Induced Nuclear Magnetic Moments and Spins for Transient Coupling to Electronic Orbitals:

Relation of Magic Number Nuclei to Biochemistry

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Abstract

This review highlights the author's theory of quantum fluctuations in systems down to nuclei, nucleons and quarks (as induced by surrounding thermal space, gravity, electric and magnetic fields and other nucleons) releasing and/or inducing nuclear fields, nuclear magnetic moment and/or spins. Many isotopes of elements are presented to give proof by many correlations of novel physical, chemical, biological, nuclear, thermodynamic and transport properties with nonzero nuclear magnetic moments (NMMs) and spins. The author further develops his theory of such fractional reversible (FR) fissing and fusing by perpetual quantum fluctuations of quarks and nucleons correlating with proximity of nucleons to magic number (MN) nuclei (2, 8, 20, 28, 50, 82, 126 …) and magic number nucleonic molecules (MNNMs). By such the author is able to correlate stable isotopes of various elements and their zero, nonzero and chiral NMMs to their masses relative MNs. The lifetimes of unstable isotopes are also reasoned and correlated to relative separation from MNs. The stable and unstable nuclei for various isotopes are presented by the authors theory to undergo hidden FR transmutations by FR electron capture (EC), FR electron release (ER), FR proton and neutron captures and/or releases as reasoned by infinitesimal quantum fluctuations of nuclei by the author's theory. New catalytic system of Ne solvent with NaF solute is introduced in highly activated conditions for catalyzing $CO_2 + H_2O \leftrightarrow C_xH_y$ and $C_xH_yO_z$ by NMMs and induced NMMs in the catalytic solute and solvent Ne and NaF. By such correlated phenomena, the author develops more his theory of new physicochemical basis for life; novel catalysis and enzymatics, unconventional nuclear reactions, room temperature and pressure superconductivity, and gravitational chemistry.

Introduction

In clumped NMMs, the NMMs induce each other to fractional, reversible (FR) fiss and fuse more easily and further induce nonzero NMMs to transmute more intensely for novel release of nuclear fields for novel chemical, physical and biological phenomena. Such phenomena are a basis of life as in that driven intrinsic dynamics by FR fissing and fusing general structures of proteins by clumped ^{1}H, ^{14}N and ^{31}P with all + NMMs in proteins and ATP for novel structures. RBL started with Little Effect by electronic angular momenta in Fe, Co and Ni in 2000. Then during 2000-03, here RBL realized with H and its nucleus much greater angular momenta arise due to relativistic effects. Then RBL expanded from ^{1}H to Cu and Ag, then to ^{14}N and ^{15}N, then to ^{13}C, ^{17}O and ^{18}O and then to all isotope of all elements with nonzero NMMs and induced NMMs. In this manuscript, RBL discloses the origin of induced NMMs and relates isotopes having greater induced NMMs to being nonmagic number nuclei and clustering of nucleons in magic number nucleonic molecules (MNNM) with excessive non-magic number residual or instability and greater proclivity to FR fissing and fusing with release of net NMM into surrounding electronic lattices for altered catalysis, chemistry, physics, transport and biology. How can fractional, reversible (FR) nuclear reactions cause superconductivity; catalyze $CO_2 + H_2O$ conversion; cold fusion;

explain life; and lead to cancer. On the basis of clumping of isotopes of nonzero NMMs. The surrounding thermal space and gravity space and E and B can induce mutual FR fissing and fusing. The author gives basis for trace minerals in living organisms affecting N and O fractionations in cells and vice versa. Also the further effects of fractionating C isotopes is noted here. And now RBL develops further his notion of induced NMMs in all nuclides for novel effects! So it is quite interesting that some elements have isotopes of + NMMs and – NMMs. So they can induce both fractional, reversible (FR) fiss and fuse so as to manifest reversible dynamics. ^{14}N/^{15}N is unique in nitrogen as ^{15}N can induce fractional, reversible dynamics in cancer to harm the cancer.

Life, Leptons, Orbitals and Spin Moments

In prior book [1] and publications [2-4], the author introduced many of these phenomena by Little Effect these ^{40}K, ^{41}K, ^{65}Cu, ^{64}Zn, and^{18}O isotopes causing cancer and NMMs pulling electrons and pushing electrons as possible mechanism of optical pumping previously proposed by RBL. It is important to further note that RBL's nuclear pressure previously proposed [5] for explaining strange metals as the nuclear magnetic moments (NMMs) can create a newly discovered nuclear pressure and can act to rotate electrons inside the orbitals for atomic continuum due to denser fields and energies released from nuclei. The revolving internal motions of electrons and quarks in orbitals can cause altered catalysis and enzymatics!

A. Near Magic Number Molecules Fiss and Fuse Readily

Here the author develops more the proclivity for certain nuclei to FR fiss and fuse. If slightly greater than magic number (especially clustered magic numbers causes greater fissing and fusing), then agitations may lead to inducing FR fissing for stability and the fiss field may bind nucleons or seep into electron lattice to alter electronic interactions between atoms and energetics. So by this theory, clustering is a cause for instability and stability to fractionally fiss, reversibly (FR). Two cluster bonding to form molecules of clustered nucleons is a cause for greater instability to fractionally fiss like in ^{18}O. It is important to note the stability of bonded magic number molecules verses even greater instability toward stability of clustering to a magic number. For instance, ^{18}O can cluster to 20 and this is even more stable to form ^{20}F and it has huge positive NMM of 2.094. And electron capture of ^{17}O can form ^{17}F of huge positive NMM (4.72). See Table I. Such huge NMM by momentary formation of ^{17}F explains the altering effects of ^{17}O by the author's theory. These dynamics about O nuclei by fractional, reversible (FR) fissing and fusing by e^- capture and/or release for induced nuclear magnetic moments (NMMs) can cause huge superconductivity of cuprates.

Magic Number Energies and Activation Energies

Magic number (MN) nuclei are nuclei having specific number of protons (p^+) and/ or neutrons (n^0) for causing quantum mechanical properties of a complete shell with consequent greater stability of such nuclei to FR fiss and fusing. The author has introduced the phenomena of nuclei of atoms manifesting fractional, reversible (FR) fissing and fusing. In this work, the author discovers and discloses that the proclivity of such FR fissing and fusing depends on proximity of the nuclei to magic number nuclei of full nucleon shells. The nucleons have wave natures just as electrons have wave nature, but the wave nature of nuclei is to lesser extent by the deBroglie wavelength $\lambda = h/mv$. But the agitation by external fields causes slowing of the particles and the slowing causes kinetic energy to ↔ potential energies of the particles of very strong interactions and the slowing fisses fields for manifesting waves that extend outward and outside the nuclei to alter internal structure and dynamics of nuclei and affect the surrounding electronic shells. The surrounding thermal space, mechanical spatial disturbances, gravitational, magnetic, electric and quantum mechanical fields also weak fields, strong field disturbances can induce misalignments of quarks and nucleons to their previously assumed static structures of self-conformations in rapid motions of nucleons for slowing of motions and transformations of kinetic energy to potential energies with release of huge nuclei fields from nuclei and altered NMMs.

Why magic numbers? Wave Nature? Repeating Self Conformation of Nuclear Wave functions.

How can I reason the magic number nuclei, vs clustered nuclei vs unstable nuclei and their extents of fractional, reversible (FR) fissing? Can pieces of molecules induce FR fiss and fuse more than external fields? The magic number nuclei may with heat fiss and fuse and with magnetizations manifesting more fissing or by clumping inducing each other to fiss more as discovered here. Without clumping the magic number may not fiss much. So bigger magic number may have compound smaller magic number, so the compounding causes greater fissing as the released fields interact with the compounding magic numbers (MN). Compounding to non-magic may fiss more but with less net intenseness. The unstable nuclei fiss more readily and irreversibly. But consider for insufficient or slightly less than magic numbers (especially clustered magnetic numbers) then it may be inducing fusing. So the fused fields may destabilize nuclei or destabilize electronic lattices to facilitate and induce novel dynamics. So here RBL identifies the compounding magic numbers and nucleon clusterings and relate to novel superconductivity, enzymatics, catalysis, energetics. Which nuclei are more induced?

In 2005, RBL in his spinrevorbital paper [2] proposed the binding of magic number pairs of p^+ and neutrons inside nuclei by revorbital motions of the nucleons as electrons in shells outside nuclei have revorbital motions for electronic orbitals. RBL stated on page "According to the Little Effect, this effect of the revolution (correlation) (spinrevorbital) on the pairing of the up-quarks is a spin induced revorbital motion that compensates the coulomb repulsion of the two up-quarks of the proton. The two revolving up-quarks also revolve about the down-quark in the proton." … "On the nuclear scale, two protons exhibit relativisitic revolutionary motion such that the down-quark is accelerated to the second proton and the second proton releases its down-quark of the other proton so there is complex revolutionary motion which confines the quarks to the two protons with residual confinement of the protons. " The number 2 for the quark pairs and proton pairs described by RBL in 2005 is the smallest magic number. From RBL's theory in 2005, just as the changing exchange of two quarks glue the 2 protons together, the two protons can manifest changing exchange to glue other magic number nucleon clusters together. Also in this manuscript in 2005, RBL explained how tiny mass energy changes relativistically in nuclei can provide energy for binding electrons inside atomic orbitals of an atom and between nuclei in molecular orbitals and metallic bands. See pages 11, 12, 18 and other pages thoughout of [2]. In 2023, an international team of scientists [41] prove RBL theory of the spinrevorbital is correct as they observe clustering of neutrons and protons by internal motions forming atom like structure with binding of such structures by intervening neutron orbitals!

Close to Magic Number Molecules and Little Effect Spin Induced Fissing and Fusing

Thereby many of these stable uncommon isotopes are close to magic number nuclei for subject to Little Effect. So the magic numbers (MN) for nucleons are: 2, 8, 20, 28, 50, 82, and 126. The He (4); Ne (10), C (12), Na (22), F (18), N (14), P (31) may be considered to have magic number clusters bonded for nucleon molecules. Magic number nucleon molecules (MNNM) are bindings of magic number clusters (molecules inside nuclei). Molecules of magic number nucleons can occur once and then possibly twice and then maybe 3 or 4 times with less stability with increasing bonding of magic number nucleon molecules and possible explanation for fractionally, reversibly (FR) fissing or fusing to more stable nuclei. Magic numbers less fractionally FR fiss or fuse to stable nuclei but manifest hidden, powerful, fractionally FR fissing and fusing that may explain many unknown phenomena. Fissing of magic number nucleon molecules (MNNM) are more probable and weaker and may explain many large distributions of isotopes of a given element and possible unstable isotopes. For instance, such instability of magic number nucleon molecules can explain: Mn(52), Cr (52), Rb (84), O(16), O(18), Mg(24), Si(28), Cl(36), Fe(56), Ni(58), Rb(86), Sc(42), Ti(48), Cu(60), Ga(68), Fe(56), Se(76). These may have deficient neutrons to capture e^- for fusing in bonding to form neutrons fractionally, reversibly (FR). These may have excess FR fissing to release e^- to form protons fractionally, reversibly. Maybe magic numbers and singly bonded magic number nucleon molecules manifest stable isotopes of elements. Maybe 3, 4, 5, bonded magic number nucleon molecules manifest unstable isotopes and possible induced FR fissing and fusing.

Induction Between Atoms, Or Induction Between Magic Number Nuclei and Nucleon Molecules

In addition to thermal baths; mechanical fields; electric fields; gravitational fields; magnetic fields; quantum fields; and nucleon fields, strong fields and weak fields can indirectly induce nucleons and nuclei reversibly, fractional (FR) fissing and fusing. ^{13}C and ^{17}O may induce ^{18}O to fractionally, reversibly (FR) fiss more. Also elements with various NMMs of isotopes may have novel properties as the pure elements can induce its various NMMs to FR fiss and fuse relative to enriched portions of specific isotope enriched. For instance, Mo, Te, O, Hg, N may manifest such. So even earth's atmosphere ^{14}N and ^{15}N mutually induce FR fissing. In isotopic altered N, the FR fissing and fusing are altered for different properties and likewise for other elements with multiple isotopes of differing NMMs. The isotopes in molecules and compounds and even gases, liquids, solids and plasma can mutually induce fractional reversibly (FR) fissing and fusing. So elements and compounds can alter isotopic distributions for altering patterns of FR fissing and fusing to alter the properties accordingly. So proteins altering patterns of NMMs would alter properties. Even isotopes of null NMMs can in clumping with nonzero NMMs be more inclined to FR fiss and fuse. Nuclei with following masses may be inclined to such: 26+28 = 56 Da (Fe) ; 28 +50 = 78 Da(Se, As); 18 + 82 = 110 Da (Cd, Ag). 56 + 2 = 58 Da (Ni, Co, Fe) ; 56 + 8 = 64 Da (Cu) (Zn); 56 + 20 = 76 Da (Se. As); 56 + 28 = 84 Da (Rb, Kr). 78 + 2 = 80 Da (Br, Kr); 78 + 8 = 86 Da (Rb, Sr); 78 + 20 = 98 Da (Mo , Tc).

E and B More Strongly Induce NMMs

It is important to consider also induced NMMs in resulting electrostatic and magnetic fields of surroundings. It is important to note that not only thermal space can agitate nucleons to fractionally reversibly (FR) fiss and fuse. Electric, magnetic and gravitational fields can also induce FR fissing and fusing. So thereby electric fields and magnetic fields can induce more fractional fiss and fuse for pushing core e^- e^- from Rb^+. Down the column of periodic table does optical pumping increase to Cs^+? Electronegativity can cause e^- capture into nuclei to decrease with decreasing atomic number. Electropositive can cause e^- release from nuclei to increase with increasing atomic number. The results of such e^- release and e^- capture from nuclei is: $n^0 \leftrightarrow p^+ + e^-$, and they tend to increase with atomic numbers.

Due to strong stability of magnetic number nucleon molecules, the author proposes greater stabilities and less reversible, fractional (FR) fissing and fusing magic number nuclei. But for nuclides near magic number nuclei, the author proposes increase tendency to FR fiss and fuse. For example, ^{16}O is a stable magic number nuclide composed of 2 magic numbers (8 + 8). The author thereby notes less FR induced fissing and fusing of ^{16}O. But ^{17}O and ^{18}O are just near ^{16}O and ^{17}O and ^{18}O are proposed to more readily FR fiss and fuse.

Stronger Induction of NMMs by Nuclei Near Magic Number Molecules

It important to note the induced nuclear magnetic moments (NMMs) by reversible, fractional (FR) fissing and fusing cause the increased and/or decreased in atomic number to dramatically alter bond strength dynamics and stability and H bonding strength dynamics and stability. The example of this is the erythritol [6], which has been observed to enrich ^{18}O and alter interactions with biomolecules to cause altered blood flow for blood clots. The FR fiss of neutrons in nuclei increase atomic numbers to increase chemical bond strength. The collapse of e^- on nuclei to transmute $p^+ + e^- \leftrightarrow n^0$ causes decrease in atomic number to weaken chemical bonds. Another example of more frequent fractional reversible fissing and fusing is ^{23}Na, which is near magic number 20. ^{23}Na with positive NMM can be induced to have – NMM as in ^{23}Ne. This induced NMMs of Na by FR fissing and fusing can cause sodium in membranes to be pumped in cell membranes. Note just as ^{18}O and ^{23}Na are near cluster 22 of (20 + 2) + 1 = 23, where 20 + 2 is magic number cluster. The extra neutron in nuclei magic numbers is subject to fissing; so ^{23}Na is really changeable by FR fissing and fusing as expressed here in ways not appreciated by current scientists. RBL here introduced unusual behaviors of sodium and other isotopes like ^{18}O and ^{17}O under highly activating conditions of high temperatures, strong electric fields, gravity, mechanical pressures, and strong magnetic fields.

B. 2 Da

The author can thereby consider magic number nuclei 2, 8, 20, 28, 50, 82, 126. And correlate stabilities of atoms ofelements having these magic number masses of their nuclei. The author can further consider atoms of elements near these magic number nuclei and correlate greater chemical, physical and biological phenomena due to greater tendency of these near magic number nuclei to fractional reversible (FR) fissing and fusing. For instance, for magic number 2, there is stability of ^{2}D and less stability of ^{3}T. As 3Da is near 2 Da of magic number 2. Such new theory of the author can give new foundation for explaining data of unusual binding energies and dynamics of ^{1}H, ^{2}D and ^{3}T vs ^{3}He. The magic number can also inside nuclei bind to form molecules of magic number clusters bonding by n^0 and p^+. Such magic number nucleons molecules also manifest greater activity and fractional reversible (FR) fissing and fusing relative to the composing magic number clusters. For instance, consider 2 + 2 = 4 He (Single Cluster molecules)

2+8 = 10 ; 4 (Double Cluster molecules) + 8 = 12 ;
2 + 20 = 22; 10 (double cluster molecules) + 20 = 30
2 + 28 = 30 ; 22 (double cluster molecules) + 28 = 50
2 + 50 = 52 .

So for magic number 2, the unusual properties should be for mass 3 Da for nuclides like ^{3}H and ^{3}He. And relative to ^{1}H, ^{2}H and ^{4}He, ^{3}H and ^{3}He have unusual properties. By RBL theory, the unusual data on ^{3}H and ^{3}He [7] can be explained. By RBL theory, the unusual data on ^{3}H and ^{3}He can be explained. So for 2 + 2 = 4 Da, then the nucleus of mass 5 Da and mass 6 Da should have unusual properties. The nucleus of ^{6}Li should have remarkable properties. So by RBL theory, ^{6}Li and the lithium ion battery [8] can be explained. RBL also can explain use of the magnetic field to charge Li^{+} ion battery [9]. RBL can explain his theory of using E, B, and vibrations to separate Li^{+} from solar brines [10].

8 Da

For magic number 8, nuclei having mass near 8 Da manifest stabilities and lower activity due to fractional reversible (FR) fissing and fusing. Formations of magic number molecules with magic number 8 manifest the following nuclides with greater stabilities. Nuclides near these masses (16, 18, 24, 28, 36, 56, 58, 86 for FR fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to consider 8 + 8 = 16 Da; 16 + 2 = 18 Da; 16 + 8 = 24 Da (Single Cluster)

8 + 20 = 28 Da; 16 + 20 = 36 Da (Double Cluster)
8 + 28 = 36 Da; 28 + 28 =56 Da
8 + 50 = 58 Da; 36 + 50 = 86 Da.

For mass 8 Da, nuclides of masses 9 Da and 10 Da should have unusual properties. The ^{10}B and ^{11}B may manifest unusual properties as $5p^{+} + 5n^{0}$ involve 1 extra p^{+} and 1 extra neutron form magic number nucleons. Thereby ^{10}B may manifest unusual properties under high temperatures, strong magnetic fields and strong electric fields. B fusion reactor of Hora [11] may be better explained by RBL theory of induced NMMs. But how do you compare unusual induced NMMs about 8 Da verses about 10 Da? ^{9}Be more unusual than ^{12}C? $^{12}C \leftrightarrow {}^{12}N$ for unusual properties of carbon under high temperatures, strong electric fields, strong magnetic fields. On the basis of such RBL explains ^{12}C by its induced spin and NMM by FR fissing and fusing to ^{12}B and ^{12}N for its role in superconductivity. Recent observation of room temperature superconductivity in wrinkles in thin graphite can be explained by RBL theory. And the 8 + 8 = 16 Da and unusual properties of ^{17}O and ^{18}O.

By RBL theory of FR fissing and fusing and induced NMMs, ^{12}C and ^{1}H are under extreme conditions to manifest induced NMMs and spins for ^{12}C to FR transmute to ^{12}B and ^{12}B has +1.00 NMM and spin =1 . ^{12}C may also FR fiss and fuse to ^{12}N with its spin = 1 and 0.47 NMM. Thereby where as ^{12}C has 0NMM and 0 spin, by the extreme conditions ^{12}C can be induced to have + NMMs and spin =1 in transiently forming ^{12}B and ^{12}N. RBL's theory gives basis for novel chemical dynamics of carbon and hydrogen by these induced NMMs and spins in extreme conditions of high temperature and pressures for forming diamond. RBL theory further by such extreme conditions in dense microwave and radiofrequency plasma gives induced spin =1 and positive NMMs of ^{12}C as transiently forming ^{12}B and ^{12}N for explaining the magnetic properties of hydrogen and carbon plasma and the magnetic coupling of H and C plasma to diamond growth edge for organizing single crystal diamond formation magnetically by magnetic coupling ^{12}C and ^{1}H in plasma to ^{12}C in the diamond growth edge for communicating the single crystal organization even in macrocarat diamond formation and single layer graphene formation!

20 Da

For magic number 20, nuclei having mass near 20 Da manifest stabilities and lower activity due to fractional reversible (FR) fissing and fusing. Formations of magic number molecules with magic number 20 manifest the following nuclides with greater stabilities. Nuclides near these masses (40, 42, 48, 50, 56, 60, 68, 76) for FR fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to consider 20 + 20 = 40 Da; 40 + 2 = 42 Da; 40 + 8 = 48 Da; 40 + 20 = 60 Da; 40 + 28 = 68; Da (Single Cluster) . 20 + 28 = 48 Da; 48 + 2 = 50 Da; 48 + 8 = 56 Da; 48 + 20 = 68 Da; 48 + 28 = 76 Da (Double Cluster). Iron arsenate and the ^{75}As by electron and proton capture goes to ^{76}As and it has negative (- 0.906) NMM. ^{74}As has huge – NMM of 1.597. ^{72}As has huge – NMM of -2.16. 20 + 50 = 70 Da. On such basis, the role of As in superconductivity [13] is rationalized by the author's theory. So for mass number 20, there is a jump from mass 16 Da to mass 20 Da (F and Ne) and how do these elements of mass 16 Da to mass 20 Da manifest compared to mass 8 Da and mass 10 Da? ^{19}F requires stronger conditions to FR fiss and fuse. ^{19}F forms strongest bonds and less reversible, fractional (FR) fiss and fuse to induce chemistry of ^{19}F to explain difficulty of breaking F bonds to other elements. Ne is inert and its nuclei do not FR fiss and fuse to induce transient bonding of Ne as with other noble gases. Such theory of RBL explains recent clustering of Ne inside diamond [14].

By mass 20 Da, there is mass 20 + 2 Da and ^{23}Na with unusual properties. And then 1 + 23 = 24 Da and this is ^{25}Mg plays role in living organisms. And Mg^{2+} is important mineral for enzyme activity. And here RBL discovers that ^{24}Mg like ^{23}Mg, ^{18}O, ^{12}C, ^{15}N plays important on electron role in life due to it being near magic number clustering in nuclei. 20 + 8 = 28 Da and this is near ^{27}Al and ^{28}Si. And then 20 + 20 = 40 Da and near 40 Da are K and Ca. ^{39}K and ^{40}Ca are around the clustering of two 20 magic numbers and the extra neutrons more easily FR fiss and fuse for altering surrounding electrons for novel properties of K and Ca for unusual properties of K and Ca for their roles in life and biomolecules. Later in this manuscript, the author relates FR fissing and fusing of K and Co due to their proximities to magic numbers to their roles in living organisms.

28 Da

For magic number 28, nuclei having mass near 28 Da manifest stabilities and lower activity due to fractional reversible (FR) fissing and fusing. Formations of magic number molecules with magic number 28 manifest the following nuclides with greater stabilities. Nuclides near these masses (56, 58, 76, 84) for fractional reversibly (FR) fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to consider 28 + 28 = 56 Da (Single Cluster). 56 +2+8 = 66 Da and ^{63}Cu and ^{65}Cu (Double Cluster)

So for mass 28 Da, then there is 28+ 2 = 30 Da and ^{32}S and ^{32}S role in living organisms. ^{32}S transmutes for its nonzero NMMs and novel properties of ^{32}S. ^{32}S transmutes to -0.252 NMMs and spin = 1 of ^{32}P to explain its role in life as discovered here. Such FR fissing and fusing of ^{32}S is here given by author to explain the superconductivity of high pressure H_2S [15]. 28 + 8 = 36 Da. And ^{35}Cl and ^{37}Cl have unusual properties near mass 36 Da as the 36 + 1 = 37/35 Da and the unusual properties of Cl due to FR fissing and fusing of Cl to produce altered NMMs by induction for unusual properties and Cl playing role in life. Cl^- ions is known to play important roles of life with special ion channels for transport across cell membranes and malfunctioning Cl^- ion channels are known to cause disease. The NMMs of Cl^- ions play a role. The Cl^-ions have filled shell and there is access to s orbitals for electrons to communicate with nuclei by quantum fluctuations. The clumping of these specific elements allows them to feel the thermal space and FR fiss and fuse for transient nuclear explosions to drive life processes. The stars are driven by fusion and these elements are from stars, and some have the instability to sense thermal space to fractionally ignite. Life is as stars and FR nuclear bombs and stars are of GOD. GOD is the cause of life. 28 + 20 = 48 Da. So from 36 ↔ 48 Da are there any clusters of 2, 8, 20? Yes 40 Da, 44 Da, 42 Da, 46 Da and 48 Da. 44 – 48 Da and there are multiple magic number clusters for Sc, Ti, V and not much roles in life as multiple clusters with intervening n^0 may fiss – NMMs. And for mass numbers of 48 to 56 Da as 28 + 28 = 56 Da and roles of Fe to life as isotopes of Fe. ^{56}Fe can transmute to ^{56}Co or ^{56}Mn and ^{58}Fe and ^{57}Fe have nuclei of 2 n^0 (neutrons) and 1 n^0 for induce NMMs. Clusters of elements can self-induced if thermal space induces one isotope of nonzero NMMs then the nonzero NMM can induce changes in null NMMs of other elements.

50 Da

For magic number (MN) 50, nuclei having masses near 50 Da manifest stabilities and lower activities due to fractional reversible (FR) fissing and fusing. Formations of magic number molecules with magic number 50 manifest the following nuclides with greater stabilities. Nuclides near these masses (100, 102, 108, 120, 128, 150) for FR fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to consider magic number nucleonic molecules (MNNM) of masses of or near magic numbers: 50 + 50 = 100 Da; 100 + 2 = 102 Da; 100 + 8 = 108 Da; 100 + 20 = 120 Da (Single Cluster).

