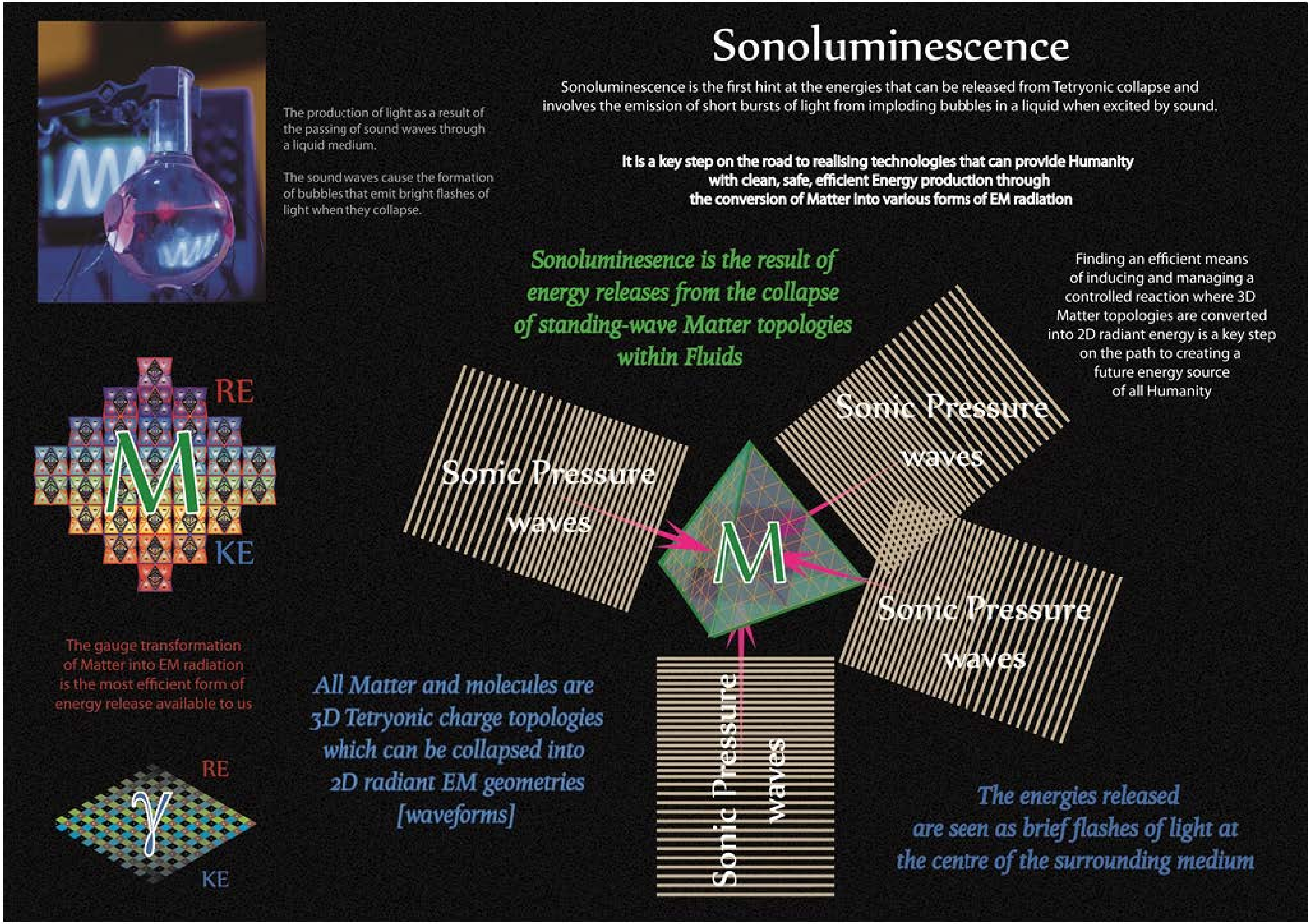

Nuclear Fission
Fission is a currently known source of nuclear energy for human consumption with an efficiency of less than 1%
Its energy output can be easily exceeded with cold fission & EM pinch technologies without any of the harmful nuclear by-products
Uranium
[Rn] 5f3 6d1 7s2
92
1 - A Slow Neutron with >0.4eV 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
56
36
3 - Remaining Bayonic cloud releases excess energy and recombines to form Nuclei
4 - Barium cores and recombined Krypton cores form Decay products
Barium
[Xe] 6s2
56
Energy Released
U Ba Kr
[1,079,424] - [534,240 + 255,744]
289,440
~ 12 rest energy Neutrons
~ 11.9760 GeV
Krypton
[Ar] 3d10 4s2 4p6
36