So for mass 50 Da, there is jump in masses from 50 to 56 Da with very little corresponding activity for life of V, Cr, and Mn atoms and their isotopes. For 50 to 52 Da = 50 + 2 Da; for 50 + 8 = 58 Da there is ^{56}Fe. And then for 50 + 20 =70 Da. So from 58 to 70 Da for magic number 50 Da there are some possible MNNMs. But 50 can form by 2, 8, 20, 28, clusters to various masses between 50 to 70 Da: 28 + 28 = 56 Da, 56 + 2 = 58 Da; 56 + 8 = 64 Da. So for 64 Da, there are roles of Cu and Zn to life. These nuclei of Fe, Zn and Cu are near magic numbers and MNNM and are able to FR fiss and fuse near ambient for novel properties for life, superconductivity, and possibly novel catalysis. So for magic numbers (MN) 64 + 20 = 84 Da. There is Rb. And from 64 to 84 Da, excluding 70 Da Ge, there is no role of isotopes to life. Ga has no role to life. Ge has no biological role. And at 84 Da there is Sr. Se is an essential micro nutrient. So the mechanisms of biochemical reactions are unknown, here RBL gives a theory to explain biochemical reaction mechanisms by near magic numbers, stabilities and instabilities and increase FR fissing and fusing. So the mechanism of biochemical reactions are unknown, but here RBL gives new theory by effects of induced NMMs by FR fissing and fusing for causing bioactivity, enzymatic behavior and properties of biomolecules. Sr has biological role. ^{92}Mo, ^{94}Mo, ^{95}Mo, ^{97}Mo, ^{98}Mo, ^{100}Mo has biological role. Mo is essential to life by RBL's theory on basis of MNNM as 50 + 28+20 = 98 Da and $\boldsymbol{\beta}$ and reverse $\boldsymbol{\beta}$ of Mo induced NMMs for biochemistry by FR fissing and fusing. Ru is present in life? Y, Zr, Rh, Pd, Ag have no roles for life and the nuclides of these elements are not MN or MNNMs. Tin has isotopes ^{115}Sn, ^{117}Sn and ^{119}Sn of large negative NMMs. Such negative NMMs of Sn contribute to its many unusual enzymatic, catalytic, superconductive and other unusual properties.

82 Da

For magic number 82, nuclei having mass near 82 Da manifest stabilities and lower activities due to FR fissing and fusing. Formations of magic number molecules with magic number 82 manifest the following nuclides with greater stabilities. Nuclides near these masses (164, 166, 172, 184, 208) for FR fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to consider 82 + 82 = 164 Da; 164 + 2 = 166 Da; 164 + 8 = 172 Da; 164 + 20 = 184 Da; 82+126 = 208 Da (Single Cluster). Pb is 206, 207, 208 Da (^{208}Pb is most abundant and is clustered nucleus). ^{175}Lu and ^{176}Lu has MNNM of 164+8 + 2 = 174 Da. These show how magic number can bind and different permutations of binding for maybe explaining observed different stabilities of isotopes of heavier atoms. Thereby many of these stable uncommon isotopes are close to magic number nuclei for subjecting them to Little Effect to explain their unusual chemistry and physics.

126 Da

For magic number (MN) = 126, nuclei having masses near 126 Da manifest stabilities and lower activities due to fractional reversible (FR) fissing and fusing. Formations of magic number nucleonic molecules (MNNM) with magic number 126 manifest the following nuclides with greater stabilities. Nuclides near these masses (252, 254, 260, 272, 280, 302) for FR fissing and fusing and novel physical, chemical and biological properties. For instance, it is good to note applications here (for these heavy nuclei as formed by chain reactions from nuclear fission and fusion waste) of using the nuclear waste to catalyze important chemical reactions such as CO_2 conversion to hydrocarbons as such nuclear waste has the thermal energy and important FR fissing and fusing along with irreversibly transmutations for causing energetic of catalyzing CO_2 to hydrocarbons.

C. Examples of Clustered Nuclei Affecting Electronic Lattices for Novel Phenomena

Across the periodic table, it is demonstrated how many anomalous properties of particular elements are explained as discovered here by magic number nucleonic molecules (MNNM) nuclei, proximities to magic number nuclei and nuclei manifesting internal magic number clusters bonded by smaller clusters of p^+ and/or n^0 for magic number nucleonic molecules.

For magic number nucleonic molecules (MNNM) 24 (two clustering), there is Mg and for MNNM of 24 (five clustered) there is ^{25}Mg (-0.855 NMM) with its instability as 25 FR fisses to 24 Da? For MNNM of 28 (no clustering) is there greater stability? Yes, there is magic number. ^{28}Mg ↔ ^{28}Al and the consistent instability of ^{28}Al. ^{28}Al ↔ ^{28}Si (stability), with $\boldsymbol{\beta}$ decay from Mg to Si for magic number (MN) = 28. And Al is near Si with forming superconductors. Al and Mg make superconductors as the e^- e^- collapse on Mg and Al form ^{28}Si and the collapsed electrons scattered back with greater energy than before the collision. And beyond phosphorus of 28 Da to 50 Da, there should be a lot of isotopes and beta ($\boldsymbol{\beta}$) decay (neutron to proton) and electron capture (proton to neutron). (There are a lot of examples of of unusual properties for masses 28 Da + 50 Da.)

Due to ease of fractional reversible (FR) fissing and fusing of MNNM there is beyond ^{31}P, ^{32}P undergoing beta decay (neutron ↔ e^- + p^+) for ^{32}S. and $\boldsymbol{\beta}$ decay of ^{33}P for ^{32}P ↔ ^{33}P. So high pressure H_2S can take its ^{32}S and electron capture for FR fissing and fusing of MNNM to form ^{32}P and ^{32}P has negative (-0.25) NMM and this can explain by RBL theory the superconductivity of high pressure H_2S [15]. Fractional, reversible (FR) transmutations may be a basis to break bonds and form bonds along reaction trajectories. Chemical reaction dynamics has assumed static nuclei. But RBL introduces concept of nuclei changing reversibly during chemical reactions by FR fissing and fusing of MNNM.

Yes, below ^{31}P there is EC by ^{29}P to ^{29}Si and EC of ^{30}P to ^{30}Si by FR fissing and fusing of MNNM. And at ^{31}P, there is 30 Da for clustered magic numbers (MN) for various unstable nuclei of P and stable ^{31}P. Such FR fissing and fusing of MNNM at ^{31}P is related to nature's use of P in ATP. On such basis of FR fissing and fusing of MNNM of ^{17}O and ^{18}O as $^{16}O \leftrightarrow {}^{18}O$ and to ^{17}O, then alterations occur with ATP. In cancer, ^{16}O in ATP $\leftrightarrow$ ^{18}O, but ^{17}O can cure cancer as ^{17}O replaces ^{18}O in ATP.

By using this theory of FR fissing and fusing of MNNM, the author can explain C doped H_2S by Dias [16]. The ^{12}C can $\leftrightarrow$ ^{12}B and ^{12}B by FR fissing and fusing of MNNM of ^{12}C, ^{12}C by irreversibly transmuting has instability by its $^{12}C \sim {}^{12}B$ positive NMM of 1.0031 with negative NMM of ^{32}P for causing the superconductivity at room temperature. ^{175}Lu and ^{176}Lu by FR fissing and fusing of MNNM of 164 + 8 + 2 = 174 Da the superconductivity at room temperature and lower pressures can be explained by resulting induced NMMs in RBL's theory. And S has ^{32}S, ^{33}S, ^{34}S and ^{36}S stable nuclei with clustering and no magnetic numbers but MNNM can manifest and have FR fissing and/or fusing for unusual properties and the superconductivity of H_2S at high pressures high temperatures. So below ^{32}S, S can electron capture (EC) and above ^{32}S, S can beta decay to various Cl nuclei.

Electron Capture (EC) verses hydride capture (HC) can occur as RBL proposed in 2003-05 for fractional, irreversible and reversible (FR) fissing and fusing. Hydrogen can occlude in high pressure superconductors for explaining the superconductivity. If the e^- e^- collide with proton, then the resulting hydride can get bound in the s orbital of S or C or Lu or La or Y; so as to prevent the dissipation of the conduction to thermal energy for sustaining superconductivity. The occluded H^- is then propelled into the lattice where the e^- e^- continue in superconducting motion and the p^+ binds more scatter e^- e^- and the H again is again occluded in the s orbital. The positive NMMs of induced ^{12}C and ^{32}S (due to high pressures) bind the H^- and its induced negative NMM. The Lu and La have positive NMMs and operate at lower pressures for explaining the proposed lower pressure superconductivity in these materials. Why do some EC for reducing atomic number (fissing) {possibly due to negative NMMs pulling in the e^- e^-} and other hydride capture (for fusing) {possibly due to positive and negative NMMs) for increasing atomic numbers? And why do others elemental atoms proton capture due to this negative NMMs for increasing atomic number? Some examples are the ^{15}N and ^{17}O altering hydrogen bonding and ^{15}N and ^{17}O causing electron avalanche in lightning as the ^{15}N and ^{17}O pull in proton then the proton is expelled to cause electron expulsion and breakdown for lightning.

And beyond S is Cl and Cl has two isotopes. By FR fissing and fusing of MNNM of 35 and 37 can be altered for unusual properties of Cl and its role in life are explained. The ^{35}Cl and ^{37}Cl have positive NMMs. Some clustered nucleons occur at 36 Da; so many stable nuclei and various stabilities due to the clustering in this mass number range without magic numbers. In the cases of ^{39}Ar, ^{38}Ar and ^{40}Ar, Ar may be reasoned by clustering of nucleon molecules to MNNM and no stable magic number nucleons exist without clustering. And about stable Ar are smaller unstable nuclei with EC. And larger unstable nuclei occur with beta ($\boldsymbol{\beta}$) decay. Therein after Ar is K and ^{39}K, ^{40}K and ^{41}K and a lot of clustered nucleon molecules (MNNM) and instability and induced NMMs. Thereby on basis of RBL theory the proximity of many nuclei near MN and MNNM for Ar gives basis for why K is important for life. Unlike Ar with masses 38-40 Da, K with masses 39-41 Da has odd nucleons and is more reactive and catalytic by odd nucleon numbers.

Ca has nuclides of mass numbers: 40, 42, 43, 44, 46, 48 Da with stable nuclei with clustering magnetic numb nucleonic molecules (MNNM) for many metastable nuclei. Such FR fissing and fusing of

MNNM near 40-48 Da explain unusual properties of Ca and its role in life. And many unstable nuclei from EC exist for nuclides less than ^{42}Ca and beta decay for nuclides greater in mass than ^{42}Ca. ^{44}Ca may FR gain e$^-$ to transmute to neutron by beta process FR to form ^{44}K with negative NMM for its role in cancer. Such ^{44}Ca explains the superconductivity in cuprates and recent Ca hydrides under high pressures [17]. As the beta decay transmute to ^{44}Sc for the superconductivity. ^{44}Ca is unusual as it may transmute by e$^-$ capture to form ^{44}K of negative NMM. But ^{44}Ca may also transmute by releasing e$^-$ from its nucleus to form ^{44}Sc of positive NMM for unusual properties of ^{44}Ca!

^{45}Sc is near magic number and this explains why Sc has huge NMM of 4.75. The FR fissing and fusing of MNNM explains this large + NMM and Sc superconductivity. Sc is superconductor [18] and the superconductivity can be reasoned due to electron capture and such reversible electron capture of Ca and Sc can explain the phonon induced collapse of Cooper pair onto Sc or Ca to form metastable Sc and the electrons by the nuclear process cannot dissipate their conduction but ricochet with even more conduction for superconductivity of Sc by RBL's theory! For Ti, then Ti has ^{50}Ti but it has low relative abundance, why? Ti has too many neutrons; 50 is magic number. ^{48}Ti is more abundance, but it can take 2 electrons to form ^{50}Ti and both have zero NMMs. ^{50}Ti is not very abundant as it has too many neutrons. Catalytic properties of ^{47}Ti can be explained by the author's theory as by FR fissing and fusing of MNNM for causing it to have negative NMM. But by e$^-$ capture, Sc can manifest ^{47}Sc of large positive NMM!

The unusual properties of V can be explained due to its proximity to magic number 50 and its FR fissing and fusing of its MNNM. ^{51}V is more abundant and it has large NMM of 5.15 NMM. {The elements having unusual catalysis, superconductivity and strange metallicity may be more inclined to FR transmute}. Vanadium has unusual catalytic properties of enriching ^{17}O and ^{18}O in sulfates for unusual catalytic properties of Cr [19] is due to ^{53}Cr due to its FR fissing and fusing of ^{53}Cr with negative NMM capturing electron to transmute to ^{53}V of zero NMM. By FR fissing and fusing of MNNM of ^{51}V, it enriches ^{18}O and ^{17}O in catalysis due to ^{51}V of large positive NMM RF transmuting by its nucleus releasing e$^-$ for neutron to proton in its nucleus to form ^{51}Cr of large negative NMM and halflife of days. Also for 52 Da (one clustering), there are Cr and Mn. So there are unusual properties of 53 Da and for 51 Da. ^{51}Cr is radioisotope with (half-life of 27.7 days and -0.934 NMM and spin 7/2). ^{53}Cr has negative (-) 0.474 NMM and unstable to FR fiss to stable ^{52}Cr. The FR fiss energy can alter nuclei and alter surrounding electronic lattice for novel properties reversibly.

By the author's theory of FR fissing and fusing of MNNM, properties of Fe can be reasoned. ^{56}Fe is most abundant and it can induce + NMM by $\boldsymbol{\beta}$ (electron capture by its nucleus) to ^{56}Mn with large induced NMM and halflife of hours. ^{56}Fe in blood can transmute by e$^-$ capture to form ^{56}Co and there is large positive NMM of ^{56}Co to push away ^{18}O (due to induce spin =1). The induced positive NMM of ^{56}Fe favors ^{17}O and ^{16}O. This + induced NMM of ^{56}Fe prevents ^{18}O from getting into body to cause cancer as both have induced + NMMs. So near O of 16 Da also has the electrons collide to ^{16}O and the metastable ^{16}O decays readily by releasing the electrons with more energy! It is important to note ^{18}O can take 2 n^0 n^0 can ↔ 20 Da, which is a magic number. The two clustering is a cause for greater instability to FR fiss ^{20}O to ^{18}O. It is important to note the stability of clustered magic number is even greater than the stability of clustering to a magic number. ^{18}O can cluster to 20 Da FR fissing and fusing of 2p$^+$ + 2e$^-$ + ^{18}O ↔ ^{20}O and this is even more stable to form ^{20}F and ^{20}F has huge positive NMM of 2.094. Electron capture of ^{17}O by FR fissing and fusing can form ^{17}F of huge positive NMM (4.72). These dynamics about O can cause huge superconductivity of cuprates. For magic number (MN) of 16 (one clustering), for O (oxygen) excess FR fusing can occur to bind e^- or e^- e^- or p or p^+ p^+. And ^{17}O is nearby and unstable so FR fiss to ^{16}O. For 18 Da (two clustering), excess FR fisses to release binding fields. ^{18}O is FR fiss to ^{16}O with greater proclivity than ^{17}O for hidden dynamics.

By the author's theory, the FR fissing and fusing can explain unusual properties of elements having masses near 8 Da: Li, Be and B. ^{6}Li can capture e^- e^- cooper pair and form mass number 8 a magic number and this helps superconductivity. Note ^{6}Li has relative abundance of 7.59%, if use 100% ^{6}Li then may see room temperature superconductivity. Yes ^{6}Li shows inverse superconducting isotope effect [20].

The FR fissing and fusing of MNNM near 82 Da can reason unusual properties of Rb, like its optical pumping. For 84 Da (one clustering) there is Rb. And ^{85}Rb (1.35 NMM) is unstable and can FR fiss to ^{85}Rb (to less massive nucleus but which one?) for stability. Likewise, ^{87}Rb (with its +2.75 NMM; notice the larger NMM than ^{85}Rb as ^{87}Rb is two clustered) is two clustered and can FR fiss to stability.

Properties of Be can be reasoned by the author's theory of FR fissing and fusing of MNNM of 8 Da + 1 = 9Da of Be for reasoning why Be has one isotope. The instability of ^{10}Be follows from its two extra n^0 beyond MNNM of mass 8. For ^{10}Be there are $4p^+ + 4n^0 + 2n^0$ with the instability from too many neutron (n^0) relative to protons (p^+). By the theory reported here excessive n^0 even in nuclei causes instability as demonstrated by ^{10}Be. In general, elements with fewer stable isotopes are explained by the author's theory to manifest due to their mass numbers not summing from magic numbers that are smaller than nucleonic clusters. But such elements with 1 or 2 isotopes tend to have mass numbers that are 2 larger or smaller than magic number nuclides. N has two isotopes and the ^{14}N and ^{15}N are near magic number and MNNM of 16. So N readily FR fuses n^0 and p^+ to form magic number nuclide to alter its NMMs for novel dynamics. Such tendency of FR fissing and fusing of nuclei explains the transition from solids of B and C, to gases of N_2, O_2 and F_2. The theory of the author further explains the instability of ^{20}O as it readily fisses to ^{16}O as the $4n^0$ are able to stabilize by transmuting ^{20}O to $^{16}O + 4p^+ + 4e^-$ from FR fissing and fusing. The author notes here the instability of all n^0 and/or all p^+ without the presence of both n^0 and p^+. So $4n^0$ MNNM is not stable and $4p^+$ MNNM is not stable. But together $4p^+$ and $4n^0$ interacting MNNM are more stable. The ^{9}N is an example as it has $7p^+ + 2n^0$. $7p^+ + p^+ \leftrightarrow 8p^+ + 2n^0 + 7p^+$ of ^{9}N captures a p^+ by FR fusing to momentarily form $2n^0 + 7p^+ + 1p^+ \leftrightarrow 2n^0 + 8p^+$ with 2 magic numbers for momentary stability. Thereby RBL reasons H impurity in the N system caused momentary stability of ^{9}N. The author's theory explains the stability of ^{9}N [21] as 9 is near 8 (magic number nuclei). ^{9}N readily loses n to magic number 8.

The author's theory can also explain the single isotope of ^{19}F , ^{23}Na, ^{31}P and ^{27}Al. These nuclides are also near magic number (MN) nuclei. ^{31}P has mass number 1 larger than MNNM 30, which is sum of magic number nucleonic molecule (MNNM) by 28 + 2. ^{19}F is nearby 1 to magic number 20. ^{23}Na is near MN 20 and 28. ^{27}Al is near MN 28 by 1. ^{31}P is near MN 28. ^{45}Sc has only one isotope for Sc. 45 is near MNNM = 20 + 20 = 40 ↔ 45 ↔ 50 = 28 + 2 + 16 = 46. ^{75}As is only isotope of As. 75 is near MNNM = 50 + 16 + 8 + 2 = 50 + 38 = 78. 75 = 50 + 25= 50 + 24 + 1 = 50 + 3 (8) + 1. In each case of fewer isotopes of element, the mass number differ by 1 from magic number or MNNM and the 1 may be binding magic number but may destabilize nonmagic number for instability of other mass numbers for unstable nuclei. So unstable nuclei are determined by the author's theory to arise by interactions of nucleons with nonmagic number nucleons. If there is no 1 extra nucleon, then the non-magic number nuclei may have longer lifetimes like ^{14}C = 14 = 8 + 2 + 2 + 2. Two (2) extends life time of interacting MNs. ^{3}T is shorter lifetime as there is 1. This by RBL's theory can explain why Be only one isotope of negative NMM. This by RBL's theory can explain why N has positive and negative NMMs. This by RBL 's theory can explain why ^{9}N is stable. This by RBL's theory can explain why Oxygen ^{20}O heavy is unstable. This by RBL's theory can explain why ^{19}F, ^{22}Na, ^{31}P and ^{27}Al have only one isotope. RBL's theory thereby explains Why Sc only one isotope and why As has only one isotope. The author's theory cannot only explain unusual chemical, physical and biological phenomena by induced + and – NMMs, but RBL's theory also explain why + NMM and why – NMMs.

The author's theory of FR fissing and fusing of MNNM also can give theoretical basis of why some elements have many stable isotopes. For example, Ti has many isotopes. Ti has mass 46, 47, 49, 50 with ^{48}Ti in largest relative abundance (RA). The mass number 48 is sum of magic number clusters for larger MNNMs: 20 + 28. The fractional, reversible (FR) fissing and fusing about the two magic number clusters in nucleus of 48 causes the range and large number of stable isotopes of Ti. Ni has wide range of stable isotopes with mass number 58, 60, 61, and 62. ^{58}Ni is most relative abundant Ni isotope. 58 = 28 + 30= 28 + 20 + 10 = 28 + 20 + 8 + 2. There again the most common isotope is related to a sum of stable magic number nucleonic molecules (MNNMs) clusters. Ge has range of isotopes of mass numbers: 70, 72, 73, 74, 76 with ^{70}Ge having largest relative abundance. Such can be reasoned as sum of magic numbers for MNNMs: 70 = 50 + 20 as Ge has mass number that is sum of mass numbers of magic numbers. Se has range of isotopes of mass numbers : 74, 76, 77, 78, 80, 82 with ^{80}Se having largest relative abundance. Such large number of stable isotopes of Se follows from its mass number 80 being sum of magic numbers for MNNMs: 80 = 50 + 20 + 8 + 2.

Br is 79 and 81 mass numbers and does not have large range of stable isotopes. Kr has mass numbers: 78, 80, 82, 83, 84, 88 with ^{84}Kr having largest relative abundance. Such large range follows from various possible summing magic numbers for many MNNMs: 84 = 50 + 34 = 50 + 28 + 6 = 50 + 20 + 8 + 6 = 28 + 28 + 28 = 84. Sr has 88 – 1 87 = 50 + 37 = 50 + 20 + 17 = 50 + 20 + 18 = 50 + 20 + 16 + 2. But 16 is not magic number, but 16 is sum of 2 magic numbers 8 + 8 for MNNMs. Zr has mass numbers: 90, 91, 92, 94, 96 with ^{90}Zr having largest relative abundance. 90 = 45 + 45 = 92 + 8 . Mo has stable isotopes of mass numbers : 92, 94, 95, 96, 97, 98, 100 with ^{98}Mo and ^{96}Mo and ^{100}Mo having larger relative abundance. The sum of Magic Number (MN) can form 98 for many possible MNNMs. 98 = 82 + 10 + 6 = 82 + 8 + 8. Cd has stable isotopes of mass numbers: 110, 111, 112, 113, 114, 116, with ^{112}Cd and ^{114}Cd having largest relative abundance. The sum of magic number (MN) can form 112 for many possible MNNMs. 112 = 82 + 30 = 82 + 20 + 8 + 2. Sn has stable isotopes with mass numbers: 116, 117, 118, 119, 120, 122, 124 with ^{120}Sn having largest relative abundance. 120 = 50 + 50 + 20. The sum of magic numbers can form 121 for many possible MNNMs. So has 121 and 123 = 82 + 41 = 82 + 20 + 20 + 1 for nonmagic number and fewer stable isotopes. But for Te there are many stable isotopes of mass numbers (MN): 122, 123, 124, 125, 126, 128, 130 with ^{130}Te having largest relative abundance: The sum of magic numbers can form 130 for possible MNNMs: 130 = 128 +2.

Elements with Many Isotopes, Why, And Fewer Isotopes

The reasons Ti has many isotopes can be explained by the author's theory. Also Ni, Ge and Se have many isotopes. Kr has many isotopes. Also Sr, Zr, Mo, Cd and Sn, Te, Xe, Nd, Sm Gd, Dy, Er, Yb, Os, Pt, and Pb. The instability of Technetium can be explained by the author's theory. The negative NMMs of Be, Ag, Rh, Tm, Y can be explained by the author's theory. The zero NMMs of Ce and Th can be explained; Ce, Th has no nonzero NMM. The all + NMMs of Tb --- Pa is explained has one all positive NMM. Tb, Ho, Bi, Pa . COMPLETE THIS!

Implications of Induced NMMs for Tunneling and Quantum Mechanic.

How Fissing and Fusing Nuclei Induce Tunneling

Nuclei by fractional reversible (FR) fissing and fusing can explain catalysis and enzymatics! By the author's theory the acceleration of catalysis without increasing KE is explained. Can catalysis be accelerated without increasing kinetic energy? The new mechanism of tunneling is presented here. Quantum mechanics and penetrating barriers can be explained by FR fissing and fusing reversibly as the FR fiss and fuse give energy to tunnel then the FR fissed and fused reabsorbed into nuclei in hidden manner as RB Little discovers here. FR, fragmenting nuclei may require energy to increase tunnel barrier. FR, fragmented nuclei may release energy to lower tunnel barrier transiently giving energy to lift particles over barrier and then giving the energy back. But now quantum entanglement the energy cannot be dissipated. The intrinsic nature of quantum mechanics is tunneling and wave nature. Fluctuations are quantum mechanical.

28 + 28 = 56 Da (Fe); 28 + 50 = 78 Da (Se)
50 + 50 = 100 Da (Ru); 50 + 82 = 132 Da (Xe)

The magic numbers (MN) are : 2, 8, 20, 28, 50 82, 126 …

After a consideration of how magic number clusters by the author's theory explains elements with large number of stable isotopes. And how by the author's theory elements that are not magic numbers but away from magic number clusters have fewer stable isotopes. And how elements with more than 2 away from magic number are unstable and more than 3 away from magic numbers are even more unstable. Now the author notes the case where magic numbers are bound by 1 or 2 neutrons or 1 or 2 p^+ for nucleon molecules. These are as in the less relative abundance isotopes forming and/or stable. Therefore, being less forming and less stable these are presented here to manifest among different elements with proclivities to FR fiss and fuse reversibly for hidden alterations of their electronic lattices and nuclear lattices for bizarre phenomena as discovered and disclosed here by the author. These bizarre phenomena manifest different chemistry, catalysis, enzymatics, physics, and energetics and biology. .

1st level (excessive nucleons bind two magic numbers together) - Magic Number Nucleonic Molecules of Equal Sizes

2+2 = 4 Da (^{4}He); 2+8=10 Da (^{9}Be,^{10}B)

8 + 8 = 16 Da (^{16}O); 8 + 20 = 28 Da (^{29}Si)

20 + 20 = 40 Da (^{40}Ar); 20 + 28 = 48 Da (^{48}Ti)

2nd Level – of Magic Number Nucleonic Molecules as Molecules Bind Magic Numbers

4 ; 4 + 2 = 6 Da (^{6}Li)

^{7}Li should have highly unusual properties and is strong activating.

10 ; 10 +2 = 12 Da (^{12}C) [or induce ^{12}N]; 10 + 8 = 18 Da (^{18}O); can ^{12}C induce to ^{12}N (+0.457) by proton collapse?

^{13}C should have highly unusual properties under strongly activating conditions.

16; 16 + 2 = 18 Da (^{18}O); 16+8 = 24 Da (^{24}Mg);

28; 28 + 2 = 30 Da (^{31}P); 28 + 8 = 36 Da (^{37}Cl, ^{35}Cl) ; 28 + 20 = 48 Da (^{48}Ti)

^{19}F should have highly unusual properties under strongly activating superconductivity discuss like cancer.

40; 40 + 2 = 42 Da (^{40}Ca , ^{45}Sc); 40 + 8 = 48 Da (^{48}Ti, ^{51}V); 40 + 20 = 60 Da (^{56}Fe, ^{58}Ni) ; 40 + 28 = 68 Da (^{64}Zn, ^{69}Ga)

48; 48 + 2 = 50 Da (^{50}V); 48 + 8 = 56 Da (^{56}Fe); 48 +20 = 68 Da (^{69}Ga); 48 + 28 =76 Da (^{75}As)

^{43}Ca should be extremely unusual under strongly activating conditions.

56; 56 + 2 = 58 Da (^{58}Ni); 56 + 8 = 64 Da (^{63}Cu); 56 + 20 = 76 Da (^{75}As); 56 + 28 = 84 Da (^{85}Rb)

56 + 50 = 106 Da (^{106}Pd, ^{108}Pd)

78; 78 + 2 = 80 Da (^{79}Br); 78 + 8 = 86 Da (^{84}Rb); 78 + 20 = 98 Da (^{97}Tc); 78 + 28 = 106 Da (^{106}Pd, ^{108}Pd);

^{59}Co should be extremely unusual under highly activating conditions. ^{59}Fe (0.2 NMM) and ^{59}Ni (0 NMM). Co has huge changes in NMM for extreme catalysis.

78 + 50 = 128 Da (I, ^{128}Te, ^{130}Te)

^{81}Br (2.27 NMM) should have highly unusual properties in extreme activating conditions. ^{81}Br ↔ ^{81}Se (0 NMM). And ^{81}Br ↔ (0 NMM). With loss of NMMs.

3rd Level - of Molecules Bind 2 Magic Number Clusters

6; 6 + 2 = 8 Da (^{6}Li); 6 + 8 = 14 Da (^{14}N); 6 + 20 = 26 Da (^{27}Al); 6 + 28 = 34 Da (^{32}S)

12: 12 + 2 = 14 Da (^{14}N); 12 + 8 = 20 Da (^{20}Ne); 12 + 20 = 32 Da (^{32}S)

18; 18 + 2 = 20 Da (^{20}Ne); 18 + 8 = 26 Da (^{27}Al); 18 + 20 = 38 Da (^{40}Ar)

24; 24 + 2 = 26 Da (^{27}Al); 24 + 8 = 32 Da (^{32}S); 24 + 20 = 42 Da (^{45}Sc)

42; 42 + 2 = 44 Da (^{45}Sc); 42 + 8 = 50 Da (^{51}V); 42 + 20 = 62 Da (^{63}Cu); 42+ 28 = 70 Da (^{69}Ga);

48; 48 + 2 = 50 Da (^{51}V); 48 + 8 = 64 Da (^{63}Cu); 48 + 20 = 68 Da (^{69}Ga);

60; 60 + 2 = 62 Da (^{63}Cu); 60 + 8 = 68 Da (^{69}Ga); 60 + 20 = 80 Da (^{79}Br); 60 + 28 = 88 Da (^{89}Y); 60 + 50 = 110 Da (^{112}Cd)

68 ; 68 + 2 = 70 Da (^{72}Ge); 68 + 8 = 76 Da (^{75}As); 68 + 20 = 88 Da (^{88}Sr, ^{89}Y); 68 + 50 = 118 Da (^{116}Sn)

50 ; 50 + 2 = 52 Da (^{52}Cr); 50 + 8 = 58 Da (^{59}Co, Ni); 50 + 20 = 70 Da (^{69}Ga, ^{70}Ge) ; 50 + 28 = 78 Da (^{80}Se); 50 + 50 = 100 Da (^{102}Ru)

56; 56 + 2 = 58 Da (^{60}Ni); 56 + 8 = 64 Da (^{63}Cu); 56 + 20 = 76 Da (^{75}As) ; 56 + 28 = 84 Da(^{84}Rb); 56 + 50 = 106 Da (^{108}Pd)

76; 76 + 2 = 78 Da (^{80}Se) ; 76 + 8 = 84 Da (^{84}Rb); 76 + 20 = 96 Da (^{98}Mo); 76 + 28 = 104 Da (^{103}Rh,^{105}Pd); 76 + 50 126 Da (^{127}I)
68; 68 + 2 = 70 Da (^{72}Ge); 68 + 8 = 76 Da (^{75}As); 68 + 20 = 88 Da (^{88}Sr, ^{89}Y); 68 + 50 = 118 Da (^{120}Sn)

58 : 58 + 2 = 54 Da (^{55}Mn); 58 + 8 = 66 Da (^{65}Cu); 58 + 20 = 78 Da (^{80}Se); 58 + 28 = 86 Da (^{84}Rb); 58 + 50 = 108 Da (^{109}Ag)
64 Da: 64 + 2 = 66 Da (^{65}Cu); 64 + 8 =72 Da (^{70}Ge); 64 + 20 = 84 Da (^{84}Rb , ^{86}Rb); 64 + 28 = 92 Da (^{90}Zr, ^{94}Zr); 64 + 50 = 114 Da (^{112}Cd,^{115}In)
84 Da; 84 +2 = 86 Da (^{84}Rb); 84 + 8 = 92 Da (^{90}Zr); 84 + 20 = 104 Da (^{103}Rh); 84 + 28 = 112 Da (^{114}Cd); 84 + 50 = 134 Da (^{133}Cs); 84 +82 = 166 Da (^{167}Er)
106 Da; 106 + 2 = 108 Da (^{107}Ag); 106 + 8 = 114 Da (^{115}In); 106 + 20 = 126 Da(^{127}I); 106 + 28 = 134 Da (^{133}Cs); 106 + 50 = 156 Da (^{157}Gd); 106 + 82 = 188 Da (^{187}Re)
76 Da: 76 + 2 = 78 Da (^{80}Se); 76 + 8 = 84 Da (^{86}Rb); 76 + 20 = 96 Da (^{97}Mo); 76 + 28 = 104 Da (^{103}Rh); 76 + 50 = 126 Da (^{127}I);
80 Da: 80 + 2 = 82 Da (^{84}Kr); 80 + 8 = 88 Da (^{88}Sr, ^{89}Y); 80 + 20 = 100 Da (^{101}Ru); 80 + 28 = 108 Da (^{109}Ag); 80 + 50 = 130 Da (^{131}Xe); 80 + 82 = 162 Da (^{163}Dy)
86 Da: 86 + 2 = 88 Da (^{88}Sr, ^{89}Y); 86 + 8 = 94 Da (^{95}Mo); 86 + 20 = 106 Da (^{105}Pd); 86 + 28 = 114 Da (^{115}In); 86 + 50 = 136 Da (^{137}Ba); 86 + 82 = 168 Da (^{169}Tm)
98 Da; 98 + 2 = 100 Da (^{101}Ru); 98 + 8 = 106 Da (^{105}Pd, ^{107}Ag); 98 + 20 = 118 Da (^{119}Sn); 98 + 28 = 126 Da (^{127}I); 98 + 50 = 148 Da (^{149}Sm); 98 + 82 = 180 Da (^{181}Ta, ^{179}Hf)
128 Da; 128 + 2 = 130 Da (^{129}Xe); 128 + 8 = 136 Da (^{137}Ba); 128 + 20 = 148 Da (^{149}Sm); 128 + 28 = 156 Da (^{157}Gd); 128 + 50 = 178 Da (^{179}Hf); 128 + 82 = 210 Da (^{208}Pb,^{209}Bi); 128 + 126 = 254 Da (Es).

In this table the author correlates Magic Number Nucleon Molecules (MNNM) with measured unusual nonzero NMMs of stable isotopes. But unstable isotopes also manifest induced NMMs for some stable isotopes. These unstable isotopes may be near magic numbers? So stable isotopes of zero NMMs (due to), stable isotopes of nonzero NMMs (due to having masses near MNNM), unstable isotopes with nonzero NMMs (due to being near MNNM) and unstable isotopes with zero NMMs (due to balance of p$^+$ and n^0 or excessive p$^+$ or n^0)! The zero NMM of unstable nuclei (with large separations and smaller densities of states) with excessive p$^+$ or n^0 is due to the motions causing stability of fermions for momentary times at expense of cancelling induced orbital magnetisms. In stable nuclei with small separations and larger densities of states, the motions of 1 or two can cause orbital magnetism as there is not so many of the fermions for instability.

Effects of NMMs on Molecular Properties

The FR fissing and fusing of MNNM would by the author's theory fractional, reversibly (FR) transmute nuclides either by e$^-$ capture, e$^-$ release, p$^+$ capture, p$^+$ release, n^0 capture and/or n$^-$ release with alterations of NMMs and release of + or – NMMs from nuclei. Positive NMM would twist the e$^-$ in same as + NMM of alkali. It is good to consider consequences of e$^-$ twist by + NMMs in comparison to e$^-$ twist by – NMMs. It is the e$^-$ e$^-$ in Ni that twist e$^-$ backward to + NMM of nuclei as RBL previously predicted. Ni nuclei are zero with tiny amount of ^{61}Ni at 1.19% relative abundance with 3/2 spin and – 0.75 NMM. The backward motions of – NMM would twist enlargement of atoms, ions, electron clouds. RBL introduced in prior manuscript that the negative NMMs and the induced negative and positive NMMs may manifest enlarge electron clouds to resonate orbitals and/or hybridized orbitals of different $e^- e^-$ in and out of orbitals via changing exchange gradients. + NMMs were noted to compress electron clouds about central atoms to rehybridize about central atoms.

RBL notes that the rehybridizations in valence bond theory by nuclei enhanced by isotopes of + NMMs. But the rehybridizations of many orbitals on different atoms by $e^- e^-$ --- $e^- e^-$ interactions are enhanced by the negative NMMs. The NMMs can alter hybridizations on an atom and between atoms but also the hybridizations can induce NMMs to fiss and fuse so resonating $e^- e^-$ can induce changes in nuclei for new effects by RBL's theory. This is why $^{13}CO_3^{2-}$ is induced to fractionally, reversibly fiss and fuse more than $^{31}PO_4^{3-}$ as 2D resonance occurs in $^{13}CO_3^{2-}$ and less 3D resonance occurs in PO_4^{3-}. The 2D resonance causes more fiss and fuse of ^{13}C due to electronic asymmetry in 2 dimensions about ^{13}C nuclei. 3D resonance less fiss and fuse ^{31}P due to more symmetry of resonance about ^{31}P in $^{31}PO_4^{3-}$.

RBL here notes that multiple NMMs in molecules can stimulate each other more intensely for releasing stronger and stronger nuclear pressures for revorbitals of many electrons for novel revolving electrons and liquidity. The liquidity of the electrons by their revolutions alter chemical bonding just as rotating molecules cause the liquid state and disrupts the gas forming solid. The rotating electrons disrupt the electron gas from solidifying to chemical bonds. And e^- layers up and down that fiss to – NMM that twist $e^- e^-$ particles ↔ waves so e^- interior twist chirality to left handed. Thereby RBL raises the issue here that such NMMs clumped in proteins and nucleic acids cause liquidity of the chemical bonds for altering metabolism for normal cells to become cancerous. Can such liquefaction of electrons in bonds explain Kreb cycle and glycolysis? Can it explain altered replication, transcription and translation?

Can – NMMs Reverse Effects of Positive NMMs

Is there a way ^{15}N and ^{17}O can correct damages by making chemistry causing damage reversibly? Or does ^{15}N and ^{17}O make damage worse to cause apoptosis? Either way ^{15}N and ^{17}O may protect normal cells from cancer and if inject cancer with ^{15}N and ^{17}O then these isotopes may kill cancer. ^{17}O may create more reactive oxygen species (ROS) in cancer. ^{17}O may attract to ROS in normal to lower damage of ROS. $H_2\,^{17}O$ ---- CC R_a R_b R_c magnetic bind ROS. Likewise, ^{15}N may protect ROS lower damage. ^{17}O and ^{15}N may be optically pumping with $^{39}K^+$, Na^+, p^+ so as to attack ^{13}C in cancer. But if ^{15}N is depleted, then ^{13}C builds up to damage DNA.

What are differences for protists, bacteria vs plant, animals, humans, single cell vs multi cells. Blood and O_2 limit multi-cellular organisms. Bacteria do not need blood. Blood transport ^{17}OH, $^{15}NH_3$ and then these uncommon isotopes cross cell membranes. Bacteria are not limited in this way. So multicellular organisms can use Fe in hemoglobin to isotopically deplete $^{17}O_2$. Blood can affect $^{17}OH_2$ and $^{15}NH_3$ enrichment. Blood and insulin may affect ^{13}C in glucose. So by multicellular interactions and transport isotopic depletions and enrichments may manifest in multicellular organisms. But bacteria, protists, and fungi and other single cellular species are not restricted in this way. Inside the cells, the different organelles may also enrich and deplete stable isotopes. The nucleus, ribosomes, cytoplasma and mitochondria may have different environments to favor specific stable isotopes.

Electrons Affect Nuclei in Ways Not Before Realized

Why ^{41}K of smaller + NMM causes different process than ^{39}K of larger + NMM? The smaller NMM in ^{41}K causes greater optical pumping. Also more neutrons cause more induced – NMM to push e$^-$ e$^-$ into outer orbital in ^{41}K. The induced NMM by transmuting momentarily to unstable nuclei may be more likely as unstable nuclei are higher in energies and look more like the starting nuclei. Induced NMMs are greater in intense high energy of optical environment. (Look for light induced superconductivity by induced NMMs. [22]) Any stable nuclei (products) would have nuclear structures really different than intermediate and less likely to form. But transient formations of unstable nuclei may be more likely as: $E_{act\ 1} < E_{act\ 2}$ with energy (at higher temperature and stronger fields). So intermediate cannot transmute to new stable nuclei at lower temperature and lower fields. Pictures…

$E_{act\ 1} << E_{act\ 3}$ so stable cannot ↔ stable nuclei .

$E_{act\ 4} > E_{act\ 3} > E_{act\ 2}$ so stable nuclei cannot transform to lighter nuclei. May consider this before Fe. After Fe the E_{act} fuse may be greater than E_{act} fiss. More neutrons / protons for trans iron atoms may lower E_{act} to fiss. Neutrons to release e$^-$ from nuclei and raise atomic numbers. Fewer neutrons/ protons for pre-iron may cause higher energy to fiss. Fiss involve p$^+$ product < p reactant.

Elements Late in Periodic Table Collapse e$^-$ to Decrease Atomic Numbers

Elements early in periodic table may more fuse e$^-$ to lower atomic numbers due to larger p$^+$/n^0 ratios for novel induced NMMs. So here RBL more develops the phenomena of his discovery of e$^-$ momentarily fusing to nuclei of less massive elements and e$^-$ fissing from nuclei of more massive elements under extreme conditions that are not currently realized in science. The availability of s orbitals facilitates such FR fissing and fusing e$^-$, p$^+$ and n^0. (Move) The alkali cations and anions lack p, d, and f subshells; so K$^+$, Rb$^+$, and Cs$^+$ twist + NMM counter to e$^-$ and neutron twists. e$^-$ momentarily collapse on nuclei and are released from nuclei as originally proposed by RBL in 2005 in spinrevorbit [2] and magnetocatalysis [3] documents for altering chemistry and chemical trends, momentarily. Such may be new basis for activating chemical, physical and biological phenomena. Prior science reasoned thermal energy agitating chemical bonds and inducing random motions. But RBL introduce thermal energy fractional reversible (FR) fissing nuclei and nuclei release organizing energy in never before conceived ways. This is why thermal energy and heat can cause adiabative (q=0) processes. Thermal energy is just as gravity as both are weaker and irrational fields than electromagnetic fields, but both can affect nuclei, nucleons, leptons, and quarks on basis of Little's Rules. The ability of gravity to couple and alter nuclei in spite of its weakness is same basis of thermal space can couple and alter MNNMs.

In 2005, RBL proposed thermal energy behaving adiabatically like q = 0. This occurs as thermal energy momentarily unleashes powerful nuclear fields (with changing NMMs) by fractionally reversibly (FR) fissing and fusing with releasing adiabatic fields that organize rather than dissipate. And ironically this occurs at higher and higher temperatures. RBL proposed and discovered by RBL Rules that released nuclear fields and momenta at high temperatures can cause classical mechanics ↔ quantum mechanics of electronic lattices and macroscopic systems. Scientists prior to RBL have focused on cooling things down to see quantum effect. But RBL introduced and discovered the opposite. Heating to very, very high temperatures causes quantum effects as the nuclei release fields that causes quantization in intense energy. But in limit as T ↔ infinitity (∞) the thermal energy ↔ electric energy and RBL in 2005 proposed adiabatic heat! Intense heat behaves like photon. So now RBL notes a photon or electromagnetic field can act on nucleus and e^- and not just push e^- away from nucleus but the pushing away of e^- from nucleus alters the nucleus in a major way by RBL Rules. The dense nuclei and huge energies couple to electronic motions. The coupling increases with mass of nuclei for new effect of RBL theory by RBL Rules. Prior science has assumed nuclei are static, but RBL introduces the Little Rules such that with greater masses, the nuclei couple more strongly to surrounding electrons and the surrounding electrons alter the nuclei for novel dynamics of RBL. Prior science assumed electrons cannot affect the nucleus. But RBL reasons the electrons do affect nuclei and vice versa. Tiny fissing and fusing of nuclei as driven by changing electrons in continua for novel effects.

Prior science reasoned and assumed that exciting e^- does not affect nuclei, but RBL has reasoned that the e^- pulls on nucleons and quarks inside nuclei so exciting e^- also alter NMM of nuclei and NMMs are released the oppose change in angular momenta of e^-. The quanta more strongly alter nuclei than the thermal energy by RBL Rules: so the Little Rules (1 and 2) manifest as the more intense released nuclear fields can pull in faint thermal energy so the momenta of product is greater than the momenta of reactants and endothermic processes occur and entropy is reduced. But if thermal energy acts, then by RBL Rules 1 and 3 the dynamics manifest so the activated state is not able to pull in thermal energy but the thermal energy is released. + NMMs can cause Rb thermal energy to accumulate. But – NMMs can cause Br thermal energy to dissipate. + NMM and – NMM together can accumulate and transmute Br and Dk thermal energies. During such phenomena e^- capture reduces p^+ number so Z decreases. But e^- release from nuclei cause increase in Z. – NMM can push e^- away to increase Z. + NMM can push e^- capture to decrease Z.

Then from induced spin = 1 of ^{41}K to induced NMMs of ^{18}O and its induced spin = 1 from spin = 0 cause cancer. But ^{41}K attacks ^{18}O as - NMM in ^{18}O is bound by ^{41}K and its - NMM by optical pumping as stronger magnetic interactions occur between ^{18}O and $^{41}K^+$; ^{39}K ---^{15}N by sharing as ^{30}K + NMM is pumped by ^{15}N. So e^- e^- is pushed into ^{39}K magnetically by ^{15}N and ^{17}O. ^{41}K of - NMM would not as well receive – NMM of ^{15}N. But ^{18}O is induced spin = 1 and it will receive e^- e^- by its larger + atomic number of ^{18}O causes cancer and ^{41}K thereby removes ^{18}O. RBL theory notes ^{18}O enriches in biomolecules to cause cancer as ^{18}O induces ^{18}F of spin = 1 and the 0 NMM alters metabolism of normal biomolecules for cancer. There is new data to support this and RBL can further explain why exercise is good for preventing cancer. The exercise increases metabolic water and the metabolic water is depleted in ^{18}O and this leads to less ^{18}O in cellular water for replacing ^{16}O in phosphates and nucleosides, other biomolecules and proteins. This is why exercise is good against cancer. Exercise also increases metabolism of endogenous ^{13}C in biomolecules to $^{13}CO_2$ to deplete the body of ^{13}C to slow cancer development.

On the basis of clumping of isotopes of nonzero NMMs inducing mutual FR fissing and fusing, the author gives basis for trace minerals in wrong organisms affecting N and O fractionations in cells and vice versa. Also the further effects of fractionating C isotopes is here noted. So the Cu and Zn isotopic fractionations may induce N and O fractionation in cells or vice versa. Cu has two isotopes ^{63}Cu and ^{65}Cu and the ^{65}Cu has larger positive NMM than ^{63}Cu and the larger positive NMM of ^{65}Cu causes it to interact more favorably with ^{14}N and ^{16}O for ionic bonding as the positive NMM of ^{65}Cu and ^{14}N and ^{16}O causes greater approximation to node between the ions forming stronger ionic bond. What about the induced NMMs of ^{65}Cu and different activating conditions? ^{65}Cu may be induced to have 0.69 NMM and 5/2 spin by its capturing e^- into its nucleus to transmute momentarily to ^{65}Ni. Such decreases + NMM and increases spin during ^{65}Cu ↔ ^{65}Ni. ^{65}Cu may also release e^- to reversibly transmute to ^{65}Zn with 0.769 NMM and spin 5/2 for decreasing NMM and increasing spin. Thereby during activation ^{14}N is induced to have smaller NMM of 0 to interact better with activated ^{65}Cu. But ^{16}O ↔ ^{16}N of spin = 2 for altered interaction with activated ^{65}Cu. ^{63}Cu loses NMM to 0 as ^{63}Ni and acquires -0.281 NMM as ^{63}Zn. So by considering induced NMMs, RBL can explain the observed fractionation of Cu by causes as can favor ^{65}Cu. The depletion of ^{63}Cu may be due to its loss of NMM by FR fusing e^- and/or gain of – NMM by FR fiss of e^- by fiss of n^0. The – NMM of ^{63}Cu would interact more strongly with ^{15}N and less with ^{14}N. ^{63}Cu shares e^- e^- with ^{15}N, but ^{63}Cu shares with ^{17}O as ^{17}O has induced + NMM as ^{17}F. So cancer depletes ^{63}Cu as it depletes ^{15}N and ^{17}O as due to – NMM and – NMM of ^{63}Cu, ^{15}N, and ^{17}O for strong bonding of ^{63}Cu – ^{17}O and ^{63}Cu – ^{15}N by – NMM --- - NMM for null and ionicity. So the ^{64}Zn enrich in cancer. ^{64}Zn has more negative 0.217 NMM by its reversible transmutation to ^{64}Cu; and ^{66}Zn has more negative 0.282 NMM by its reversible fractional transmutations to ^{66}Cu for weaker ionic bonding ^{64}Zn to ^{14}N and ^{16}O in cancer relative to ^{66}Zn binding ^{14}N and ^{16}O and ^{18}O. Thereby the cancer by enriching with ^{65}Cu and ^{64}Zn will favor ^{14}N over ^{15}N and ^{16}O and ^{18}O over ^{17}O and for favoring with depletion of ^{15}N and ^{41}K from cancer cells to cause cancer. Thereby RBL's theory, he can explain the known depletion of Cu and Zn isotopes in cancer cells vs normal cells.

Next Ge, Br, Kr, and Rb are analyzed by the discovered disclosed theory here of the author. ^{72}Ge has 27.5% RA and can be induced by nucleus capturing electron to have negative NMM of ^{72}Ga for novel properties. Seems more EC for larger mass numbers. Seems longer lifetime with heavier nuclei so maybe multiple transmutations. The nuclei with more neutrons tend to release in e^- to beta process to increase atomic number. The nuclei with fewer neutrons tend to capture electrons to reverse beta to decrease atomic number. ^{79}Se from ^{79}Br absorbing electron is unusual as it has no spin but negative NMM! ^{85}Rb and ^{87}Rb can transmute to ^{85}Kr and ^{87}Kr of positive and negative NMMs of same magnitudes for storing energy and NMM basis of optical pumping by RBL theory!

For long long time, I work with passion to produce groundbreaking theory. I know this is the tipping point of my success. I discovered and published ^{18}O causing cancer in my book from 2018 as archived partially and fully published in Oct 2022. Can this get me a press release? I think California and all states should proceed slowly recycling water as the recycling may increase accumulation of ^{18}O to recirculate into the human body via drinking water. I think such increase ^{18}O in the body for causing cancer. You may think what is it with RBL as he said ^{13}C causes cancer. ^{13}C does does cause cancer, but in my book I note that the clumping of many isotopes are involved in cancer's origin due to altered nuclear magnetic moments. you may think, RBL is wrong as ^{18}O lacks NMMs. BUT RBL sees where others have not seen or reasoned; as RBL discovered and invented ^{18}O and some other nuclei can be induced to manifest NMMs transiently as RBL notes in his book and prior publications. RBL discovered in his book that the ^{18}O clumps with ^{13}C in mitochondria to cause cancer, just as ^{13}C clumps with ^{18}O in calcite. So drinking water enriched with ^{18}O can increase damage to mitochondria

Thermodynamics, Non-Induced Weaker , Kinetic Induced Stability

^{15}N --- ^{17}O – stronger; node --- weaker

^{15}N --- ^{18}O – stronger; Magneti, altered dynamics

^{14}N --- ^{17}O - stronger; node

^{14}N --- ^{18}O - weaker; magnetic, stronger, altered dynamics

Picture of + NMM interacting with negative NMM and region between with non-node.

Picture of + NMM interacting with another + NMM and region of node between them.