Copyright ABRAHAM [2008] - All rights reserved

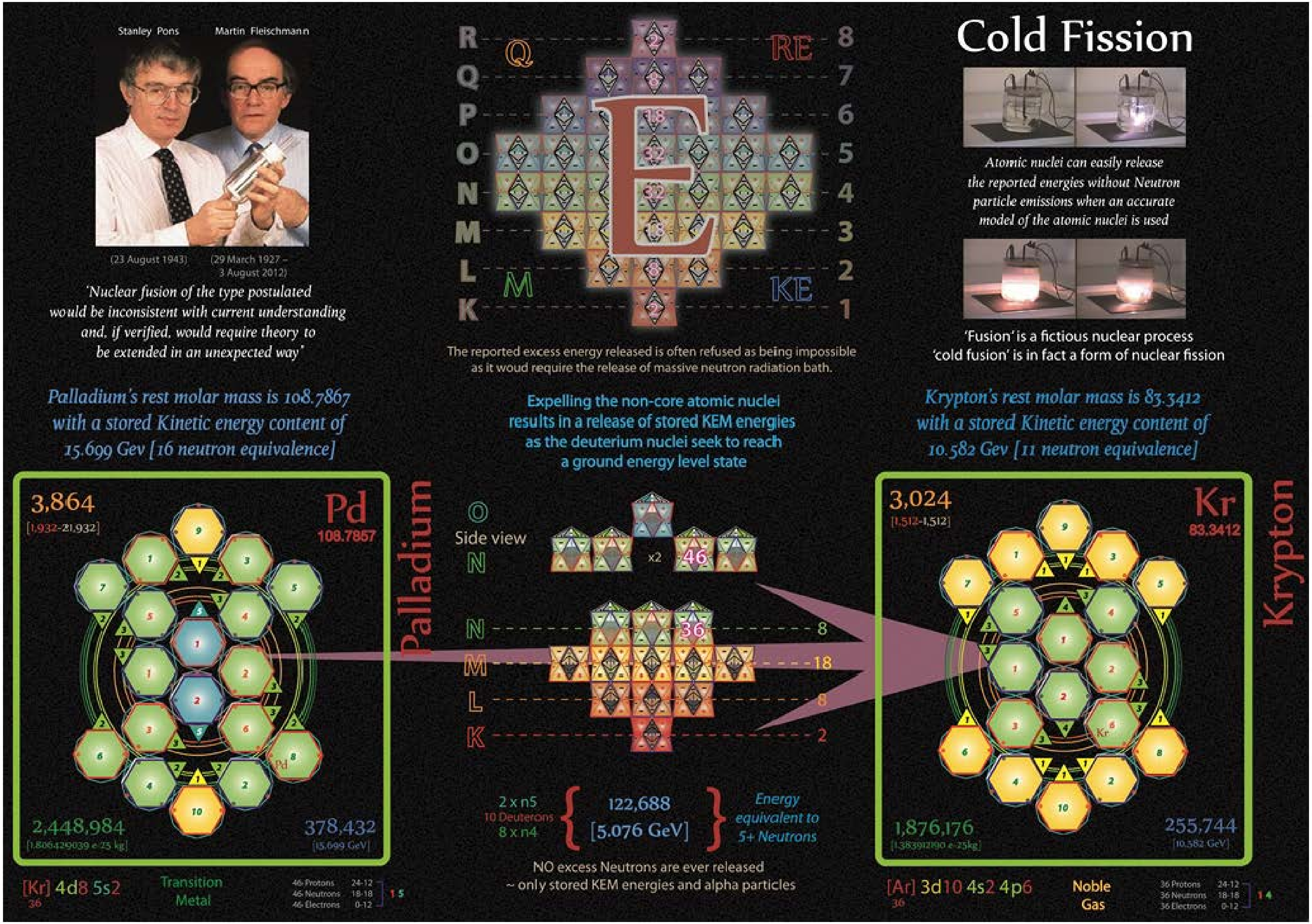


Tetryonics 60.13 - Nuclear Fission process