Picture of – NMM interacting with another – NMM and region of node between them.

Ionic bonds are stabilized by both NMMs and electric interactions if anions and cations both have either all + NMMs or all negative. Ionic bonds having cation and anion involve e^- transfer with the resulting + and – charge separations not as thermodynamically stabilized by intervening non-node if the cation has positive NMM and anion has negative NMM. Also, the atoms transfer e^- for kinetic effects by E_{act}. The resulting ions are stabilized by nuclei effective nuclear charge binding or giving e^- and + NMM on anions and – NMM on cations for thermodynamic stability. Also resulting ions can have e^- e^- interactions to stabilize. But if + NMM is on the cation and – NMM is on the anion then both magnetic NMMs and electric interactions destabilize the ionic bond. So for the case of + and – NMMs the positive and negative NMMs lack nodes for thermodynamic instability and the wave functions from NMMs help transfer of e^- from nonmetal to metal of positive NMM (pictures) for instability.

The Nature of Particles and Fields by Moving Space and Compressions/ Bends of Space

Spatial Bend is field. Motion in bend is matter. Gravity is space. But charge and magnetism is motion of space. The relativistic spatial motion is compressed, bent and/or spiraled for space ↔ matter (as motion of space in space). Gravity is bend of space but Br and Dk matter are motions of the space in bends and curves. Charge, mass, and spin are moving space matter is moving (mostly) rational space. Space is loss of rational motion. As noema becomes irrational it becomes infinitesimal and infinite as noema becomes rational it becomes finite. The fields are bend and compressed space. Br Charge and Br magnetism are motions of space by vibrations and rotations. Dk charges and Dk magnetism are motions in opposite sense in space. Br and Dk particles are spaces moving in space with motions in counter directions Br and Dk fields are curvatures in opposite sense of concavity and convexities of space. But in C Frame, in L Frame (of electronic lattices) in NS Frame (of nuclei) in RS Frame (of nucleons) and in LS Frame (of electrons and quarks), the Br and Dk fields and energies change in their interactions. In C Frame, Br and Dk fields do not interact. In L Frame, Br and Dk fields fuse to wavefunctions. In NS Frame, Br and Dk fields fiss to separate p^+ and n^0. In RS Frame, Br and Dk fields fuse to bind quarks. In LS Frame, Br and Dk fields fiss to separate poles of dipoles and multipoles of color magnetism. As for as motion in space, the e^- does not go to e^+ or dark e^-. So if it is bright, then it still moves in same direction. So the + ---- - NMM for ionic helps transfer e^- for kinetic ease. But the resulting bond is not stable. (pictures) The + NMM --- + NMM of – NMM --- - NMM is less kinetically feasible, but the ionic bond is more stable. (picture) nodes. {This is an intervening paragraph as I reasoned fields, interactions and quanta interactions!}

NMMs and Their Stabilizations of Covalent Bonds

But for covalent bond, + NMM --- - NMM are kinetically stable with inducing (what pushes e$^-$ one way or the other) resulting covalent with bond thermodynamically stable. + NMM --- + NMM has node and kinetic limiting and resulting covalent bond has node and unstable.

On the basis of Interpretation of Particle / Field Superposition ReInterpretation of Carbonates, CO$_2$ and CO

Ideas pore, as RBL realizes the clumping of ^{13}C-^{18}O in carbonates and explain by superposition by not only fields but new quanta also. Originally RBL noted stability of ^{13}C-^{17}O due to positive and negative NMMs of ^{13}C and ^{17}O, as the covalence is facilitated (picture) as in + NMM interacting with – NMM as ^{13}C --- ^{17}O in CO$_2$. As in the resulting ^{17}O=^{13}C=^{17}O, the electrons are more uniformly shared in polar covalence by the differences of electronegativities of the C and O of Pauling's relative to the covalence in carbonate as the carbonate is anionic (CO$_3$)$^{2-}$. The electric charge in carbonate causes instability of + and – NMMs of ^{13}C-^{17}O but favors ^{13}C-^{18}O due to magnetism of ^{18}O* ~ ^{18}N and ^{18}O* ~ ^{18}F and ^{13}C-^{16}O due to magnetism of ^{16}O* ~ ^{16}N. Thereby ^{17}O and ^{15}N disrupt cancer by destabilize ^{13}C in cancer. Two net electron charge over the carbonate anions is more stabilized by + NMMs of ^{13}C according to RBL as the + NMMs magnetically pull the e$^-$ toward nuclei as + NMMs of ^{16}O pull the e$^-$ e$^-$ away from nuclei. For null ^{13}C-^{16}O it is important to note the patterns inside nuclei by cluster bonding magnetic numbers alter the surrounding electron bonds in hidden ways... vice versa the electrons alter the nuclei in hidden ways. It is therefore important to note the pull of e$^-$ e$^-$ by ^{13}C stabilize in the planar carboxylic acid and carbonyl as RBL noted; as p$^+$ by RBL's theory in 2007 prevents $\boldsymbol{\pi}$ bonding. p$^+$ and its proton orbital disrupts the $\boldsymbol{\pi}$ bonding by + NMMs. The – NMM of ^{17}O favors the $\boldsymbol{\pi}$ bonding as they pull e$^-$ e$^-$ away from the center ^{17}O to diminish e$^-$ e$^-$ denseness about the ^{17}O. Thereby in ^{17}O=^{13}C=^{17}O, the ^{13}C pulling e$^-$ e$^-$ and ^{17}O pushing e$^-$ e$^-$ magnetically by (+ NMM and – NMM, respectively) to stabilize the bond as polar covalence is supported /reinforced by the – NMM of ^{17}O pushing against O electronegativity (away from ^{17}O) and the e$^-$ e$^-$ of ^{17}O interact more for $\boldsymbol{\pi}$ bond and O nucleus less pulling e$^-$ e$^-$ into sigma bonds. So by RBL's theory, NMMs affect in molecular orbital in a global sense as opposed to valence bond sense.

So the (^{13}C^{17}O$_2$) is more stable, (due to NMMs opposing electrostatic pull of e$^-$ e$^-$ to ^{17}O) but in [^{17}O-^{13}C (=O)O]$^{2-}$the resonance is unstable as the – NMMs of ^{17}O depolarization of the resonance for pushing e$^-$ e$^-$ into ^{13}C and ^{13}C pulling the e$^-$ e$^-$ into ^{13}C; So e$^-$ is too concentrated on ^{13}C. So that dense e$^-$ e$^-$ on ^{13}C cannot be accommodated with + NMM of ^{13}C and its weak electronegativity. So carbonate is less stable and subjects the ^{13}C to reduction to ^{13}C^{17}O$_2$ and the charge across bond of 2 extra e$^-$. Also the ^{13}C is induced to fuse e$^-$ of s orbitals to form ^{13}B and ^{13}B has large + 3.1 NMM for the transient nucleus to pull e$^-$ e$^-$ of ^{13}C=O more to the ^{13}C ~ ^{13}B magnetically. But electrically the B nucleus is less charge and the ^{13}B$^+$ O$^-$ bond becomes ionic momentarily. The ^{13}C ↔ ^{13}B with spin and + NMM and ^{13}C ↔ ^{13}N with spin and + NMM. So the activated ^{13}C is just as nonactivated, so this supports [^{17}O-^{13}C (=O)O]$^{2-}$ of instability and ^{13}C^{17}O$_2$ stability ^{17}O ↔ ^{17}N (spin = ½ and 0 NMM). ^{17}O ↔ ^{17}F (5/2 spin and +5.472 NMM). So in activated state ^{17}O favors (^{13}C^{17}O$_3$)$^{2-}$ and opposes ^{13}C^{17}O$_2$. (^{13}C^{17}O$_3$)$^{2-}$ forms faster but is more easily broken. ^{13}C^{17}O$_2$ forms slower and is less easily broken. As p$^+$ + e$^-$ ↔ n^0 by weak interaction, the e$^-$ crowding of C is stabilized. Weak interaction can cause greater induce electronegativity to pull e$^-$ and fuse e$^-$ to p$^+$ ↔ n^0 with induced + charge on center and lowering of atomic numbers. This push of e$^-$ e$^-$

into the center is here shown to drive these transient dynamics. But unlike ^{17}O, ^{18}O should under activation conditions induce spin to pull $e^- e^-$ from ^{13}C to stabilize $^{13}C=^{18}O$ and $^{13}C-^{18}O$ bonds.

But if place ^{18}O in carbonate then $(C^{18}O_3)^{2-}$ the induce spin of ^{18}O under activating conditions stabilize the $e^- e^-$ dense on ^{13}C as the spin = 1 of ^{18}O pushes $e^- e^-$ into ^{13}C to stabilize $(^{13}C^{18}O_3)^{2-}$. The magnetic ^{18}O also accelerate rehybridization of O with ^{13}C rehybridize to resonate $e^- e^-$. It is important to note that there are $2e^-$ in carbonate.

It is good to also compare dynamics of ^{16}O with ^{17}O and ^{18}O. Whereas ^{18}O (due to magnetization by spin = 1 an activation conditions) stabilize carbonate anion, what does ^{16}O do? In prior publication RBL noted $^{17}O=^{13}C$'s stabilized by resonance of the $e^- e^-$ $\boldsymbol{\pi}$ bond relative to $^{16}O=^{12}C$, as the null NMMs do not pull $e^- e^-$ into ^{12}C as ^{17}O and its – NMM push $e^- e^-$ into ^{12}C and ^{13}C. Note induced NMM are important here as bonds are polarized. The huge electronic and magnetic field fields induce NMMs. So the induced NMM at ^{12}C is ^{12}B (1NMM) and ^{12}N (0.47 NMM). So ^{12}C of induced + NMM should interact unfavorably with ^{17}O by induced ^{17}F of 4.77 NMM. But favorable with ^{18}O of induced + NMM but spin = 1. This is why ^{12}C tends to clump ^{18}O with induction of cancer due to ^{18}O and its induced spin. So $^{16}O-^{12}C(=O)=^{16}O$ is less stable than $^{18}O-^{12}C(=O)-^{18}O$. And this is true of RBL in prior theory. But RBL presents here ^{18}O stabilize the carbonate even more than ^{17}O due to ^{18}O induced + NMMs and spin 1. The spin of ^{18}O nucleus due to induced transmuting to ^{18}N and ^{18}F causes angular momenta to rehybridize ^{18}O during resonance. So it pulls e^- from ^{13}C... But it all depends on ^{13}C, as the same effects of ^{17}O and ^{18}O are not with ^{12}C... ^{12}C cannot pull on $e^- e^-$ like ^{13}C for nuclear pressures. So ^{17}O pushing $e^- e^-$ into ^{12}C destabilizes carbonates. But ^{18}O pulling and pushing by its nuclear spin $e^- e^-$ from ^{12}C alters and offers stability and this is why ^{18}O clumps in biomolecules... The clumping of ^{18}O can lead to cancer... $^{18}O =^{12}C(=O) =O$ is not as stable as $^{18}O=^{13}C(=O)=O$. The induction in intrinsic electric fields of ionic bonds, in intrinsic NMMs in radicals at high temperature and high pressures have caused complications to hide this effect of induced NMMs. RBL penetrates the mystery.

What about nucleophilicity, ^{16}O vs ^{17}O vs ^{18}O? It is important to note ^{18}O requires stimulation... But ^{17}O has permanent – NMM and its polarizability causes it to be great nucleophile. ^{18}O has induced nuclear spin to affect it attacking radical centers and other centers with polarized nuclear spins. ^{17}O is more polarizable and bigger orbitals. Oxygen is good nucleophile it is just that ^{17}O is more labile... But ^{17}O is rare... ^{18}O is getting with ^{13}C. ^{17}O may be treatment for cancer.

I have to be careful of nano, molecular, atomic and nuclear systems, as for such system kinetic barriers are penetrated quantum mechanically by tunneling. The author here gives theory explaining tunneling in quantum systems as due to nuclei fissing to accelerate the motions momentarily. But the fractional fissing and fusing may also raise barrier or prevent tunneling. And these effects of fractional, reversible (FR) fissing and fusing for overcoming barriers for tunneling or producing barriers (for causing tunneling and preventing tunneling) may thereby cause kinetic induced or kinetic limited dynamics as at high temperature strong electric and magnetic field or high energy photons ($h\boldsymbol{\nu}$). RBL thereby has presented new mechanism of tunneling by quantum mechanics of nuclei for fractional reversible (FR) fissing and fusing for nuclear pressures to release or absorb interior into electron lattices for penetrating or creating electronic barriers for altering atomic, molecular, nanosized and macrosize properties as never before conceived. The tunneling and NMMs may not however alter thermodynamics unless fissing and fusing occur irreversibly? But the FR fissing and fusing as allowed by QM (as nucleus as quantum system) can visit many states and this FR fissed and or fused state may be a possibility. Such FR fissed and/or fused state of nuclei may be of low probability, but even if occasionally visited the momentary states may induce unusual interactions with surrounding electronic lattices for explaining and causing mysterious bizarre phenomena by Little's Effect as discovered by RBL. Such induced dynamics are not totally reversible. And as nuclear energies are so much greater than chemical energies these tiny irreversibly components of (FR) fissing and fusing may cause irreversible chemical change for altering chemical kinetic and thermodynamics. Thereby endothermic and exothermic chemical processes can occur so as to alter nuclei in fractional unmeasurable, irreversible ways. So may be totally stable nuclei FR fiss to severely alter chemical kinetics and dynamics for altering thermodynamics. So may be unstable nuclei FR fiss and fuse to permanently alter chemical dynamics. So maybe nonzero NMMs of stable nuclei alter chemical reactions in lesser ways by momentarily induced NMMs. Thereby this theory of author determines nuclei may be FR altered by are chemical reactor with transporting translating energy to a different chemical reaction for new catalytic mechanism.

Weak Interaction Momentarily Overwhelm Traditional Chemistry

D. NMMs and How They Alter Effects of Thermodynamic and Kinetic Controlling Dynamics

Thermodynamic and Kinetic Controlling Dynamics and NMMs

The author clearly distinguishes prior conventional thermodynamics and kinetics relative to new phenomena determined in his theory for clarity clear about thermodynamic limiting verses kinetics controlling conditions and consequent dynamics. Typically, low temperature is kinetic controlling by classic science. Typically, high temperatures is thermodynamic controlling by classic science. High temperature is like large NMMs. All + or all – NMMs are homosystems and transports the energy as manifesting equivalent high temperature or large kinetic energy systems. But mixed + and – NMMs stores the energy as QFs and manifest equivalent high potential energy systems that have not been realized by prior science. The author discovers a hidden science of dynamics solely by potential energies with negligible dissipations to kinetic and thermal energies. The + NMM and – NMMs form quanta that can tunnel through activation barriers that cause kinetic controlling conditions. Such potential energy systems are discovered on basis of huge energy densities that prevent dissipations. Denser energies naturally manifest order from disorder. QF and denseness of less ordered E and B fields and irrational G and irrational thermal space. The self-interactions order to self-interactions intrinsically prevent dissipation and loss. Picture + NMM interact with + NMM with convexity for Null. Picture + NMM interacting with + NMM with concavity for Null. Picture - NMM interact with - NMM with convexity for Null. Picture - NMM interacting with - NMM with concavity for Null. Picture + NMM interact with - NMM with convexity for non-zero NMM. Picture + NMM interacting with - NMM with concavity for nonzero NMM. Stored energy may be particles of quanta and here RBL notes that particles are composed of mixed bright and dark particles and Dk and Br fields for leptons and quarks.

Illustrations of Thermodynamic and Kinetic Controlling Conditions

Low temp and kinetic controlling conditions. High temperature and thermodynamic controlling conditions. Kinetic control can be overcome by tunneling effects of NMMs. Thermodynamic controlling conditions can have temperature and NMMs for release of PE from nuclei to manifest high temperature conditions even at low temperature. So thermodynamic control of lower energy states does not dictate. So system goes to lower energy state even low temperature by obtaining KE momentarily.

Homoclumping and Heteroclumping for Optical Pumping

In this work, RBL develops further that all + NMMs or all – NMMs may allow optical pumping as the mixed atoms with all + NMMs or all – NMMs for homo-NMMs may not allow relaxations for greater build-up of energy for optical pumping. (Talked about optical pumping before in this manuscript, after considering effects of NMMs, the author here explains optical pumping by NMMs.) K has + and – NMMs and may not optically pump due to heteroclumping of + and – NMMs. But Rb has all + NMMs and elements like Y, Ag, Tm, Be, and Rh have all negative NMMs for buildup of all negative NMMs for mysterious optical pumping. This explains Rb unusual optical properties. The author (RBL) here proposes new experiments to determine unusual properties of Ag, Be, Rh, Y and Tm by optical pumping. All null (0) NMMs dissipate energies for current models in chemistry, physics and biology. Dissipation arise as not enough self-interactions to order. All + NMMs and all – NMMs can create self-interactions for order. + and – NMMs can create self-interactions for ordering.

But for various systems, the author cautions that under extreme conditions, the induced NMMs play hidden roles to replace ambient NMMs. (But RBL cautions what is ambient as at room temperature and pressures the interior of matter is not ambient.) The homo-clumping of NMMs pose novel energetic phenomena. The + and – hetero-NMMs pose novel transport properties as the energy is efficiently hopping from NMM to NMM without dissipation. In gaseous mixtures + and – NMMs can cause currents even huge resisting void gaps. In ^{14}N and ^{15}N of atmosphere or can ^{15}N dissipate optically pumped volts of ^{14}N. If compress N_2 then the current can flow without resistance. The physical and chemical interactions compress the isotopes relative to air, so stronger interactions release NMMs for the QFs of SC. ^{15}N in LuH is example as the current flows without resistance ^{17}O and ^{18}O in Cu replaced Pb apatite is another example. Cuprates is another example. This manifest novel transport in systems of + and – hetero-clumping of NMMs. I need to disclose further my theory and discovery here of novel properties of induced NMMs with homo, null and hetero distributions.

Induced NMMs and Thermo vs Kinetic Controlling Dynamics

Heating of RbF ↔ Rb^+ and F^- can be fitted to RBL prior theory of adiabatic heating, as the dense spins and nuclear magnetic moments (NMMs) operate on the thermal energy to transmute the thermal energy to electric, magnetic, and/or electromagnetic energy for the thermal process to manifest adiabatic phenomena. It is important to consider RBL previously noted NMMs transduce thermal energy to E, B and electromagnetic fields and energies [3]. The storage of energy or release of energy in $Rb^+ + F^- \leftrightarrow RbF$ has less energy being released. The energy is not released as it is stored internally in RbF. How do Rb^+ nuclei and F^- nuclei store the energy? The empty s orbitals of Rb^+ and F^- nuclei store energy. Previously RBL noted importance of s orbitals for these phenomena [3]. The empty s orbitals of Rb^+ and F^- interact by their nuclei to cause energy of interacting ions to be absorbed by nuclei of F^- and Rb^+ as both Rb^+ and F^- have + NMMs; and + NMMs tend to absorb surrounding optical fields, B fields and E fields and gravitational and thermal fields. F^- ions help pull electrons out of core of Rb^+. F^- is the smaller and denser ion. Cations and anion pairs can by their + and – NMMs facilitate transfer of e^- e^- to catalyze ionic reactions for kinetic effect in new way by optical pumping. But + and + NMMs and – and – NMMs do not catalyze such by giving thermodynamic stability. So + NMM --- - NMM produce QFs nonionic reactions are thermodynamically limited as the QFs tunnel kinetic barriers cause thermodynamic limitations. But such may be kinetically induced. It is important to note transient NMMs cannot cause thermodynamic limitations as they only alter kinetics by momentarily by providing fields and energies. It is important to note that dynamics systems are more affected by induced NMMs than permanent NMMs. Permanent NMMs may play roles in systems properties. But changing systems may involve induced NMMs more than static NMMs. Therefore in life, surrounding NMMs affect and cause perpetual changing bonds. The bath of NMMs are important. But + …. + NMMs and - …. – NMMs are kinetically limited but thermodynamically induced stability. This has in priori paper not been given in details. But here it is noted that temperature and pressure can be parameters to drive either kinetically restricted (low temperature, + …. + and - …. NMM) or thermodynamically restricted (high temperature, + …. – NMM). (Pictures)

Rb^+ Properties

This consideration of Rb^+ and its unusual size and lattice energy with RbF gives credence to the unusual interaction of ^{41}K with $^{14}NH_3$ and $^{15}NH_3$.The Rb ↔Sr by FR fissing and fusing with induced negative NMM of Rb* by Sr metastable states and the resulting induced – NMM pushes e^- e^- from core of Rb into upper levels of Rb*. Rb thereby may have non-shielded upper subshells. The unshielded upper level states of Rb atoms are 4f; and 4f feels very strong induced – NMM of Rb* nucleus to hold e^- e^- in 4f and magnetic field of Rb* nucleus can polarize excited e^- to stabilize excited state F^-, whereby F^- may pull the 4f e^- e^- of Rb*. This prior pushing of e^- e^- into empty upper level states is an optical pumping. So NMMs and induced NMMs give new chemistry, catalysis, enzymatics and energetics. But also new physical interactions and manifesting by NMMs and induced NMMs for facilitating separations. But what else?

Here Invented New Catalyst for CO_2 + H_2O Conversion to Hydrocarbons and Carbohydrates

On the basis of the induced NMMs reasoned and further developed in this review the author proposes a new catalytic system for CO_2 and H_2O conversion to hydrocarbons and carbohydrates. The new catalyst under extreme conditions of thermal energy and electric and magnetic fields is of a new type involving noble gas neon and salt sodium fluoride. The basis of such catalysis is the three stable isotopes of neon ^{20}Ne, ^{21}Ne and ^{22}Ne. ^{20}Ne has 90.5% relative abundance and 0 NMM and 0 spin. ^{22}Ne has 9.25% relative abundance and also 0 NMM and 0 spin. ^{21}N has only 0.27% and -0.66 NMM and 3/2 spin. The author develops here that the large induced NMM of the ^{20}Ne as its FR transmutes to $^{20}Ne^*$ ~ ^{20}F of 2.094 NMM and spin of 2 would cause such induced spin and large NMM to play important role for breaking CO_2 and H_2O with forming carbohydrates and hydrocarbons. In addition to ^{20}Ne solvent, the author here notes a solute like NaF by 100% relative abundance as ^{23}Na (100%) and ^{19}F (100%) would give key sites in the ^{20}Ne solvent for manifesting not only the large + NMMs and spins of ^{23}Na (3/2 spin and 2.21 NMM) and ^{19}F (1/2 spin and 2.62 NMM). But also the contrary chiral large induced NMMs of ^{19}F FR transmuting to ^{19}O (5/2 spin an 0 NMM) and ^{19}F FR transmuting to ^{19}Ne (1/2 spin and -1.885 NMM) for such component of the solvent to assist the ^{20}Ne converting the CO_2 and H_2O to hydrocarbons and carbohydrates. Moreover the ^{23}Na would under the intense environment manifest FR transmuting to ^{23}F (5/2 spin and 0 NMM) and the ^{23}Na transmuting to ^{23}Mg (3/2 spin and 0.536 NMM) for additional nuclear spins and orbital angular momenta from the nuclei for converting CO_2 and H_2O to hydrocarbons and carbohydrates. The FR fissing and fusing of solute $^{23}Na^{19}F$ in the ^{20}Ne solvent would transiently form unstable ^{23}Ne and unstable ^{19}Ne in the ^{20}Ne solvent to impart momenta to the ^{20}Ne solvent for ^{20}Ne to act on the CO_2 and H_2O for transforming these reactants across the activation states to form the products of hydrocarbons and carbohydrates. As the solvent ^{20}Ne is inert in its ground state the hydrocarbons and carbohydrate products would not have any impurities from ^{20}Ne catalysts. Also the ^{23}Na^{19}F is extremely stable in ground state and would not form NaH, NaC, NaO, CF, OF or HF as the NaF solid ionic lattice is stable.

E. Spin, Particles, Waves, and Nuclear Magnetic Moments

The author now considers the possibility of fermionic change. Can spin, change? During particle ↔ waves, the spins change. Such phenomena of quanta spins are as classic spins; as the quanta spin fisses it slows and as the quanta spin fuses it accelerates its internal angular momenta. How do fermions ↔ boson? The fermions ↔ bosons by the particles ↔ waves and refusing to composite particles. It is important to compare this to space is matter and matter is space. The matter alters internal spins as it fisses to space by slowing spin and this is consistent with RBL theory of converting thermal spaces to mechanical spaces to electric spaces to gravity spaces to magnetic spaces to quantum spaces to lepton spaces. The space collapse due to relativity; the relative motion causing v>c and the contraction and the contraction from thermal fields to electrical fields. Electric force is manifestation of contraction and elongations, relativistically. The contractions in different directions cause twists and swirls as the v>c induces twists. And with further increases in momenta, the space contracts and the contractions cause faster rotations by relativity. The spin originates due to contractions and relative motions. And rotations develop within rotations for magnetic fields to transduce to quantum fields and particles. The rotations develop within rotations within rotations for lepton fields and particles. Br and Dk fields can compound for left handed rotations and right-hand rotations for quark leptons and nucleon (hadronic) formations. And just as these motions and space are taken up, they can be released fractionally or completely. The fractional release in hidden ways are discovery of RBL!

Matter is Space and Space if Matter

Space is matter and matter is space. This fractional reversible (FR) induced NMMs by fractional reversible uptake and fractional reversible (FR)release is aspect of matter and space equivalence. By such fermions can FR fiss and refuse and this can have them share components for entanglements and explaining entanglements. And the FR fissing and refusing can cause fermions to ↔ bosons. And the transformations are activated and the activations for some can be thermal space itself for perpetual fissing and fusing fractionally reversibly. The FR fiss cannot transmute as the internal motions and forces are too great and the irreversibility has to involve stronger activating conditions like inside stars, inside black holes and at the Original Singularity. The Original Singularity is conditions to convert Br to Dk quanta. But under less extreme conditions as inside black holes then the nature of Br can be altered. And under even lesser extreme conditions, the interactions between Br particles in our sector of universe can be altered for altering confinements of quarks as inside neutron stars for transforming quarks to nucleons and vice versa transformations of nucleons to unconfined quarks. It is important to note that the isolations of quark from a nucleon are impossible, But the isolation of quarks within a nucleon surrounding by many nucleons is possible and manifestation of internal nucleon dynamics and internal stellar and blackhole dynamics. It is important to consider later the difference and equivalence of changing a quark in time or at one time many quarks visiting many states. And under even lesser extreme conditions as inside stars, the alterations of confinements between nucleons can be changed for form different nuclei. And even less much less extreme conditions as on earth, thermal fields can agitate nuclei to alter confinements of nuclear fields and NMMs for releasing the NMMs and nuclear fields reversibly into surrounding electronic lattices for altering physics, chemistry and biological phenomena. It seems here that interior of stars and interior of nucleons and nuclei are superconductors and superfluids as by Little's Rules surrounding thermal space perpetually agitate them. But RBL discovers how systems can use such perpetual motions inside nucleons and inside stars to perpetuate motions of planets and perpetuate motions of e^- in shells an perpetual motions of e^- in molecules in nanoparticles and now RBL determine perpetual motion in macro-systems.

Quantum Mechanics and Classical Mechanics Relativistically by v>c

So by this phenomena 2 fermions can fiss and refuse to form boson. But why cannot 2 e^- annihilate? The energy activation is too weak. The annihilation requires spaces and spatial motions to destructively interfere. The annihilation of 2 e^- has large activation and endothermic. But consider electron and positron, the annihilation releases energy and such is exothermic and occurs under ambient. The space would be Br and Dk fields. The space motion would be Br and Dk particles. Matter and antimatter annihilate as space and motions destruct and release energy. Br and Dk particles have high activations. e^- and e^+ energy pictures. So this seems different as RBL realizes Br and Dk are macroscopic concepts but quanta has both. So in trying to reason quanta and interactions of quanta RBL cannot use Br or Dk but both exist.

The line of classical science has either right motion of left motion. And the gravity curves have either partially CW or partially CCW with concavity or convexity. Pictures. And Quanta have mix of Br and Dk. But if quanta have Br and Dk, then they Br and Dk interact at quantum level but they do not at macroscopic levels. But why do they interact on large scale of macroscopic? The $v > c$ causes interaction on submicroscale as picture of same concavity but different motions within concavity. As the relative motions has v>c so the motions transmute by interactions so v>c. It is important to note that not concavity and convexity can superpose constructively or destructively. But motions in opposite directions can also superpose. But transmutations cause motions inside motion. Fields may transmute under post Singularity. This is how energy, fields, transmute inside e^- and nuclei nucleons and quarks. (Perpetual motion is rule not the exception at high energy densities.) The v>c of Br and Dk causes internal motion inside Br and Dk as Br is excessive the Dk is pulled inside Br. Why is motion of space a particle? The process is reversibly as Br can release Dk. And protons release Dk into L Frame and the proton spins slower. And neutrons can release Br and neutrons spin revolve slower. The interactions of Br and Dk cause v>c, which is revolution and continuum. Before RBL reasoned, Br releasing Br and Dk release Dk . But is it the Br releases Dk and Dk releases Br? p^+ interact to release Dk to overcome p^+ --- p^+ electric repulsion. And neutrons interact to release Br to increase n^0 --- n^0 magnetic repulsion. But can magnetic field cause neutrons to be stable longer outside nuclei? Yes by RBL's theory. The magnetic field of the neutron star causes greater neutron --- neutron stability inside Fe, neutrons are more stable. This may explain the transmutations in the earth's core. Also inside iron, cobalt, and nickel the ferromagnetism causes prolong stability of neutrons and this explains reverse beta in these materials as reasoned by RBL in 2005. So why are p^+ --- p^+ interactions and collisions and neutrons interactions and collisions more common in less massive nuclei? Neutron collisions are less common in less massive atoms. THE SMALLER MASS CAUSES LESS MAGNETISM AS THERE ARE FEWER PROTONS. In more massive nuclei, the magnetism is greater as there are more p^+ (s); so more magnetism causes greater neutron --- neutron stability and less n^0 --- n^0 correlation and more n^0 --- p^+ interactions. Fewer

p^+ and less magnetism cause more n^0 --- n^0 collisions and correlations to release Br and push neutrons apart. Lesser magnetism causes more p^+ --- p^+ collisions and correlations to pull p^+ together. Stronger magnetism causes less neutron --- neutron collisions as neutrons correlate and n^0 --- p^+ collide and correlate more release Br and Dr for nuclear orbitals and better correlation. Heavier nuclei release QF about nuclei. Lighter nuclei release net Br or net Dk regions about their nuclei. So ^{17}O release Br and ^{18}O release Dk. So the release of half orbitals increase transport for strange metal properties. But Br and Dk release by – NMM and + NMM (respectively) (or n^0 and p^+) causes quantum fields (QF) about nuclei to correlate e^- e^- about nuclei in new transient QF.

Dark Matter and Its Uptake into and out of Nucleons for their Interactions and for Its Difficulty Detection of Dark

Thereby RBL gives new basis for searching for Dk matter. Slamming p^+ --- p^+ together release Dk or slamming n^0 --- n^0. release Br? Slam p^+ --- p^+ together and use ^3He as solvent background as – NMMs will not absorb the released Dk from p^+ absorbs Dk more as this counters their internal repulsions. Neutrons (n^0) absorb Dk less and this absorption increases their internal repulsion. n^0 absorb Br to diminish their internal repulsion. So now going back off this tangent, the quanta has both Br and Dk. Example of stable N (excess p^+ release) and unstable isotope of O (magic number by excessive neutrons release Br. On basis of quanta having both, then how do quanta interact? They interact using their Br and Dk, but they have excess Br and exist in Br bath. And compare interactions to original Singularity and Inflation by excess Dk (outward) and induced interior Br (inward). So note the quanta tend to thereby collapse relative to Original Singularity as quanta lack the original energy density. But the Universe prevents collapse of quanta by the Bigger outward Dk. But the fields about quanta are what?

PICTURE

Br particles. Br Particles. Dk particle. Dk particles

Br Field. Br Field. Br field. Br Fields

PICTURE

Br Particles. Br Particles. Dk Particles. Dk Particles

Dk Fields. Dk Fields. Dk Fields. Dk Fields

What can cause Dk particle ↔ Br particles

What can cause Dk field ↔ Br fields

Fields can ↔ particle as as v > c. fast motions cause attraction. And faster motions can cause attract to convert to repulsion.

Particles can ↔ fields, as $v < c$. slow motions cannot oppose repulsion and with even slower motion the repulsion may convert to attractions.

Fields ↔ particles by endothermic processes. Such transformations of fields ↔ particles occur intensely with compressions as big ↔ small implodingly and cooling and vice versa small ↔ big explodingly. Matter is potential energy that cannot be released to motions by second law of thermodynamics. It could be that tiny amount of matter is released to kinetic energy by second law of thermodynamics. But most of the energy cannot be released to disorder as in denseness as its matter disorders, then the disordering matter self-interacts so strongly that it reorders itself.) But particles ↔ fields by exothermic processes intensely with rarefactions and small ↔ big explosively and heating composite of exothermicity. And fields ↔ particles endothermicity with densification and big to small implosively. Field to particle and particle to field with static ↔ dynamics. So Dk fields ↔ Br particles with cooling and Br fields ↔ Dk particles with cooling. And Br particles ↔ Dk fields with heating exploding. And Dk particles ↔ Br Fields with heating (?) exploding. What did I miss? How does this help me analyze Br and Dk interactions? As the quanta have Br and Dk particles ↔ fields then what happens to their interactions, structures and motions as they move? Recall I consider such already in publications for e^- and quanta ($h\boldsymbol{\nu}$) about LS Frame of e^- as the e^- is dipole. PICTURE. e^- is made of Br and Dk. They are separated by Br and Dk poles. Across equator Br and Dk flip. Across equator Br and Dk have $v>c$ to flip Br to Dk fields. e^- has Br and Dk fields but all Br particles as excess Br is internalized as Br particles. But the e^- cannot pull in more Br as it fuses; so some Br fisses to create E, B fields about e^-. But e^- can pull in more Dk so e^- fuses Dk and the spin slows. Slowing of spinning e^- detects Dk particles. Just as e- fuses Dk causes slowing of spin, e- fuses Br quanta causes acceleration of spin for $v>c$ and some Br fisses to create push / pull on e^-. Muons are more massive and may have dark particles. So the e^- has both Br and Dk fields across its equator and it is the field that flips as cross equator as the fields have to move $v>c$ to cross the equator. So in $v>c$ they flip.

So for quanta, the fields about quanta cannot flip as they have $v<c$. Pictures Br particle (A) interacting with Br particle (B). Then picture Br particle B to left interacting with same Br particle (A). The particle nucleus cannot move faster than the fields. (But what if it could, then what would be?) So fields adjust to change in position of heavy source. In nucleus this is not so. In nucleus one approach stellar conditions of denser fields and less massive quarks. In Black holes, one approaches the Original Singularity, but the collapse is insufficient as Blackholes fall short of Original Singularity. Blackholes and Stars may be hell. So under conditions of terrestrial activation, the nuclei can be induced fractionally to release fields that affect electronic shells, subshells, orbitals, spins for novel chemical, physical and biological phenomena. But under more extreme conditions, the nuclei can be altered as inside stars as Br transmutes to Br. But the conditions have to approach Original Singularity to convert Br quanta to Dk quanta. So this opening sets the stage for this fractional, reversible (FR) induced NMMs. As Br and Dk enter and are released from nuclei. But the author had to consolidate the meaning of Br and Dk particles and Br and Dk fields and how they vary from macroscopic to quantum to nucleon to lepton sizes and energies. How are they transmuted why are they transmuted? Considerations of some consistency to physics, chemistry and biology and more. We do not really approach conditions of Original Singularity. But we momentary approaches to Original Singularity occurs in blackhole activations and states and momentarily approach to Original Singularity occurring during Stellar activations for transitions for motions, chemical transformations and nuclear processes.

Fractional Fiss and Fuse of Particles and Fields, Moving Space and Space

It is important to note the bends of + ---- + , - --- - and/or + ---- - NMMs affect ionic and covalent bonds (note the and/or as the NMMs may change during interactions from + to – and vice versa as the induced NMMs may have different signs than the noninduced NMMs. So electrons can oscillate in and out of nuclei in transition states by transformations to Br and Dk and + and - NMMs). This change from noninduced to induced vice versa, has profound influence on driving oscillations of surrounding electronic lattices and the spin polarizations and the atomic and molecular orbitals. But motions (quanta) in the curvatures also affect the bonding. Pictures +)))) --- ((((+ verses +)))) ---)))) - . The fields cause null fields but charges can cause null also zero fields. The fields and charges can cause superpositions, constructively. The constructive / destructive interactions occur in classic waves, but RBL introduces motions within the waves and constructive and destructive motions inside the waves, also. Lake waves of classical physics exist but here river waves of RBL are introduced. RBL introduces river waves where there are motions within the classic waves for quanta within classic waves and Br and Dk particles and the Br and Dk particles can interfere. As Br particles are more intense in our sector of Universe, the Br attenuate the Dk. The internal motions (quanta) can alter the construction and destructive interference of the fields. But if accelerated faster than light, then Br particles can produce Dk particles by Little's Theory. Gravity is curvature phenomena in space. But other fields are motions in the curvature of gravity. Motions in the curvature are E and B fields. The electric, magnetic, strong and weak fields are thereby distinct from gravitational fields. Strong force may be a dense gravity that simultaneously pushes and pulls.

F. Example of Rb and Optical Pumping
Optical Pumping and Rb

Rb^+ is unusual in ionic size [23]. RbF is unusual in lattice energy [24]. Such properties of Rb^+ have been explained by optical pumping. But Rb^+ lacks velence electrons. Here RBL proposes that the optical pumping of Rb^+ is due to the nuclear magnetic moments (NMMs) pushing and pulling core electrons of the Rb^+ cation. Here RBL gives general phenomena and here RBL can justify this general phenomena of induced NMMs as by near magic numbers for life as by RbF and its unusual properties relative to Li, Na, K and Cs. As Rb is near magic number and has more neutrons, so it fractional fisses due to being near magic number for unusual thermodynamics properties and gives new basis for life. Optical pumping is the ability to use light to raise electrons in an atom to upper excited states for adiabatic process (q=0) and can lead to population inversion. Such optical pumping was discovered by Alfred Kaster in 1950 [25]. RBL later reasoned adiabatic processes approached by thermal energy in strong magnetic environment [3]. Thermal energy acting on potassium and potassium fluoride can manifest RBL's adiabatic thermal activations without light as the nuclear pressures by NMMs of Rb and F can provide strong magnetic fields for meeting criteria of RBL. And in general, hidden optical pumping can occur for other atoms and isotopes as the laser induces release of + NMM or – NMMs for altering electrons for causing optical pumping.

NMMs, Unusual Thermodynamics of Optical Pumping

Prior reasoning gives basis for optical pumping; for anomalous thermodynamics of potassium (K^+). Is radiation used to melt potassium fluoride? Thermodynamics of Haber cycle may involve optical pumping. Why would optical pumping cause unusual thermodynamic properties? What is optical pumping? It involves stored energy or converting heat to light. RBL proposed magnetic field and spins exciting electrons across continuum of quantum systems in 2005 [3] for Little's Effect. Such dynamics of RBL for adiabatic heat dynamics is relevant to optical pumping and can explain optical pumping.

What is Optical Pumping and Its Here Proposed Mechanism

Optical pumping was proposed in 1950 [25]. Why is Rb subject to optical pumping, but K, Cs are not subject to optical pumping? NMMs may cause difference for Rb^+, intervening d subshell may cause difference for Rb^+ relative to K^+ and Cs^+. Larger atomic numbers may be the reason as causing difference in optical pumping for Rb^+ relative to K^+. Post iron of Rb^+ may be the reason for distinct properties of Rb^+ relative to K^+. Cs^+ may be different due to 2d subshells. What is relationship of NMMs to optical pumping? The optical pumping may be caused by NMMs as NMMs give nuclear pressures for magnetism that prevent relaxation but storing energy. How can Rb^+ optically pump if it lacks valence e^- ? The absence of valence e^- in Rb^+ points to core electrons for the optical pumping and RBL has noted before the possibility of core electrons exciting and magnetically stabilizing inverted atoms [3]. The theory of RBL of induced – NMMs for Rb^+ isotopes may further give basis for distinct properties of Rb^+ relative to K^+ and Cs^+. RBL here notes that there is emergent effect as the NMMs increase in magnitude with exciting core and valence e^- and via intervening electrons clumped isotopes with NMMs so that NMMs can interact via intervening e^- e^-. The resulting excited Rb^+ can occlude F^- just as p^+ discovered by RBL to be occluded in s orbitals [pycnonuclear]. Does Rb^+ have core e^- to optically pump? Yes Magnetic Rb^+ interact with F^-.

Surrounding Fields Induce Optical Pumping by Action of Nuclei

NMMs cause optical pumping as nuclear spin polarizes e^- spin, NMMs can push e^- into upper levels of heavier atoms and the polarizing of the spins can slow relaxations. NMMs of Rb are unusual as Rb is near nucleon molecules of magic number clusters of nucleons MNNM. Also, in mixed elemental systems, the relaxations are slowed due to quantizations of orbital momenta and inability of different elements in compounds and mixtures to relax. This may be new basis for properties of biomolecules. High temperature, strong electric field, and strong magnetic fields may activate such dynamics. This may cause core e^- to be excited in alkali. RBL has proposed this in new way for higher temperature superconductivity. If bonds have too many NMMs then + and – NMMs can push e^- e^- into low lying upper empty orbitals. Inverted atoms were introduced by spins, internal magnetism and B_{ext} in 2005 by RBL. But internal nuclear pressure is stronger and denser for inverting atoms. Also, asymmetry of – NMMs (2005) by – NMMs help pull electrons from – NMMs into + NMMs. Thereby here, it is important to consider RB Little Effect, Ferrochemistry, Spinrevorbital, Little Rules. Can these explain optical pumping and anomalous of Rb^+?

Compare Alkali Fluorides to Alkali Chlorides

NMMs tend to release optical, B, and E fields. Nucleons of nuclei can absorb energy and store energy. RbF is compared to other alkali fluorides. RbF is also compared to alkaline earth fluorides. The other alkali fluorides may not have + and – NMMs as the isotopes of Rb thereby they do not optically pump as much as RbF. The alkaline earth fluorides lack the optical pumping of RbF as alkaline earth have mostly zero NMM, whereas Rb has many isotopes with nonzero NMMs and many with induced – NMMs for explaining optical pumping of RbF and lack of optical pumping in alkaline earth fluorides. RbF is compared to alkali chlorides and alkaline earth chlorides. The alkali chlorides may not compare to RbF as Cl^- is less dense than F^- and lacks the induced – NMM as ^{19}F (as $^{19}F \leftrightarrow {}^{19}Ne$ (-NMM). RbF is compare to alkali sulfides and alkaline earth sulfides. Sulfides lack NMMs. Such can explain why sulfides differ from RbF and its optical pumping. Although ^{32}S lacks NMM, ^{32}S can have induced – NMM in ^{32}P, but ^{32}S is 95% relative abundant. Chlorides are larger and more shielded and smaller NMMs. Chlorides have 2s and 2p shielding 3s and 3p from chlorine nucleus. Cl is smaller NMM. Such can explain why chlorides differ from RbF and its optical pumping. For Br and I, the larger NMMs but shielding, but 3d may have patterns that are not shielded. Such explains why bromides and iodides differ from RbF and its optical pumping. ^{79}Br has induced – NMM by ^{79}Se so RbBr may have unusual properties. Yes, in $RbPbBr_3$ [26]. ^{127}I has – NMM in ^{127}Xe so ^{127}I shows also optical pumping [27]. RB Little discovers a quantum shielding by wave function in comparison to classical shielding by particles. Whereas Cs and K lack induced NMMs, one isotope of ^{41}K does induce – NMM; so this isotope may be basis for cancer.

G. Different Conditions in Cells, Nucleus, Cytoplasma, Ribosomes and Mitochondria

So it is important to here consider different conditions in cells in humans, in plants, and in test tubes. In the cell, the local electric and magnetic fields are more greatly in the mitochondria relative to the cytoplasma. The greater fields in the mitochondria cause different induced NMMs in the mitochondria for different dynamics in the mitochondria. The cytoplasm has less intense fields for less induced NMMs and different dynamics in cytoplasma relative to the mitochondria. The nucleus also has more dense energies and fields relative to cytoplasmas. By the Little Rules, the greater energy densities (for thermodynamic restrictions) in the nucleus and mitochondria cause more altered enzymatics in the nucleus and mitochondria relative to the cytoplasma due to nonzero NMMs in covalence and ionic bonds. The cytoplasma and the ribosomes may have less dense energies (for kinetic restrictions) and NMMs accelerate translation of proteins and glycolysis as nonzero NMMs activate fast anaerobic and RNA interacting with amino acids. {On the basis of lower pressures and fields in the cytoplasma relative to the mitochondria and nucleus for intrinsic cancer dynamics of cancer by accelerated glycolysis in the cytoplasma, the author reasons large static mechanical pressures like deep in the ocean may kill cancer cells. The lack of cancer in sharks is explained [28]. Elephants lack cancer by the large pressures [29].} But at high pressures, strong electric fields and strong magnetic fields in mitochondria and nucleus, the nonzero NMMs more fractionally fiss in magnitude for more extreme alterations of reactions dynamics and enzymatics. The greater effects manifest as altered Kreb cycle and altered DNA replication, RNA transcription and protein translations. Beyond prior reasoning, it may be important to consider more the induced NMMs in prime amino acids and oligonucleotides and sugars in biochemical processes.

The higher pressures, E fields, B fields, and induced nuclear pressures in mitochondria and nucleus cause not only altered E_{act} (possibly even altered relative energies for altered thermodynamics, transiently) but altered reaction paths for manifesting cancer. {Is it – NMMs rarefy electron densities and + NMMs compress $e^- e^-$ densities for causing cancer? $^{18}O \leftrightarrow {}^{18}F \leftrightarrow {}^{18}N$ for singlet nuclei ; so the spin of nuclei really alter proteins dynamics. Proteins in cancer have unusual magnetism for altered metabolism relative to proteins in normal cells.} Here it is important to note that by RBL's theory such higher energetics and magnetizations in cell nuclei and mitochondria due to the higher pressures, higher charge and greater clumped NMMs, thereby the nucleus and mitochondria are more sensitive to accelerated motions and changes in gravity. The altered reaction paths manifest altered protein ---

sugar, aldehyde, ketone, and carboxylic acid interactions due to heavier isotopes of ^{13}C, ^{15}N, ^{17}O, ^{18}O, ^{33}S, ^{25}Mg, ^{41}K, and ^{65}Cu in mitochondria. ^{15}N, ^{18}O, ^{17}O and ^{13}C in proteins may interact different with carbohydrates, aldehydes, ketones, and carboxylic acids at higher energy densities of pressures, E, B, and nuclear fields in cellular mitochondria and nuclei of cells.

Quite interestingly RBL introduce concept of varying properties of a particular biomolecule in different subcellular organelle inside cells due to different conditions. The aldehydes, ketones, carbohydrates, O_2 and H_2O slow in oxidizing C and reducing O due to ^{13}C (vs ^{12}C) and ^{17}O (vs ^{16}O), ^{17}O (vs ^{18}O) or ^{18}O (vs ^{16}O). (How can this affect the reverse process of CO_2 fixation and H_2O reduction and oxidation, which is issue? With CO_2 conversion) ^{12}C-^{16}O ↔ (R)(O)-C=OH or $^{12}C^{16}O_2$ vs ^{13}C-^{18}O ↔ (R)(^{18}O)-^{13}C=^{18}O. The heavier ^{13}C---^{18}O manifest magnetization that alters kinetics and dynamics relative to nonmagnetic ^{12}C---^{16}O under mild activating conditions. Stronger activation can induce NMMs of ^{12}C and magnetize ^{16}O for nuclei accelerating even the null ^{12}C and ^{16}O and stronger activating conditions. Thereby for the author's theory, when considering reactants having various isotopes of varying NMMs and induced NMMs, it is important to consider, which nuclei is more activated under activating conditions. By Little's Rules, the nuclei having induced NMM in transmuted state of longer half-life contributes more and it is more easily formed. The bonds are covalent and in covalent bonds as noted in RBL book [1], + NMM --- - NMM are stable due to integrity of wave functions of the bonds impressed and reinforced by nuclear fields on electronic fields. Kinetically two nonmetals are accelerated by NMMs to covalently bond if more electronegative elements have + NMM and less electronegative element has – NMM so such is thermodynamically restricted, but the issue of tunneling in quantum systems with nonzero NMMs need to be considered in more details.

H. Nonmetals and + and – NMMs and Covalence and Intermolecular Interactions by Induced NMMs

So F has + NMMs and – NMMs of ^{17}O or ^{15}N will covalently bind F, Cl, and Br . But how are the thermodynamics and kinetics altered if the activated atoms have induced NMM with alterations like for ^{19}F where induced NMMs has – NMM? What happens when + --- + or - --- - NMMs in covalent bonding and in ionic bonding? For + ··· + and - ··· - NMM in covalent bonds, the covalent bond is weakened. But in CO_3^{2-} , the bonds have ionic nature and + ··· + or - ··· - NMM do not destabilize the bonds in $[CO_3]^{2-}$. Is there relationship between formation of uncommon isotopes and magic numbers? Yes, there is a relationship between formation of uncommon isotopes and magic number nuclei. As uncommon isotopes form from MNNM or MN that are greater than 1 away from MN or MNNM. Is there a relation between fissibility and magic number? Yes, there is a relationship between fissibility and magic number as if nuclei are near magic numbers, then the nuclei more transmute to release fields for altering chemistry, physics and biology.

Well it means ^{19}F chemical and physical dynamics have temperature, strong electric field, and strong B field dependent properties. So at low temperature, low electric field and low magnetic fields, ^{19}F behave like + NMMs. But at high temperatures, high electric fields, high magnetic fields then the ^{19}F behaves like – NMMs. Under such strong intense activation ^{19}F ↔ ^{19}F* ~ ^{19}Ne (-1.1885 NMM, ½ spin). Under low activating conditions the ^{19}F and its + NMMs are kinetically driven to bind – NMM of :^{15}N and :^{17}O with consequent thermodynamic stabilization. But under high activating conditions, the + NMM is altered to – NMM in ^{19}F and the induced -NMM of ^{19}F is kinetically restricted from being attacked by ^{15}N and ^{17}O. But ^{15}N under activating conditions has ^{15}C of +1.32 NMM, so the ^{19}F of induced -NMM may attack ^{15}C induced from ^{15}N to form ^{19}F-^{15}N with thermodynamic instability as the + NMM pull e^- e^-

magnetically from ^{19}F electronegative pull. ^{15}N ↔ ^{15}O of 0.719 NMM and ½ spin; so nucleus of ^{15}N can pull in and push out $e^- e^-$ pairs to become induced + NMM and ½ spin of ^{15}C ↔ ^{15}O for oscillating electronic configuration about ^{15}N and magnetic compression. This breaks ^{13}C-^{15}N as ^{13}C-^{15}O and ^{13}C-^{15}C in cancer cells break cancer's DNA. But in normal ^{12}C-^{15}C and ^{12}C-^{15}O have null --- + NMM. This is Little Effect. For ^{17}O ↔ ^{17}N (0 NMM and ½ spin) and ^{17}O ↔ ^{17}F (+4.722 NMM and 5/2 spin) for breaking ^{13}C-^{17}F and ^{13}C – ^{17}N*. The + NMM of induction on ^{17}O will induce ^{19}F to attack but the resulting bond is thermodynamically unstable.