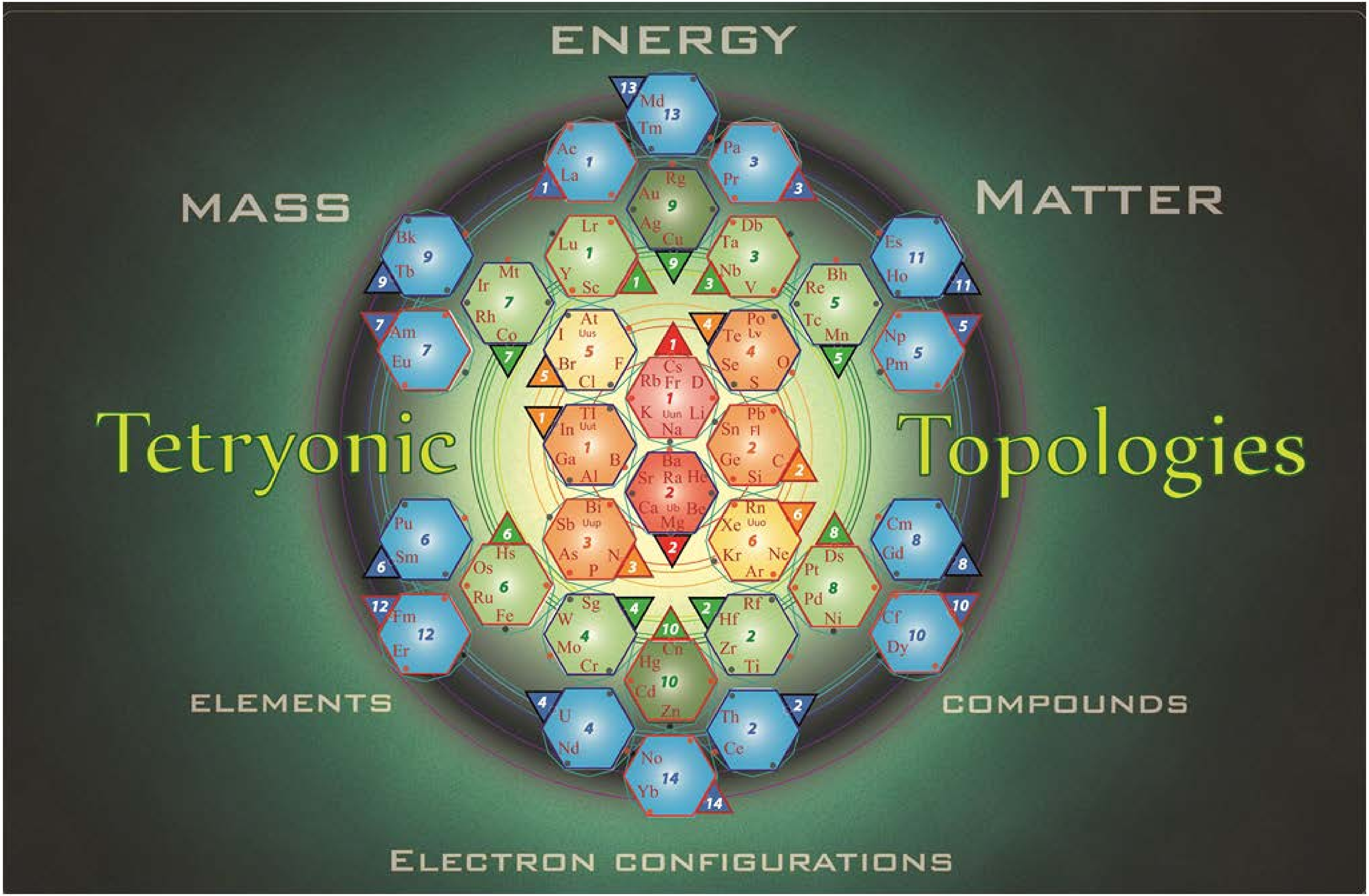
Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved



Copyright ABRAHAM [2008] - All rights reserved