^{14}N (spin = 1, 0.40 NMM) ↔ ^{14}O (0 spin, 0 NMM); ^{14}N ↔ ^{14}C (0 spin, 0 NMM). But unlike ^{15}N, as ^{14}N reversibly transmutes it loses its spin and NMM for less kinetic driving of ^{14}N under activating conditions. Suh loss of activation of ^{14}N and greater activation of ^{15}N may be reason for toxicity of ^{15}N to cancer cells. (As electronic lattice is quantum mechanical and the nucleus is quantum mechanical and in quantum mechanics tunneling occurs and wave particle duality. Then why should not the electrons transiently visit nuclear states even if barrier is there. By such transient visitations then the effects of weak interactions on chemistry is manifested if hidden but explaining!) ^{14}N favors cancer. But normal cells deal with ^{15}N as ^{15}N may repaired by normal cells. Cancer cells may not repair damage done by ^{15}N to DNA and proteins. ^{41}K ↔ ^{41}Ar (7/2 spin, 0 NMM); ^{41}K ↔ ^{41}Ca (7/2 spin, -1.59 NMM). Therefore ^{41}K interacts with ^{15}N and ^{41}Ca (-1.59 NMM) interacts with ^{15}O (+0.719 NMM). Thereby ^{15}N pulls in ^{41}K if ^{15}N is depleted then ^{41}K is depleted. ^{41}K may slow glycolysis and accelerate Kreb cycle.

It is important to note that the author has I have not considered Iodine (I) in cancer. It is important in living organisms. It has + NMM. ^{17}O and ^{15}N may serve roles to bind up + NMMs like ^{13}C, F, Cl, I, Br, ^{31}P, and ^{1}H for thermodynamic stability and kinetic driven processes. But for ionic bonds, the – NMM --- + NMM kinetically accelerates (need to consider quantum tunneling accelerated by nonzero NMMs) formation of ionic bond formations, but resulting bonds have thermodynamic metastabilities, especially if more electronegative has - NMM. (Positive NMMs would accelerate tunneling, into nonmetal negative NMMs would slow tunneling into nonmetals. But negative NMM would accelerate tunneling into metal and positive NMM would decelerate tunneling into metal Why? Negative NMMs cause Dk like interactions for negative to attract negative and positive to attract positive to accelerate tunneling of e^- wavefunctions through barriers. But positive NMMs may increase barrier to decelerate tunneling of e^- wavefunctions through barriers. Thereby ^{18}O (and induced spin = 1 may decelerate tunneling. ^{15}N and ^{17}O may accelerate tunneling. ^{13}C may slow tunneling, ^{1}H slows tunneling.)

If two nuclei magnetically pull in opposite directions on $e^- e^-$ then the $e^- e^-$ are likely shared separated one into one atom and the other e^- pulled into the other atom. Picture of two positive NMMs and their fields interacting. The NMMs cancel in the bend of space for null. The quanta are here shown to also cancel in their motions in the bends of space for quanta cancellations with incomplete and tiny thermal field generations. Such cancellations cannot push or pull $e^- e^-$. This creates null so the $e^- e^-$ are not likely to be in this space but on other sides of nuclei. The $e^- e^-$ are likely and the $e^- e^-$ are separated so spin up on one atom and spin down on the other atom to change the exchange as spin up and spin down are usually between nuclei but now spin up and spin down are on other sides of nuclei with void between nuclei. Note the surroundings can couple to the spin up and spin down differently to agitate to inequality so the cancellation is incomplete for residual gravity and thermal fields. RBL notes this is the mechanism of gravity that RBL discovers as the nuclei have Br and Dk dense gravities of nucleon and quark up and down symmetries interacting to partial cancellation in rapid motions in in completeness of cancellations for leaving thermal and gravity spaces. If this is so then heating should change gravity and heat production and gravity and magnetic field and strong and weak fields. This may magnetically separate covalent bonds and magnetize the product atoms for magnetic binding. Magnetic nuclear spin can flip and polarize the resulting radicals to prevent rebonding. Picture of + and – NMMs and their fields and interactions by their fields. So the quanta in the space push and pull the e^- by extending and compressing space. The space bends path of e^- by twisting space. So the nuclear fields are two dense to release thermal space and gravity spaces. So the space is mostly QF and QF fiss and fuse. The e^- and residual thermal irrational fuse the e^- . So the Br and Dk QF push and pull untwisted e^- waves. So it is that + NMM and + NMM create dense QF or do they create voids (Nulls)?

+ and + NMMs. Picture of + interacting with +NMM and their fields. The + --- + NMM create approximate null QFs nodes picture of the fields of + --- + NMM cancelling and the moving quanta cancer and as the fields cancel the space collapse pulling remaining together. But RBL notes in the rapidity of moving the nuclei, the fields moving can move before they cancel. Lake waves are different from river waves as RBL introduces here. But moreover RBL introduces relativistic river waves. The relativistic motions of the river waves cause them to move before they can cancel and the cancellations are incomplete leaving thermal space and gravity space. And RBL here discovers to origin of gravity. Also RBL discovers the way gravity entangles nucleons and nuclear fields and quantum fields. The gravity can disrupt entanglement of quanta and alter entanglement of quanta just as the quanta in entangling and superpositioning can be produced for formation of gravity by moving superpositions. The gravity can induce the fissing of quanta and the interference of their fields and the gravity induces fusing of the nucleons and quarks. So the gravity induces space to fuse quanta. The space near stars and black holes are more likely for large quanta fluctuations. Gravity from distant objects has the pattern of the origin. Like the sun, its gravity has some imprint of the nucleons and quarks that formed inside the sun and then such gravity can then couple to atmosphere of planets to induce quanta in the atmosphere. This is reason the gravity from sun induces lost of Neptune's clouds. So the + --- + NMMs and - ---- - NMMs. this explains the rapidity of thermal energy release for strong metals for creating void and thermal space and gravity by the interactions of rapidly moving quarks and nucleons as RBL previously published. Such voids oppose covalent bonds but such voids may stabilize ionic compounds.

Pictures of + NMMs interacting with – NMMs. Contrast this + --- - NMMs with the prior + --- + NMMs. In + --- - NMMs, the quanta annihilate but the spatial bends superpose constructively to create huge gravity fields ↔ magnetic fields ↔ QF for + --- - NMMs. These nuclei with + and – NMMs manifest superconductivity. So on such basis, + and – NMMs favor covalence but destabilize ionic bonds.

Go back and interpret CO, CO_2, CO_3^{2-}

CO

$^{12}C^{16}O$ $^{12}C^{17}O$ $^{13}C^{16}O$ $^{12}C^{18}O$ $^{13}C^{17}O$ $^{13}C^{18}O$

The effects of NMMs and spin on triple bond of C-O are considered here. Effects of induced NMMs and spins on triple bond in C-O. Null NMMs --- Null NMMs. Induced NMM --- Induced NMMs. Spin --- Spin. Induced Spins interact with induced Spins.

CO_2

$^{16}O^{12}C^{16}O$ $^{17}O^{12}C^{16}O$ $^{18}O^{12}C^{16}O$ $^{17}O^{12}C^{17}O$ $^{17}O^{12}C^{18}O$ $^{18}O^{12}C^{18}O$

The differing effect of NMMs, spins on double bonds in O=C=O (CO_2). Double bonds, resonating double bond may be affected by the NMMs, induced NMMs, spin and/or induced spins.

$^{16}O^{13}C^{16}O$ $^{17}O^{13}C^{16}O$ $^{18}O^{13}C^{16}O$ $^{17}O^{13}C^{17}O$ $^{17}O^{13}C^{18}O$ $^{17}O^{13}C^{17}O$
$^{18}O^{13}C^{18}O$

CO_3^{2-}

$^{16}O^{12}C\ (=^{16}O)^{16}O$ $^{16}O^{12}C\ (=^{17}O)^{16}O$ $^{16}O^{12}C\ (=^{18}O)^{16}O$ $^{17}O^{12}C\ (=^{17}O)^{17}O$

$^{16}O^{12}C\ (=^{17}O)^{18}O$ $^{17}O^{12}C\ (=^{17}O)^{18}O$ $^{18}O^{12}C\ (=^{17}O)^{18}O$ $^{18}O^{12}C\ (=^{18}O)^{18}O$

$^{16}O^{13}C\ (=^{16}O)^{16}O$ $^{16}O^{13}C\ (=^{17}O)^{16}O$ $^{16}O^{13}C\ (=^{18}O)^{16}O$ $^{17}O^{13}C\ (=^{17}O)^{17}O$

$^{16}O^{13}C\ (=^{17}O)^{18}O$ $^{17}O^{13}C\ (=^{17}O)^{18}O$ $^{18}O^{13}C\ (=^{17}O)^{18}O$ $^{18}O^{13}C\ (=^{18}O)^{18}O$

Carbonate is different as it is ionic and covalent and it should have different stability relative to CO and CO_2. Magnetic nuclei of ^{18}O induced breaking pi (π) bonds to resonate the pi bond. Resonance is favored by magnetic field of the nuclei of ^{18}O as by its induced spins. Spin causes such magnetic field to fragment e^- e^- to resonate delocalized π e^- cloud over 3 oxygen atoms. ^{12}C and ^{13}C have induced spins in ^{12}B and ^{12}N. The changing nuclei give momentary patterns of activation about carbon atoms for altering bonds.

^{12}C (0 spin, 0 NMM) ↔ ^{12}B (1,1 NMM).
^{12}C (0, 0 NMM) ↔ ^{12}N (1, 0.47 MM)
^{12}C changes character in excited state relative to ground as it polarize spin and becomes magnetic.

^{13}C(1/2, 0.7 NMM) ↔ ^{13}B (3/2, 3.1 NMM)
^{13}C(1/2, 0.7 NMM) ↔ ^{13}C (1/2 , 0.322 NMM)
^{13}C changes spin and orbital moment from ground to excited states. ^{13}C ↔ ^{13}B ss more likely to cause greater stability of $[CO_3]^{2-}$.
^{16}O (0, 0 NMM) ↔ ^{16}N (2, 0 NMM)
^{16}O (0,0 NMM) ↔ ^{16}F (?) unstable
^{16}O maintains orbital but changes spin
^{17}O (5/2, -1.89 NMM) ↔ ^{17}N (1/2, 0 NMM)
^{17}O (5/2, -1.89 NMM) ↔ ^{17}F (5/2, 4.72 NMM)
^{17}O changes spin and chirality of orbital. All three O isotopes are activated by nuclear spins by large change in ^{17}O causing faster kinetics relative to ^{16}O and ^{18}O.
^{18}O (0, 0 NMM) ↔ ^{18}N (1, 0 NMM)
^{18}O(0, 0 NMM) ↔ ^{18}F(1, 0 NMM)
^{18}O changes spin
^{14}N(1, 0.40 NMM) ↔ ^{14}C(0, 0 NMM)
^{14}N(1.0, 0.40 NMM) ↔ ^{14}O(0, 0 NMM)
^{14}N does not changes spin or orbital. This role in protein inactivated states there is less magnetic drive for resilience of ^{14}N in proteins and other biomolecules. Stability of proteins are due to ^{14}O losing spin and NMM in activated states.

^{15}N(1/2, -0.283 NMM) ↔ ^{15}C (1/1, 1.32 NMM)
^{15}N(1/2. -0.283 NMM) ↔ ^{15}O(1/2, 0.79 NMM)

^{15}N is different as in ground state it differs from ^{14}N in chirality. And in activated state ^{15}N changes its own ground state chirality. Activated ^{15}N acts like ground state of ^{14}N. ^{15}N on the other hand changes NMM to cause kinetic lability. Both ^{15}N and ^{17}O are very reactive having kinetic ease under activation. The rapidity of cancer then ^{15}N and ^{17}O may kill cancer as they cannot repair cancer DNA. But activates ^{17}O is not like ground state ^{16}O.

^{19}F(1/2, 2.92 NMM) ↔ ^{19}O(5/2 , 0 NMM)
^{19}F ↔ ^{19}Ne(1/2, -1.88 NMM)

Activated ^{19}F changes spin and NMM polarity. Along reaction trajectory ^{19}F is very different from ground ^{19}F compounds on shelf differ from compounds along reaction trajectories.

Ionic Bonding and + and – NMMs and Induced NMMs

For ionic bonding, the + NMM --- - NMM is kinetically driven but thermodynamically metastable if + NMM is on most electronegative element. (Can halides be induced to have – NMMs?). But for covalent bonds, the + NMM --- - NMM is accelerated kinetically driven and thermodynamically stability. In comparing thermodynamics and kinetics must use noninduced and induced states of nuclei. But if + NMM is on less electronegative nonmetal then the reaction may be less kinetically driven with kinetic limitations conditions. Example is ^{13}C-^{15}N or ^{13}C-^{17}O. Such for ^{13}C-^{15}N, ^{13}C-^{17}O explains the greater reactivity relative to ^{13}C-^{19}F as the ^{19}F pulls $e^- e^-$ to F just to overpower ^{13}C pull. ^{19}F pulls magnetically to F just as ^{19}F electronegativity and electron affinity pull $e^- e^-$ to F to explain difficulty isolating fluorine. The + NMM on carbon hinders the bond formations for the thermodynamically bond stability under ambient conditions and for destabilization the bond as it destabilizes bond polarity and in molecules it alters molecular dipoles under ambient.

But in activated states induced NMMs may alter effects. In activated state ^{15}N has induced + NMMs of both ^{15}C and ^{15}O. But ^{17}O has induced + NMMs of ^{17}F. Thereby ^{15}N has the oddest property relative to ^{17}O. ^{14}N has induced 0 NMM making ^{15}N even more odd. This explains why cancer dislikes ^{15}N. ^{16}O has induced 0 NMM of ^{16}N with spin = 2. The oddity of ^{15}N and its induced + NMMs are what causes detrimental effects of ^{15}N on cancer. Cancer has ^{13}C enriched and ^{15}N destabilizes ^{13}C-^{15}N in cancer to kill cancer. But be careful, as + NMM ··· + NMM may cause stronger ionic bond and + ··· - NMM causes stronger covalent bond. As ^{15}N of – NMM can be induced to have + NMMs will this cause bond to get stronger with higher temperatures or will the vibrations become stiffer at higher temperature. This is a new phenomenon of stronger bonds with heating. Compare to freezing with heating. It is important to note this explains Pomeranchuk Effect of order with heat as induced NMMs in ^{3}He can cause stronger interactions with heating. The Pomeranchuk Effect [30] is the solidification of very few materials when they are heated over a small temperature range. Also induced NMMs of ^{12}C cause stronger interactions for superconductivity and ordering at HPHT. ^{3}He ↔ ^{3}T with change in chirality of NMMs for explaining ordering with heating. For ^{3}He there is strong effect as nucleus acts directly on valence $e^- e^-$ as valence is core $e^- e^-$ in H and He.

I already published the theory of negative and positive NMMs associated with freezing of ^{3}He with heating. So now the ^{3}He has negative NMMs and under activation ^{3}He induced to ^{3}T of ½ spin and

2.97 NMM). Also ^3He induced to ^3Li with its instability of $3p^+$ in its nucleus. The positive NMM of ^3T and negative NMM of ^3He can induce freezing of the ^3He with heating. The positive and negative NMMs increase attractive interactions and quantum fields between the ^3He and ^3T for general broad consistency of RBL' s theory. But the NMMs on more electronegative ^{17}O and ^{15}N increases kinetic drive for nucleophilic attack under ambient conditions. This resulting ^{13}C-^{17}O (^{13}C-^{15}N) is not as stable as ^{13}C-^{16}O (^{13}C-^{14}N). But careful as instability due to +NMM on ^{13}C may be overwhelming by instability of + NMM ··· + NMM of ^{13}C – ^{14}N forever greater instability. ^{14}N and ^{15}N have both changes in spin and nuclear magnetic moments whereas ^{13}C and ^{17}O may not have both changes in spin and NMMs. This can cause cancer cells with ^{18}O ---^{13}C (^{17}O-^{13}C; ^{15}N-^{13}C) to be more stable and sicken cancer cells. ^{18}O ---^{12}C stronger is and ^{18}O --- ^{14}N is weaker bond. As the cancer cells replace with ^{18}O-^{15}N or ^{17}O-^{13}C or ^{17}O-H or ^{15}N-^{12}C; the –NMM on O and N alter bonds stabilities and bond dipoles, molecular dipoles and molecular interactions. This is how ^{15}N and ^{17}O protect cells from cancer. ^{17}O and ^{15}N stabilize ^{13}C, but destabilize ^{18}O. ^{18}O has induced spin but no induced NMM. ^{17}O and ^{15}N have induced spin and induced NMM. Induced spin causes radical pair effect and change reaction rates. But induced NMMs cause altered orbitals and change in bonding.

^{18}O changes rates for cancer by inducing radical pair effects. But induced NMMs change reaction path and trajectories for altering chemical reaction dynamics and kinetics. (^{18}O more induced in mitochondria and nucleus). So in glycolysis –(^{18}O)C-C(R)-N-C(O)-C(R)-N , ^{18}O alters role of breaking ^{18}O=^{12}C double bond and bond is stronger. The proteins interacting with the aldehyde, ketone, and carboxylic acid are altered due to ^{18}O so as to stop Kreb cycle. The amino acids interact with nucleotides for alterations (stronger bonds) due to ^{18}O and hydrogen bonding in nucleotides are altered by spin polarization to alter rates of bond reforming and activated states. And more over C=O and C-C(O)-N in purines and pyrimidines are altered by stronger bonds. The bonds are strengthened by ^{18}O-^{12}C and the bonds are weakened by C-^{15}N. ^{18}O alters nucleosides to strengthen H-bonds and strengthened ^{12}C=^{18}O bonds, but ^{18}O-^{12}C-^{15}N bonds are weaken in the nucleotides to sicken cancer. Under activating conditions $^{18}O \leftrightarrow {}^{18}N$ (spin = 1 and 0 NMM) and $^{18}O \leftrightarrow {}^{18}F$ (spin = 1 and 0 NMM) with induced spin less induced NMM in ^{18}O for less activation but magnetization. ^{14}N has spin= 1 and $^{18}O \leftrightarrow {}^{18}F$ and $^{18}O \leftrightarrow {}^{18}N$ having spin = 1 for same magnetic nature of ^{18}O as ^{14}N for causing DNA alterations by misreadings.

In this model, the author develops more of his theory that nuclear spin is mechanism for DNA, RNA , and protein replications, transcriptions, and translations, respectively. ^{14}N has spin and different number of N in nucleotides. The author here develops more his prior theory of strong electric field inducing change in fermions. As in prior publications, the author proposed strong electric and/or magnetic fields induce e^- fermions to fiss to waves of E and B and the electron (e^-) is dense E and B fields. Heat and thermal energies in irrationality were proposed to fuse E and B fields by the author. So in general, the author reasons that leptons and fermions are rational quanta that in surrounding E and B fields perturbations are induced to transduce to electric (E) and magnetic (B) fields. Quarks, neutrons and protons are also transformed to electric fields and magnetic fields like the lepton electron. Quarks, and the protons and neutrons they compose also are induced to fiss to rational electric and magnetic fields. The irrationality of space time by thermal and gravity fields or on the other hand induce the quanta of e^- quarks, p^+ and n^0 to fuse to quanta from corresponding waves. Thereby RBL explains matter interacting with light in new ways as the light causes e to fiss to wave and the wave manifest over space can cause e^- to relocate by model of RB Little. The thermal space acts on diffuse e^- to fuse it at new location. So light excite e^- by fissing it and refusing it in new orbital.

So electric fields and magnetic fields can form when light excites electrons about atoms. Electric and magnetic fields can be generated by breaking and forming chemical bonds. Thereby when chemical reactions occur or light is stimulating or the atoms are exposed to very high temperatures, then the atoms with nuclear spin or NMMs are stimulated to FR fiss the nuclei and nucleons and e^- FR fissing induced nuclear FR fissing. But if no net spin, then the nuclei less FR fiss. Spin up and spin down (pictures) e^- e^- pair FR fiss and fuse. So e^- e^- spin up and spin down FR fissing producing counter fields (picture of destructive waves) so the FR fiss fields cancel. But nuclei wih net spin FR fiss E and B fields that do not cancel. So ^{18}O (and other nuclei with net spin) FR releases huge E and B fields during chemical reactions, ^{16}O and ^{17}O do not have such large FR released E and B fields. Thereby RBL introduced new isotope effect. This model can explain isotope clumping in $(^{13}C^{18}O_3)^{2-}$.

But what about in ribosomes, ^{18}O-^{12}C bonds are altered in reading amino acids but why? Why in glycolysis, does ^{18}O accelerate breaking glucose to pyruvate? In glycolysis C(H)C(OH)- alcohol and PO_4^{3-} oscillate C-C and C-H bonds to the break bonds. ^{18}O helps the phosphate resonate as ^{18}O-^{31}P bonds are weakened due to induced spin interacting with + NMMs.; ^{18}O weaken phosphate and weakened phosphate makes phosphorylation faster. (But in mitochondria the ^{18}O=^{13}C in R-$(CO_2)^{-1}$ is strengthen due to resonance, phosphate does not resonate, so ^{31}P=^{18}O is weakened in cytoplasma). Why do induced spin --- + NMM decrease of stability of $\boldsymbol{\pi}$ bonds, but increase stability of resonating $\boldsymbol{\pi}$ bonds? 1) C is of second row and P is of 3rd row 2) ^{12}C, ^{13}C and O lack inner 1p for greater interactions with nuclei. 3) ^{31}P has 3p outside of 2p for shielding of 3p by 2p for less nuclear effects of P=O bonds relative to C=O bonds. 4) ^{31}P is 10% and ^{13}C is 1%. 6) stronger overlap of C=O molecular orbitals. The carbonate has planar structure and phosphate has 3D structure and nucleus has 3D structure and the 3D nucleus causes less stability of 3D PO_4^{3-}. There were some reactions where ^{17}O opposed forming cancer and ^{17}O favored in other reactions. The ^{18}O in combination with ^{17}O helps the dilemma.

I. ^{18}O and Magic Number Molecules

Also note ^{18}O is induced to have zero NMMs, but net spin = 1. And the inductions of nonzero NMMs and spins are easier if near magic number stable nucleus. As ^{16}O is stable, extra neutrons more easily fractionally, reversibly (FR) fissed and fused for inducing non-zero NMMs and spins. The FR fiss and fuse are induced by external thermal space. A stable cluster with slight excess can FR fiss. A cluster with fractional deficiency can FR fuse. The stability opposes slight excess; so FR fissing is induced. The stability also induces FR fusing to deficient to make magic numbers. And the potential for stability induce FR fusing to stability. The FR fiss and fuse are opposed by internal nuclear forces when internal nuclear forces are strongest and tightly binding. Then in weakness, the stable magic numbers are not as inclined to oppose external thermal, perturbations. So in ^{16}O the nucleons are tightly bound but the extra neutron in ^{17}O and 2 extra neutrons in ^{18}O are not as able to bind as $2n^0$ cluster (molecule bond) with $8p^+$ and/or for more weak binding of $2n^0$.

The stronger internally bound magic numbers (MN) are more sensitive to external tiny perturbations and manifest more FR fiss and fuse that persist over shorter times with induced NMMs and spins . But slightly excess or deficient of (or to) magic numbers for less stable quarks, nucleons, electrons, leptons, nucleonic molecules and/or nuclei are more easily perturbed and the FR fiss and fuse are less rapid and persist for longer times. Tiny perturbations like thermal space drive such activated unstable persisting states of quarks, leptons and hadrons. The stronger magic numbers (MN) persist over shorter times and are driven by thermal space over less time. The unstable nuclei drive the near MN unstable states by Little's Rules 1 and 3. Such unstable are also driven by strong perturbations of gravity, B and E fields. The magic numbers are driven by thermal space by Little Rules 1 and 2. Thermal activation couple to both stable and unstable. But the power of resulting activated state is more powerful for stable though it persists for shorter times. The activated states induced by thermal or unstable near MN states are less powerful and persist longer. Therefore, thermally induced NMMs and spins or ^{16}O are more powerful and shorter lived for hidden dynamics. But thermally induced NMMs and spins on ^{17}O are longer lived and less powerful than ^{16}O. And the nuclear molecules of 2 + 16 = 18 in ^{18}O is stable and it thermally induced + and – NMMs and spins also are more powerful and persist shorter times than ^{17}O. But ^{17}O couple more strongly to B_{ext}, E $_{ext}$, due to its permanent nonzero NMMs.

Stables:	more abundant	Less Abundant
Unstable:	longer lifetimes Regions near MNNM (+/-3)	Shorter Lifetimes regions for from MNNM

Magic Number 2 8. 20. 28. 50. 82. 126
6. 16. 8. 22. 32. 44

Near Magic Numbers, Non Magic Numbers. Compound Magic Numbers MNNM

What about sign and chirality? Do extra n^0 cause – NMMs? Do different or excess n^0 cause + NMM? It is important to consider neutron deficiency has excess 1, 7, 19, 27 neutrons in motions for – NMMs: ^{3}He, ^{9}Be, ^{15}N, ^{17}O, ^{107}Ag, ^{109}Ag for 50 + 50 + 8 = 108. Extra neutrons or deficient p$^+$ cause – NMMs of nuclei. Extra p$^+$ or deficient n^0 cause + NMM as in ^{14}N. + NMM are caused by slightly less than MN: ^{1}H, ^{7}Li, ^{11}B, ^{19}F. As 1 + 1 = 2. 1 + 7 = 8. 1 + 11 = 12. 8 + 4 = 12. 19 + 1 = 20. It seems both MN and MNNM causes the + and – NMMs. ^{27}Al is as 27 + 1 = 28. ^{23}Na is as 23 + 1 = 24. 24 = 20 + 4 = 18 + 8. So can excess of 1 p$^+$ or deficient 1 p$^+$ cause + NMMs.

So it has been shown in smaller nuclei p$^+$ --- p$^+$ and n^0 --- n^0 collide more and in more massive nuclei p$^+$ --- n^0 collide more. So the n^0 --- n^0 collide more in the 2n^0 cluster and in 8p$^+$ + 8n^0 the p$^+$ --- n^0 collide more. The more collisions of 2n^0 causes more inverse beta. {Where beta process (p$^+$ + e$^-$ ↔ n^0 forms neutrons to decrease and inverse of beta process decomposes neutrons n^0 ↔ p$^+$ + e$^-$ to increase atomic number. } For n^0 ↔ p$^+$ + e$^-$ and reversibly transmutation of ^{18}O to ^{18}F. For lighter nuclei, the beta is reversed to decrease atomic number for more massive the beta ($\boldsymbol{\beta}$) is driven to right to increase atomic number. ^{18}F has 0 NMM net spin = 1, so the ^{18}O reversibly, fractionally (FR) fiss and fuse to form ^{18}F of 0 NMM net spin =1. Such induced 0 NMM and spin = 1 of ^{18}O as ^{18}F causes the unusual properties of ^{18}O relative to ^{16}O. But the smaller mass of O causes it to fuse e$^-$ to p$^+$ to decrease atomic number then increase atomic number. So the FR transmuting of ^{18}O ↔ ^{18}N is more probable than ^{18}O ↔ ^{18}F. {How do you compare more p$^+$ vs more p$^+$ --- p$^+$ collisions and more n^0 --- n^0 collisions for less massive nuclei? n^0 --- n^0. and p$^+$ --- p$^+$ collide destabilize the p$^+$ --- p$^+$ and n^0 --- n^0 accelerate faster in smaller atoms to stabilize the smaller atoms. How do you compare more n^0 and more p$^+$ --- n^0 collisions for more massive nuclei ? p$^+$ --- n^0 collide to stabilize the p$^+$ --- p$^+$ and n^0 --- n^0 accelerate less in heavier nuclei but collide p$^+$ --- n^0 for stabilization.} So ^{18}O exist more as ^{18}O of spin = 1 and NMM = 0. For either ^{18}N or ^{18}F, the ^{18}O acquires spin = 1. Such change in spin from 0 to 1 of ^{18}O by FR fissing and fusing causes its unusual properties in extreme conditions. But less tightly bound nuclei fiss to high energy states that disturb excess nucleons to FR fiss, but bind excessive nucleus. But if internal nuclear fields are strong and binding then external fields induce FR fissing and FR fissing are not as able to oppose FR fissing for short periods of time; and agitated excess intermediates FR fiss more momentarily for easier when induced to oppose the huge internal energy releases huge momentary outward fields. This explains ^{17}O; and ^{18}O is more potent than ^{17}O as there are n^0---n^0 extra interactions in ^{18}O causing huge release of fields relative to n^0 extra interaction in ^{17}O.

^{18}O and enrichment in Erythritol and Disease

It is important to note ^{18}O can undergo by beta ($\boldsymbol{\beta}$) process (electron collapse on ^{18}O to form neutron in nucleus) for transient ^{18}N. The ^{18}O ~ ^{18}N behaves like N chemistry and lacks NMM, yet has spin 1! The ^{18}N in the DNA and RNA can cause T to be as C or G to be as A. The ^{18}N can alter hydrogen bonding for mutating DNA. The spin = 1 of ^{18}N ~ ^{18}O causes magnetic interactions with p^+ to increase strength of H-bonding. Transient nuclear reactions can mutate DNA! The mitochondria can have ^{18}O in carbonyl, so the carboxylic acids have C-N like bonds rather than C=O bonds to alter oxidation as the ^{13}C-^{18}N bonds have spin = 1 on ^{18}N for radical like natures and magnetism. The magnetic nature of ^{18}O ~ ^{18}N or ^{18}O ~ ^{18}F by spin = 1 alters its release of O especially if it is bonded to ^{13}C-^{18}O. The burning and large bond energy induce ^{18}O to behave as ^{18}N with induced spin = 1. CN has stronger bond than C=O. It is important to note in the molecules, the s and p subshells are full in comparison to the atoms. The filled subshells and shells in molecules give proclivity for s electrons to collapse on nuclei. The s orbital also gives proclivity for nuclear fields to FR fiss into electronic lattice. The ^{14}N has spin 1 and interacts with the s electrons collapse on the ^{14}N to magnetize the C-^{14}N bond dynamics for different dynamics. Also in Tl compounds, lone pair effect of Tl can be explained by s electrons interacting with Tl nuclei of all positive NMMs ^{203}Tl and ^{205}Tl of 29% RA with 1.62 NMM and 70.5% RA with 1.64 NMM, respectively. Throughout this review, the author has looked at other magic number nuclei (2, 8, 20, 28, 50, 82, 126) and see if nuclei nearby have unusual physics and chemistry.

This is open interesting point of can nuclear spin cause overpowering effect to nuclear charge so the ^{14}N has spin = 1 and ^{18}O has spin = 1. Thereby can ^{14}N behave like ^{18}O. Can ^{18}N release $2e^-$ to form ^{18}F or release an e^- to form ^{18}O. Can ^{14}N acquire + $n^0 \leftrightarrow {}^{18}N$, then $^{18}N \leftrightarrow {}^{18}O$ by loss of 1 e^-. the n^0 can come from p^+ of H. Hydrogen compounds may momentarily give n^0 to nuclei to cause whole new chemistry for N to behave like O or for C to behave like N. How does this alter life? This may occur transiently with H_2O environment and in acidic solutions.

J. Potassium and Cancer

So $^{39}K^+$ twists with + NMM to reinforce and stabilize $^{15}NH_3$ by its - NMM, but ^{40}K by its - NMM and ^{41}K, (by induced – NMMs) twist opposite chirality to destabilize ^{15}N and block ^{15}N entering cancer cells for enriching in ^{40}K and ^{41}K. The ^{41}K FR transmutes by $19p^+$ and $22n^0$ → $20p^+$ and $21n^0$ and $1e^-$ or ^{41}K ~ ^{41}Ca with 20 protons. It is important to note the $20p^+$ and $20n^0$ + $1n^0$ causing excess n^0 for – NMM of ^{41}K. ^{41}Ca with 20 protons has 7/2 spin and -1.59 NMM to twist e^- e^- in opposition to ^{15}N for destabilizing ^{15}N and stabilizing ^{14}N in K---N interactions to deplete cells of ^{15}N to induce rewiring and cancer for caner genesis by such depletion of cells of ^{15}N. Also depletion of ^{15}N can cause enriching of ^{40}K and ^{41}K. Cancer cells are thereby enriched in ^{41}K and ^{14}N. Although ^{41}K is with low relative abundance among K isotopes relative to the Rb isotopes and its ^{85}Rb and ^{87}Rb magnetic centers having higher relative abundance for more optical pumping. The ^{41}K and its induced -NMM can optically pump core $e^- e^-$ of ^{41}K to then stabilize $^{14}NH_3$ and destabilize $^{15}NH_3$ in K—N interactions in analog to RbF optical pumping. Cancer cells have stored energy in enriched, clumped ^{41}K, ^{25}Mg, and ^{43}Ca by optical pumping to cause trace minerals to cause depletions of ^{15}N and ^{17}O from normal cells to cause cancer cells. It may be that the ^{14}N enriches the ^{41}K, ^{25}Mg, and ^{43}Ca from normal cells to cause cancer cells. ^{15}N may prevent enrichment of ^{41}K, ^{25}Mg and ^{43}Ca to prevent cancer. It is important to note these alkali and alkaline earth cations have available s orbitals for connecting to nuclei. This is important and should be emphasized. Does K cause cancer all cancer? Yes, fungi increase soil potassium. Cancer and depression due to K. K isotopes to kill cancer ^{39}K.

Liquid State and Effects of NMMs on Shells, Subshells, Orbitals and Atomic Rotations

The author (RBL) expresses new nuclear effects on electronic shells, subshells and orbitals for new chemical properties of atoms; new catalytic properties; new enzymatic properties; new sizes of atoms; new lattice energies of atoms and ions; new interactions with photons; and new light for optical pumping; new phonons by rotons; new interactions for transport; new binding $e^- e^-$ for superconductivity. It is important to note that heat transfer is different as heat ↔ phonons ↔ rotons ↔ for optical pumping via nuclei in new ways; so less dissipation of energy occurs. Physical states of nuclei, liquids and optical pumpings are related; so at lower temperatures interactions of nuclei cannot release lattice energies, but convert lattice energies to rotational energies. So the rotational energies keep atoms moving unable to lock into solids; but and able to twist around each other for liquid state. Such nuclear pressures are magnetically dense enough to revolve e^- and explain liquid state of electrons in strange metals. This twisting motion allows new separation of atoms and ions as by varying in rotations and interactions in new ways for new way to understand chromatography. Thereby rotational chromatography is here invented by RBL. By this RBL can separate Li! By this I can reason new ways to biology of novel interactions in cellular membranes. Scientists observe novel ^{17}O motion thru membrane [31]. The rotations of atoms of RBL by NMMs is awesome to explain this. But H^+ and Na^+ motions thru membranes by NMMs are explained by RBL [10]. p^+ rotations of RBL and its quantization are important for p^+ current to procures cellular potentials. Rotations of Li^+, Na^+, Rb^+, K^+, and Cs^+ are quantized.

Can Ion Rotations Alter Transport Across Cell Membranes?

Spinrevorbitals are here developed more for quantum transport across cell membranes. Can + NMM of cations in minerals in cellular walls and membranes (and vice versa) slow the + NMMs of nonmetal anions transport and dynamics through and across cell membranes ^{13}C and ^{33}S of + NMMs do not want to interact with minerals like Na^+ and K^+ of + NMMs in cellular walls and membranes and Na^+ and K^+ can thereby regulate ^{13}C and ^{33}S entering cells and vice versa. But ^{17}O and ^{15}N of negative NMMs are accelerated across cell membranes by Na^+ and K^+ of + NMMs and vice versa by the RBL theory [1,32]. And ^{15}N and ^{17}O are healthy for mammals and humans as they oppose activities of ^{13}C and ^{18}O of + NMMs and in induced spin 1, respectively. But the same mechanism can manifest in isotopes having induced + NMM and - NMMs, respectively. But same mechanism that depletes ^{41}K depletes ^{15}N as ^{41}K has negative NMM as ^{15}N has – NMM. So by RBL's theory of NMMs and induced NMMs [1,32], K^+ ion malfunction in its motion across cell membrane and this is part of cancer.

The induced NMMs are more activated under stronger metabolism and this may explain the important of exercise for helping prevent diseases like cancer and diabetes and contributing to good health. And this can explain glycolysis and Kreb cycle. Rotations of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{33}S, ^{41}K accelerate glycolysis, but suppresses Kreb cycle. Enzymes depleted in ^{15}N lead to less ^{41}K (and vice versa) to less penetrate across cell membranes and less ^{41}K causes less ^{15}N to penetrate cell membranes. So ^{39}K, ^{40}K, and ^{41}K interact differently with ^{15}N and ^{14}N. $^{15}NH_4^+$ ~ ^{41}K in size. ^{17}O flows across cell membranes well; also $^{15}NH_3$ flows across cell membranes well.

Healthier cells operate with ^{12}C, ^{14}N, and ^{16}O in membranes, but changing to ^{13}C, ^{15}N and ^{17}O alters ^{41}K, ^{65}Cu (induced ^{65}Ni of positive NMM and electronic ferromagnetism) and ^{66}Zn (induce ^{66}Cu of -0.282 NMM) penetration of cell membrane to cause cancer. ^{65}Cu [33] and ^{66}Zn[34] (by induced positive and negative NMMs, respectively), hinder ^{15}N penetrating into cells to cause cancer. Like ^{13}C and ^{18}O, exercise may flush the body of ^{66}Zn and ^{65}Cu to help prevent diseases. Cu^{+2} ions have been associated with NO_3^- penetrating membranes. ^{63}Cu can lose e^- from nucleus to transmute to ^{63}Zn of negative NMM to oppose cancer. ^{65}Cu can release e^- from its nucleus to form ^{65}Zn of positive NMM to aid cancer. So, the superconducting cuprate and Cu/Pb apatite can use ^{65}Cu and ^{63}Cu for positive and negative NMMs to support RBL's NMM theory of superconductivity [35]! Also by RBL theory of induced NMMs and spins, the superconductivity of pyrolytic graphite [12] can be reasoned and explained by induced spin and NMMs in ^{12}C nuclei by ^{12}B (spin =1, 1 NMM) and ^{12}N (spin = 1, 0.47 NMM) as activated wrinkled defects. With larger masses the unstable nuclei have longer lifetimes from seconds to minutes. Why? More clustered magic number nuclei?

Less Mass Fewer Neutrons , More Mass More Neutrons

Smaller less massive nuclei have less neutrons and less transmutations to release e^- and thereby less FR induced increase atomic numbers. More massive nuclei have more neutrons and less FR fuse e^- to thereby induced decrease atomic numbers. $^{16}O \leftrightarrow {}^{17}O \leftrightarrow {}^{18}O \leftrightarrow {}^{19}O \leftrightarrow {}^{20}O \leftrightarrow {}^{21}O \leftrightarrow {}^{22}O$, shortest lifetime due to more neutrons is not able to $\leftrightarrow {}^{22}O$. This manifest RBL theory of more n^0 or p^+ away from magic number (MN) about midway between MN. Then shorter lifetimes. But too many p^+ of n^0 beyond equal p^+ or n^0 are unstable as with ^{28}O [36]. In general, do electronic transitions occur by nuclei changing charge and spins? Photons may cause changes in nuclei [37] and the changed nuclei can then oscillate the electrons into different orbitals! By Little's Rules, the photon should interact more strongly with nuclei than electrons. The changes in electrons is the consequence of changes in nuclei charge and change orbital momenta and spins! Nuclei fluctuate to affect surrounding nuclei and e^- e^- can mediate such nuclear --- nuclear interactions. 16 + x = 28 for MNNM. 16 + 12 = 28 . $^{22}O \leftrightarrow {}^{22}F \leftrightarrow {}^{22}Ne$, as 20 + 2 = 22 for MNNM. How does ^{12}C form from ^{16}O? $^{16}O \leftrightarrow {}^{16}N \leftrightarrow {}^{16}C$? RHC=CRH has 3010 to 3040 cm^{-1}, 1645cm^{-1}. R_2C=CHR has with 3075 – 3095 cm^{-1}, 1653 cm^{-1}. N-H has 3429 cm^{-1}. C-N has 1277 cm^{-1}.

^{41}K Couple to $^{15}NH_3$, $^{17}OH_2$ in Cells

Then $^{15}NH_3$ and $^{17}OH_2$ of – NMMs interact favorably with ^{41}K and ^{39}K of induced – NMMs by transmuting to ^{39}Ar and ^{41}Ca in normal cells; so ^{41}K and ^{39}K slow glycolysis and accelerates Kreb cycle due to their induced – NMMs by transient ^{39}Ar and ^{41}Ca. Recently experiments demonstrate Potassium Ions Promote Hexokinase II Dependent Glycolysis [38]. But isotopic shift of decrease $^{15}NH_3$ or decreased ^{41}K causes less $^{15}NH_3$ across cell membrane, $^{14}NH_3$ increase inside cell to cause cancer by RBL theory. ^{40}K of – NMM is induced to 0 NMM and spin = 2 as $^{40}Cl \leftrightarrow {}^{40}Ar \leftrightarrow {}^{40}K$. ^{40}K of – NMM is induced to ^{40}Ca of zero NMM and zero spin for altered chemistry and biochemistry of K. By RBL theory of FR fissing and fusing with NMMs and induced NMMs, K is explained to have unusual properties. What can cause either ^{41}K or $^{15}NH_3$ depletion or both eating too little $^{15}NH_3$ seafood. Eating potassium that (unknowingly) is depleted in ^{41}K like in K supplements. Thereby enrichment of trace amount $^{41}K^+$ and $^{15}NH_3$ can go to regions of damage biomolecules and repair the damage.

But how? Do they trigger apoptosis? Do they cause repairs? They (K isotopes) are magnetic and attract to free radicals, ROS and bind them. They (K isotopes) clump with defective ^{13}C (as ^{13}C-^{15}N and ^{13}C-^{18}O and ^{13}C-^{17}O are stable due to + … - NMM) and removed these from the body for basis of healing effects of ^{17}O-^{15}N (nitric oxide). By optical pumping $^{15}N < ^{17}O$, ^{40}K and ^{41}K optically pumping to change thermodynamics in biomolecules; and change biochemistry to prevent damage inside cells. Carbonates from Kreb cycle build-up with ^{13}C-^{18}O and ^{13}C-^{17}O by clumping for cancer. ^{15}N, ^{40}K and ^{41}K destabilizes ^{13}C and ^{18}O enriched biomolecules breaking up $^{13}C(O)$ -^{18}O to reform sugars, alcohols to eliminate ^{13}C and ^{18}O from body for health benefits of ^{41}K. It could be by RBL model that the trace amounts of ^{15}N, ^{17}O, ^{40}K, and ^{41}K cause reverse of metabolism in Kreb cycle, whereby the enzymatics forming ^{13}C-^{14}N, ^{13}C-^{16}O, ^{13}C-^{18}O, ^{13}C-^{17}O are reversed, so the damaged ^{13}C is reversed with $^{15}NH_3$ and ^{17}OH as the carboxylic acids with ^{13}C-^{17}O and ^{13}C-^{18}O converted back to alcohols and sugars. $O{=}^{13}C$-^{18}O are more subject to nucleophilic attack by ^{17}O and ^{15}N and less subject to attack by ^{14}N. This may be way ^{15}N opposes cancer. ^{39}K and ^{41}K and their + NMMs and induced - NMMs may strongly bind $^{15}NH_4$ so as to favor $^{15}NH_3$ attack ^{13}C centers as ^{39}K of + NMM --- $^{15}NH_3$ of negative NMM for optical pumping cations and $^{15}NH_3$ to stabilize. Healthier cells have ^{15}NH-^{13}C; ^{17}OH-^{13}C and these have thermodynamic stability that cause their eliminations to stop cancer and Alzheimer's Disease. These are healthy role of ^{17}O and ^{15}N and ^{41}K in humans and mammals. When ^{17}O, ^{15}N and ^{41}K are missing cells accumulate ^{18}O-^{13}C for disease. ^{17}O, ^{15}N and ^{41}K also may bind the damage to make damage worse so damaged cells die before the reproduce.

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Table I – Nuclear Magnetic Moments of Stable Isotopes of Elements (from Webelements). The Data is from Reference #40 (https://www.webelements.com/)

Hydrogen					
^{1}H		99.98%		1½	2.79
^{2}H		0.01%		0	0.85
Unstable					
	^{3}H	12.33 yr	β to ^{3}He	½	2.97 NMM
Helium					
^{3}He		.00001		½	-2.12
^{4}He		99.99%		0	0
	^{6}He	0.807 s	β^{-} to ^{6}Li 3/2	0 NMM	
	^{8}He	0.119 s	β^{-} to ^{8}Li 3/2	0 NMM	

Lithium						
	^{6}Li		7.59%		1	0.82
	^{7}Li		92.4%		3/2	3.52
		^{8}Li	0.84 s	β^- to ^{8}Be	2	1.65 NMM
		^{9}Li	0.178 s	β^- to ^{9}Be	3/2	3.44 NMM
		^{11}Li	0.0087 s	β^- to to ^{11}Be	½	3.67 NMM
Beryllium						
	^{9}Be		100%		3/2	-1.17
		^{6}Be	10^{-21} s	2p to ^{4}He	0	0 NMM
		^{7}Be	53 days	EC to ^{7} Li	3/2	0 NMM
		^{10}Be	10^{6} years	β^- to ^{10}B	0	0 NMM
		^{11}Be	13.8 s	β^- to ^{11}B	½	0 NMM
		^{12}Be	0.024 s	β^- to ^{12}B	0	0 NMM
		^{13}Be	0.004 s	β^- to ^{13}B	0	0 NMM
Boron						
	^{10}B		19.9%		3	1.80
	^{11}B		80.1		3/2	2.68
		^{8}B	0.770 s	EC to ^{8}Be	2	1.03 NMM
		^{9}B	19^{-19} s	p to ^{8}Be	3/2	1.8 NMM
		^{12}B	0.02 s	β^- to ^{12}C	1	1.00 NMM
		^{13}B	0.017 s	β^- to ^{13}C	3/2	3.1 NMM
Carbon						
	^{12}C		98.9%		0	0
	^{13}C		01.07%		½	0.702
		^{9}C	0.127 s	EC to ^{9}B	3/2	0
		^{10}C	19.3 s	EC to ^{10}B	0	0 NMM
		^{11}C	20.3 s	EC to ^{11}B	3/2	-0.94 NMM

		^{14}C	5715 y	β^- to ^{14}N		0		0
		^{15}C	2.45 s	β^- to ^{15}N		½		1.32
		^{16}C	0.75 s	β^- to ^{16}N		0		0 NMM
		^{17}C	0.19 s	β^- to^{17}N		0		0 NMM
Nitrogen								
	^{14}N		99.6%		1		0.40	
	^{15}N		0.36%		½		-.283	
		^{12}N	0.011 s	EC to ^{12}C		1		0.47 NMM
		^{13}N	9.97 m	EC to ^{13}C		1/3		0.322 NMM
		^{16}N	7.13 s	β^- to ^{16}O		2		0 NMM
		^{17}N	4.17 s	β^- to ^{17}O		½		0 NMM
		^{18}N	0.62 s	β^- to ^{18}O		1		0 NMM
Oxygen								
	^{16}O		99.7%		0		0	
	^{17}O		0.03		5/2		-1.89	
	^{18}O		0.21%		0		0	
		^{14}O	70.60 s	EC to ^{14}N		0		0 NMM
		^{15}O	122.2 s	EC to ^{15}N		½		0.719 NMM
		^{19}O	26.9 s	β^- to ^{19}F		5/2		0
		^{20}O	13.5 s	β^- to ^{20}F		0		0 NMM
Fluorine								
	^{19}F		100%		½		2.62	
		^{17}F	64.5 s	EC to ^{17}O		5/2		4.72 NMM
		^{18}F	1.83 h	EC to ^{18}O		1		0
		^{20}F	11.00 s	β^- to ^{20}Ne		2		2.094 NMM
		^{21}F	4.16 s	β^- to ^{21}Ne		5/2		0
		^{22}F	4.23 s	β^- to ^{22}Ne		4		0
		^{23}F	2.2 s	β^- to ^{23}Ne		5/2		0
Neon								
	^{20}Ne		90.5%		0		0	

	^{21}Ne		0.27%		3/2		-0.66	
	^{22}Ne		9.25			0		0
		^{18}Ne	1.67 s	EC to ^{18}F		0		0 NMM
		^{19}Ne	17.22 s	EC to ^{19}F		½		-1.885 NMM
		^{23}Ne	37.2 s	β^- to ^{23}Na		3/2		-1.08 NMM
		^{24}Ne	3.38 m	β^- to ^{24}Na		0		0 NMM
		^{25}Ne	0.61 s	β^- to ^{25}Na		½		0 NMM
Sodium								
	^{23}Na		100%		3/2		2.21	
		^{21}Na	22.48 s	EC to ^{21}Ne		3/2		0 NMM
		^{22}Na	2.6 s	EC to ^{22}Ne		3		1.746 NMM
		^{24}Na	15 hr	β^- to ^{24}Mg		4		1.69 NMM
		^{25}Na	59.3s	β^- to ^{25}Mg		5/2		3.68 NMM
		^{26}Na	1.07 s	β^- to ^{26}Mg		3		2.85
Magnesium								
	^{24}Mg		78.99		0		0	
	^{25}Mg		10.0%		5/2		-0.86	
	^{26}Mg		11.0%		0		0	
		^{22}Mg	3.86 s	EC to ^{22}Na		0		0 NMM
		^{23}Mg	11.32 s	EC to ^{23}Na		3/2		0.536 NMM
		^{27}Mg	9.45 m	β^- to ^{27}Al		½		0 NMM
		^{28}Mg	21 hr	β^- to ^{28}AL		0		0 NMM
		^{29}Mg	1.3 s	β^- to ^{29}Al		3/2		0 NMM
Aluminum								
	^{27}Al		100%		5/2		3.64	
		^{24}Al	2.07 s	EC to ^{24}Mg		4		3.64 NMM
		^{25}Al	7.16 s	EC to ^{25}Mg		5/2		0 NMM

		^{26}Al	710000 y	EC to ^{26}Mg		5		0
		^{28}Al	2.25 m	β^- to ^{28}Si		3		3.24 NMM
		^{29}Al	6.5 m	β^- to ^{29}Si		5/2		0 NMM
		^{30}Al	3.68 s	β^- to ^{30}Si		3		0 NMM
Silicon								
	^{28}Si		92.2%		0		0	
	^{29}Si		4.68%		½		0.55	
	^{30}Si		3.08		0		0	
		^{26}Si	2.23 s	EC to ^{26}Al		0		0 NMM
		^{27}Si	4.14 s	EC to ^{27}Al		5/2		0 NMM
		^{31}Si	2.62 h	β^- to ^{31}P		3/2		0 NMM
		^{32}Si	160 y	β^- to ^{32}P		0		0 NMM
		^{33}Si	6.1 s	β^- to ^{33}P		3/2		0 NMM
		^{34}Si	2.8 s	β^- to ^{34}P		0		0 NMM
Phosphorus								
	^{31}P		100%		½		1.31	
		^{29}P	4.14 s	EC to ^{29}Si		½		1.23 NMM
		^{30}P	2.50 m	EC to ^{30}Si		1		0 NMM
		^{32}P	14.28 d	β^- to ^{32}S		1		-0.252 NMM
		^{33}P	25.3 d	β^- to ^{33}S	½		0 NMM	
Sulfur								
	^{32}S		94.9%		0		0	
	^{33}S		0.76		3/2		0.64	
	^{34}S		4.29		0		0	
		^{30}S	1.18 s	EC to ^{30}P		0		0 NMM
		^{31}S	2.56 s	EC to ^{31}P		½		0 NMM
		^{35}S	87.2 d	β^- to ^{35}Cl		3/2		1.00 NMM
		^{37}S	5.05 m	β^- to ^{37}Cl		0		0 NMM
		^{38}S	2.84 h	β^- to ^{38}Cl		0		0 NMM

		^{39}S	11.5 s	β^- to ^{39}Cl		0		0 NMM
		^{40}S	9 s	β^- to ^{40}Cl		0		0 NMM
Chlorine								
	^{35}Cl		75.8%		3/2		0.82	
	^{37}Cl		24.22		3/2		0.68	
		^{36}Cl	301000 y	β^- to ^{36}Ar		0		0 NMM
		^{38}Cl	37.2 m	β^- to ^{38}Ar		2		2.05 NMM
		^{39}Cl	55.6 m	β^- to ^{39}Ar		3/2		0 NMM
		^{40}Cl	1.38 m	β^- to ^{40}Ar		2		0 NMM
		^{41}Cl	34 s	β^- to ^{41}Ar		0		0 NMM
		^{42}Cl	6.8 s	β^- to ^{42}Ar		0		0 NMM
		^{43}Cl	3.3 s	β^- to ^{43}Ar		0		0 NMM
Argon								
	^{36}Ar		0.33%		0		0	
	^{38}Ar		0.06%		0		0	
	^{40}Ar		99.6		0		0	
		^{35}Ar	1.77 s	EC to ^{35}Cl		3/2		0.633 NMM
		^{37}Ar	35.0 d	EC to ^{37}Cl		3/2		1.15 NMM
		^{39}Ar	268 y	β^- to ^{39}K		7/2		-1.3 NMM
		^{41}Ar	1.82 h	β^- to ^{41}K		7/2		0 NMM
		^{42}Ar	33 y	β^- to ^{42}K		0		0 NMM
		^{43}Ar	5.4 m	β^- to ^{43}K		0		0 NMM
		^{44}Ar	11.87 m	β^- to ^{44}K		0		0 NMM
Potassium								
	^{39}K		93.9%		3/2		0.39	
	^{40}K		0.012%	4		-1.2		
	^{41}K		6.7%		3/2		0.21	
		^{37}K	___	EC to ^{37}Ar		3/2		0.203 NMM
		^{38}K	7.63 m	EC to ^{38}Ar		3		1.37 NMM
		^{40}K	1.2 X 109 y	EC to ^{40}Ar		4		0

		^{42}K	12.36 h	β^- to ^{42}Ca		2		-1.14 NMM
		^{43}K	22.3 h	β^- to ^{43}Ca		3/2		0.163 NMM
		^{44}K	22.1 m	β^- to ^{44}Ca		2		-0.856 NMM
		^{45}K	17.8 m	β^- to ^{45}Ca		3/2		0.173 NMM
		^{46}K	1.8 m	β^- to ^{46}Ca		2		-1.05 NMM
		^{47}K	17.5 s	β^- to ^{47}Ca		½		1.93 NMM
		^{48}K	6.8 s	β^- to ^{48}Ca		2		0 NMM
		^{49}K	1.26 s	β^- to ^{49}Ca		0		0 NMM
Calcium								
	^{40}Ca		97%		0		0	
	^{42}Ca		.65%		0		0	
	^{43}Ca		.14%		7/2		-1.31	
	^{44}Ca		2.09%		0		0	
		^{41}Ca	102000 y	EC to ^{41}K		7/2		-1.595 NMM
		^{45}Ca	162.7 d	β^- to ^{45}Sc		7/2		-1.327 NMM
		^{47}Ca	4.536 d	β^- to ^{47}Sc		7/2		-1.38 NMM
		^{49}Ca	8.72 m	β^- to ^{49}Sc		3/2		0 NMM
		^{50}Ca	14 s	β^- to ^{50}Sc		0		0 NMM
		^{51}Ca	10 s	β^- to ^{51}Sc		3/2		0 NMM
		^{52}Ca	4.6s	β^- to ^{52}Sc		0		0 NMM
Scandium								
	^{45}Sc		100%		7/2		4.76	
		^{43}Sc	3.89 h	EC to ^{43}Ca		7/2		4.62 NMM
		^{44}Sc	3.93 h	EC to ^{44}Ca		2		2.56 NMM
		^{46}Sc	83.8 d	β^- to ^{48}Ti		4		3.03 NMM
		^{47}Sc	3.35 d	β^- to ^{47}Ti		7/2		5.34 NMM
		^{48}Sc	43.7 h	β^- to ^{48}Ti		6		0 NMM
		^{49}Sc	57.3 m	β^- to ^{49}Ti		7/2		0 NMM

		^{50}Sc	1.71 m	β^- to ^{50}Ti		5		0 NMM
Titanium								
	^{46}Ti		8.35%		0		0	
	^{47}Ti		7.4%		5/2		-0.79	
	^{48}Ti		73.7%		0		0	
	^{49}Ti		5.4%		7/2		-1.10	
	^{50}Ti		5.18		0		0	
		^{44}Ti	67 y	EC to ^{44}Sc		0		0 NMM
		^{45}Ti	3.08 h	EC to ^{45}Sc		7/2		0.095 NMM
		^{51}Ti	5.76 m	β^- to ^{51}V		0		0 NMM
		^{52}Ti	1.7 m	β^- to ^{52}V		3/2		0 NMM
Vanadium								
	^{50}V		.25%		6		3.35	
	^{51}V		99.8%		7/2		5.15	
		^{47}V	32.6 m	EC to ^{47}Ti		3/2		0 NMM
		^{48}V	15.98 d	EC to ^{48}Ti		4		2.01 NMM
		^{49}V	337 d	EC to ^{49}Ti		7/2		4.47 NMM
		^{52}V	3.76 m	β^- to ^{52} Cr		3		0 NMM
		^{53}V	1.61 m	β^- to ^{53}Cr		7/2		0 NMM
Chromium								
	^{50}Cr		4.3		0		0	
	^{52}Cr		83.8		0		0	
	^{53}Cr		9.5		3/2		-0.47	
	^{54}Cr		2.4%		0		0	
		^{48}Cr	21.6 h	EC to ^{48}V		0		0 NMM
		^{49}Cr	42.3 m	EC to ^{49}V		5/2		0.476 NMM
		^{51}Cr	27.7 d	EC to ^{51}V		7/2		-0.934 NMM
		^{55}Cr	3.5 m	β^- to ^{55}Mn		3/2		0
		^{56}Cr	5.9 m	β^- to ^{56}Mn		0		0 NMM
Manganese								

	^{55}Mn		100%		5/2		3.45	
		^{51}Mn	46.2 m	EC to ^{51}Cr		0		0 NMM
		^{52}Mn	5.59 d	EC to ^{52}Cr		6		3.06 NMM
		^{53}Mn	3.7 X 10^{6} y	EC to ^{53}Cr		7/2		5.024 NMM
		^{54}Mn	312.2 d	EC to ^{54}Cr		3		3.28 NMM
		^{56}Mn	2.579 h	β^- to ^{56}Fe	3		3.227 NMM	
		^{57}Mn	1.45 m	β^- to ^{57}Fe	5/2		0 NMM	
Iron								
	^{54}Fe		5.85%		0		0	
	^{56}Fe		91.75%	0		0		
	^{57}Fe		2.12%		½		0.091	
	^{58}Fe		0.28%		0		0	
		^{52}Fe	8.28 h	EC to ^{52}Mn		0		0 NMM
		^{53}Fe	8.52 m	EC to ^{53}Mn		7/2		0 NMM
		^{55}Fe	2.73 y	EC to ^{55}Mn		3/2		0 NMM
		^{59}Fe	44.5 d	β^- to ^{59}Co		3/2		0.29 NMM
		^{60}Fe	1.5 X 10^{6} y	β^- to ^{60}Co	0		0 NMM	
		^{61}Fe	6.0 m	β^- to ^{61}Co	0		0 NMM	
		^{62}Fe	68 s	β^- to ^{62}Co	0		0 NMM	
Cobalt								
	^{59}Co		100%		7/2		4.63	
		^{55}Co	17.53 h	EC to ^{55}Fe		7/2		4.82 NMM
		^{56}Co	77.3 d	EC to ^{56}Fe		4		3.85 NMM
		^{57}Co	271.8 d	EC to ^{57}Fe		7/2		4.72 NMM
		^{58}Co	70.8 d	EC to ^{58}Fe		2		4.04 NMM
		^{60}Co	5.27 y	β^- to ^{60}Ni		5		3.79 NMM
		^{61}Co	1.65 h	β^- to ^{61}Ni		7/2		0 NMM
		^{62}Co	13.9 m	β^- to ^{62}Ni		2		0 NMM
Nickel								

	^{58}Ni		68.1%		0		0	
	^{60}Ni		26.2%		0		0	
	^{61}Ni		1.1%		3/2		-.75	
	^{62}Ni		3.63		0		0	
		^{56}Ni	6.08 d	EC to ^{56}Co		0		0 NMM
		^{57}Ni	35.6 h	EC to ^{57}Co		3/2		0.88 NMM
		^{59}Ni	76000 y	EC to ^{59}Co		3/2		0 NMM
		^{63}Ni	100 y	$\boldsymbol{\beta}^-$ to ^{63}Cu		½		0
		^{65}Ni	2.517 h	$\boldsymbol{\beta}^-$ to ^{65}Cu		5/2		0.69 NMM
		^{66}Ni	54.6 h	$\boldsymbol{\beta}^-$ to ^{66}Cu		0		0
Copper								
	^{63}Cu		69.17		3/2		2.22	
	^{65}Cu		30.8		3/2		2.38	
		^{59}Cu	1.36 m	EC to ^{59}Ni		3/2		0 NMM
		^{60}Cu	23.7 m	EC to ^{60}Ni		2		1.22 NMM
		^{61}Cu	3.35 h	EC to ^{61}Ni		3/2		2.14 NMM
		^{62}Cu	9.74 m	EC to ^{62}Ni		1		-0.38 NMM
		^{64}Cu	12.7 h	EC to ^{64}Ni		1		-0.217 NMM
				$\boldsymbol{\beta}^-$ to ^{64}Zn				
		^{66}Cu	5.09 m	$\boldsymbol{\beta}^-$ to ^{66}Zn		1		-0.282 NMM
		^{67}Cu	2.58 d	$\boldsymbol{\beta}^-$ to ^{67}Zn		3/2		0 NMM
		^{68}Cu	31 s	$\boldsymbol{\beta}^-$ to ^{68}Zn		1		0 NMM
		^{69}Cu	2.8 m	$\boldsymbol{\beta}^-$ to ^{69}Zn		3/2		0 NMM
Zinc								
	^{64}Zn		48.6		0		0	
	^{66}Zn		28%		0		0	
	^{67}Zn		4.10		5/2		.87	
		^{60}Zn	2.40 m	EC to ^{60}Cu		0		0 NMM
		^{61}Zn	1.48 m	EC to ^{61}Cu		3/2		0 NMM
		^{62}Zn	9.2 h	EC to ^{62}Cu		0		0 NMM

	^{63}Zn	38.5 m	EC to ^{63}Cu	3/2	-0.281 NMM
	^{65}Zn	243. 8 d	EC to ^{65}Cu	5/2	0.769 NMM
	^{69}Zn	56 m	β^- to ^{69}Ga	½	0
	^{71}Zn	2.4 m	β^- to ^{71}Ga	½	0 NMM
	^{72}Zn	46.5 h	β^- to ^{72}Ga	0	0 NMM
Gallium					
^{69}Ga		60.1		3/2	2.01
^{71}Ga		39.9%		3/2	2.56
	^{64}Ga	2.63 m	EC to ^{64}Zn	0	0 NMM
	^{65}Ga	15.2 m	EC to ^{65}Zn	3/2	0 NMM
	^{66}Ga	9.5 h	EC to ^{66}Zn	0	0 NMM
	^{67}Ga	3.26 d	EC to ^{67}Zn	3/2	1.85 NMM
	^{68}Ga	1.13 h	EC to ^{68}Zn	1	0.0118 NMM
	^{70}Ga	21.1 m	EC to ^{70}Zn β^- to ^{70}Ge	1	0 NMM
	^{72}Ga	14.10 h	β^- to ^{72}Ge	3	-0.1322 NMM
	^{73}Ga	74.8 h	β^- to ^{73}Ge	3/2	0 NMM
	^{74}Ga	8.1 m	β^- to ^{74}Ge	3	0 NMM
	^{75}Ga	2.1 m	β^- to ^{75}Ge	3/2	0 NMM
Germanium					
^{70}Ge		20.84%		0	0
^{72}Ge		27.5%		0	0
^{73}Ge		7.7%		9/2	-.88
^{74}Ge		6.3%		0	0
^{76}Ge		7.61%		0	0
	^{64}Ge	1.06 m	EC to ^{64}Ga	0	0
	^{65}Ge	31 s	EC to ^{65}Ga	0	0
	^{66}Ge	2.26 h	EC to ^{66}Ga	0	0
	^{67}Ge	19.0 m	EC to ^{67}Ga	½	0 NMM

^{68}Ge	270.8 d	EC to ^{68}Ga	0		0 NMM
^{69}Ge	1.63 d	EC to ^{69}Ga	5/2		0.735 NMM
^{71}Ge	11.2 d	EC to ^{71}Ga	½		0.547
^{75}Ge	1.38 h	β^- to ^{75}As	½		0.510 NMM
^{77}Ge	11.3 h	β^- to ^{77}As	7/2		0
^{78}Ge	1.45 h	β^- to ^{78}As	0		0

Arsenics

^{75}As		100%		3/2		1.43	
	^{68}As	2.53 m	EC to ^{68}Ge		3		0 NMM
	^{69}As	15.2 m	EC to ^{69}Ge		5/2		1.2 NMM
	^{70}As	52.6 m	EC to ^{70}Ge		4		2.1 NMM
	^{71}As	2.72 d	EC to ^{71}Ge		5/2		1.67 NMM
	^{72}As	26 h	EC to ^{72}Ge		2		-2.16 NMM
	^{73}As	80.3 d	EC to ^{73}Ge		3/2		0 NMM
	^{74}As	17.8 d	EC to ^{74}Ge		2		-1.59 NMM
			β^- to ^{74}Se				
	^{76}As	26.3 h	β^- to ^{76}Se		2		-0.906 NMM
	^{77}As	38.8 h	β^- to ^{77}Se		3/2		0 NMM
	^{78}As	1.512 h	β^- to ^{78}Se		2		0 NMM
	^{79}As	9 min	β^- to ^{79}Se		3/2		0 NMM

^{76}Se can transmute to ^{76}As of negative NMM to explain WSe2 forming tunneling exciton with superfluid exciton!

Selenium

^{74}Se		0.89		0		0	
^{76}Se		9.37%		0		0	
^{77}Se		7.63		½		.53	
^{78}Se		23.8		0		0	
^{80}Se		49.6		0		0	
^{82}Se		8.73		0		0	
	^{70}Se	41.1 m	EC to ^{70}As		0		0 NMM

		^{71}Se	4.7 m	EC to ^{71}As	5/2	0 NMM
		^{72}Se	8.5 d	EC to ^{72}As	0	0 NMM
		^{73}Se	7.1 h	EC to ^{73}As	9/2	0 NMM
		^{75}Se	119.8 d	EC to ^{75}As	5/2	0.67 NMM
		^{79}Se	65000 y	β^- to ^{79}Br	0	-1.018
		^{81}Se	18.5 m	β^- to ^{81}Br	½	0 NMM
		^{83}Se	22.3 m	β^- to ^{83}Br	9/2	0 NMM
		^{84}Se	3.3 m	β^- to ^{84}Br	0	0 NMM
Bromine						
	^{79}Br		50.7%		3/2	2.11
	^{81}Br		49.3%		3/2	2.27
		^{72}Br	1.31m	EC to ^{72}Se	3	0 NMM
		^{73}Br	3.4 m	EC to ^{73}Se	3/2	0 NMM
		^{74}Br	25.4 m	EC to ^{74}Se	0	0 NMM
		^{75}Br	1.62 h	EC to ^{75}Se	3/2	0.75 NMM
		^{76}Br	16.0 h	EC to ^{76}Se	1	0.548 NMM
		^{77}Br	2.37 d	EC to ^{77}Se	3/2	0 NMM
		^{78}Br	6.46 m	EC to ^{78}Se β^- to ^{78}Kr	1	0.1 NMM
		^{80}Br	17.66 m	EC to ^{80}Se β^- to ^{80}Kr	1	0.51 NMM
		^{82}Br	1.47 d	β^- to ^{82}Kr	5	1.62 NMM
		^{83}Br	2.4 h	β^- to ^{83}Kr	3/2	0
		^{84}Br	31.8 m	β^- to ^{84}Kr	2	0 NMM
		^{85}Br	2.87 m	β^- to ^{85}Kr	3/2	0 NMM
Krypton						
	^{78}Kr		.35%		0	0
	^{80}Kr		2.28%		0	0
	^{82}Kr		11.6%		0	0
	^{83}Kr		11.5%		9/2	-0.97

^{84}Kr		57.0%		0		0	
^{86}Kr		17.3%		0		0	
	^{74}Kr	11.5 m	EC to ^{74}Br		0		0 NMM
	^{75}Kr	4.3 m	EC to ^{75}Br		0		0 NMM
	^{76}Kr	14.8 h	EC to ^{76}Br		0		0 NMM
	^{77}Kr	1.24 h	EC to ^{77}Br		5/2		
	^{79}Kr	1.455 d	EC to ^{79}Br		½		0 NMM
	^{81}Kr	210000 y	EC to ^{81}Br		7/2		0 NMM
	^{85}Kr	10.73 y	β^- to ^{85}Rb		9/2		1.005 NMM
	^{87}Kr	1.27 h	β^- to ^{87}Rb		5/2		-1.018
	^{88}Kr	2.84 h	β^- to ^{88}Rb		0		0 NMM
	^{89}Kr	3.15 m	β^- to ^{89}Rb		5/2		0 NMM
Rubidium							
^{85}Rb		72.1%		5/2		1.35	
^{87}Rb		27.8		3/2		2.75	
	^{81}Rb	4.57 h	EC to ^{81}Kr		3/2		2.06 NMM
	^{82}Rb	1.258 m	EC to ^{82}Kr		1		0.554 NMM
	^{83}Rb	86 d	EC to ^{83}Kr		5/2		1.425 NMM
	^{84}Rb	32.9 d	EC to ^{84}Kr		2		-1.32 NMM
			β^- to ^{84}Sr				
	^{86}Kr	18.65 d	EC to ^{86}Kr		2		-1.69 NMM
	^{87}Rb	4.75 X 10^{1}0 y	β^- to ^{87}Sr		3/2		
Strontium							
^{86}Sr		9.86%		0		0	
^{87}Sr		7.0%		9/2		-1.09	
^{88}Sr		82.6%		0			
	^{80}Sr	1.77 h	EC to ^{80}Rb		0		0 NMM
	^{81}Sr	22.3 m	EC to ^{81}Rb		½		0.544 NMM

^{82}Sr	25.3 d	EC to ^{82}Rb	½	0 NMM
^{83}Sr	1.35 d	EC to ^{83}Rb	7/2	-0.898 NMM
^{85}Sr	64.8 d	EC to ^{85}Rb	9/2	-1.001 NMM
^{89}Sr	50.5 d	β^- to ^{89}Y	5/2	-1.15 NMM
^{90}Sr	29.1 y	β^- to ^{90}Y	0	0
^{91}Sr	9.5 h	β^- to ^{91}Y	5/2	-0.887 NMM
^{92}Sr	2.71 h	β^- to ^{92}Y	0	0 NMM

Yttrium

^{89}Y	100%		½	-.137
^{85}Y	2.6 h	EC to ^{85}Sr	½	
^{86}Y	14.7 h	EC to ^{86}Sr	4	0.6 NMM
^{87}Y	3.35 d	EC to ^{87}Sr	½	0 NMM
^{88}Y	106.6 d	EC to ^{86}Sr	4	0 NMM
^{90}Y	2.67 d	β^- to ^{90}Zr	2	-1.63 NMM
^{91}Y	58.5 d	β^- to ^{91}Zr	½	0.146 NMM
^{92}Y	3.54 h	β^- to ^{92}Zr	2	0 NMM
^{93}Y	10.2 h	β^- to ^{93}Zr	½	0 NMM

Zirconium

^{90}Zr	51.45%		0	0
^{91}Zr	11.2%		5/2	-1.30
^{92}Zr	17.15		0	0
^{94}Zr	17.4%		0	0
^{96}Zr	2.8%		0	0
^{86}Zr	16.5 h	EC to ^{86}Y	0	0NMM
^{87}Zr	1.73 h	EC to ^{87}Y	9/2	0 NMM
^{88}Zr	83.4 d	EC to ^{88}Y	0	0

Why no NMMs for these unstable nuclei? Sudden reduced EC and increase β^- to, why?

^{89}Zr	3.27 d	EC to ^{89}Y	9/2	0 NMM
^{93}Zr	1.5X10^{6} y	β^- to ^{93}Nb	5/2	0 NMM

		^{95}Zr	64.02 d	β^- to ^{95}Nb	5/2	0 NMM
		^{96}Zr	3.9X10^{19} y	2β^- to ^{96}Mo	0	0 NMM
		^{97}Zr	16.8 h	β^- to ^{97}Nb	½	0 NMM
Niobium						
	^{93}Nb		100%		9/2	6.17
		^{89}Nb	1.10 h	EC to ^{89}Zr	½	0 NMM
		^{90}Nb	14.6 h	EC to ^{90}Zr	8	4.96 NMM
		^{91}Nb	700 y	EC to ^{91}Zr	½	0 NMM
		^{92}Nb	3.7X10^{7} y	EC to ^{92}Zr	7	6.11 NMM
				β^- to ^{92}Mo		
		^{94}Nb	24000 y	β^- to ^{94}Mo	6	0
		^{95}Nb	34.97 d	β^- to ^{95}Mo	9/2	6.141 NMM
		^{96}Nb	23.4 d	β^- to ^{96}Mo	6	4.98 NMM
		^{97}Nb	1.23 h	β^- to ^{97}Mo	9/2	6.15 NMM
Molydenum						
	^{92}Mo		14.8%		0	0
	^{94}Mo		9.25%		0	0
	^{95}Mo		15.9%		5/2	-.91
	^{96}Mo		16.7%		0	0
	^{97}Mo		9.5%		5/2	-.93
	^{98}Mo		24.13		0	0
	^{100}Mo		9.6%		0	0
		^{90}Mo	5.7 h	EC to ^{90}Nb	0	0 NMM
		^{91}Mo	15.5 m	EC to ^{91}Nb	9/2	0 NMM
		^{93}Mo	3500 y	EC to ^{93}Nb	5/2	0 NMM
		^{99}Mo	2.74 d	β^- to ^{97}Tc	½	0.375 NMM
Technetium						
	Radioactive					

^{93}Tc	2.73 h	EC to ^{93}Mo	9/2	6.26 NMM
^{94}Tc	4.88 h	EC to ^{94}Mo	7	5.08 NMM
^{95}Tc	20 h	EC to ^{95}Mo	9/2	5.89 NMM
^{96}Tc	4.3 d	EC to ^{96}Mo	7	5.04 NMM
^{97}Tc	2.6X10^{6} y	EC to ^{97}Mo	9/2	0 NMM
^{98}Tc	4.2X10^{6} y	$\boldsymbol{\beta}^-$ to ^{98}Ru	6	0 NMM
^{99}Tc	213000 y	$\boldsymbol{\beta}^-$ to ^{99}Ru	9/2	5.68 NMM

$\boldsymbol{\beta}^-$ decreases and EC increases again why? Across the table the electron more easily pulled to nuclei later in later electronic series for EC. More electrons captured less electron release for less beta process of neutrons release e-! electronic shells reduce electron release as more + charge acting on electron shell, so electron shell resist release of e- with more electrons in shell. Early in series fewer electrons oppose electron release. Electronic shells affect beta process! In proteins many electrons affect electron release and electron capture processes in hidden ways. So across series the C, N, O , F increases electron capture.

Ruthenium

^{96}Ru	5.4%	0	0
^{99}Ru	12.8%	5/2	-.64
^{100}Ru	12.6%	0	0
^{101}Ru	17.1%	5/2	-.72
^{102}Ru	31.5%	0	0
^{104}Ru	18.6%	0	0

^{95}Ru	1.64 h	EC to ^{95}Tc	5/2	0 NMM
^{97}Ru	2.89 d	EC to ^{97}Tc	5/2	-0.78 NMM
^{103}Ru	39.2 d	$\boldsymbol{\beta}^-$ to ^{103}Rh	3/2	0.20 NMM
^{105}Ru	4.44 h	$\boldsymbol{\beta}^-$ to ^{105}Rh	3/2	-0.3 NMM
^{106}Ru	1.02 y	$\boldsymbol{\beta}^-$ to ^{106}Rh	0	0 NMM

Rhodium

^{103}Rh	100%	½	-0.088

^{99}Rh	16 d	EC to ^{99}Ru	½	0 NMM
^{100}Rh	20.8 h	EC to ^{100}Ru	1	0 NMM
^{101}Rh	3.3 y	EC to ^{101}Ru	½	0 NMM

		IT		
^{102}Rh	2.9 y	EC to ^{102}Rh β^- to ^{102}Pd	6	4.04 NMM
^{104}Rh	42.3 s	EC to ^{104}Ru β^- to ^{104} Pd	0	0 NMM

^{104}Rh to ^{104}Pd (11.1% RA) is unusual drop in lifetime for collective formations and this is related to Unconventional nuclear reactions of RBL theory. Rh is great catalysts. Transmuting Pd to Rh forms large positive NMM and catalytic activity of Rh with positive NMM and negative NMMs in Pd!

^{105}Rh	35.4 h	β^- to ^{105}Pd	7/2	4.45 NMM

Palladium

^{102}Pd	1.02%	0	0
^{104}Pd	11.1%	0	0
^{105}Pd	22.3%	5/2	-.64
^{106}Pd	27.3%	0	0
^{108}Pd	26.5%	0	0
^{110}Pd	11.7%	0	0

^{100}Pd	3.7 d	EC to ^{100}Rh	0	0 NMM
^{101}Pd	8.4 h	EC to ^{101}Rh	5/2	-0.66 NMM
^{103}Pd	16.99 d	EC to ^{103}Rh	5/2	0 NMM
^{107}Pd	6.5X106 y	β^- to ^{107}Ag	5/2	0 NMM
^{109}Pd	13.5 h	β^- to ^{109}Ag	5/2	0 NMM
^{111}Pd	23.4 m	β^- to ^{111}Ag	5/2	0 NMM
^{112}Pd	21.04 h	β^- to ^{112}Ag	0	0 NMM

Silver

^{107}Ag	51.8%	½	-.113
^{109}Ag	48.2%	½	-.131

^{103}Ag	1.10 h	EC to ^{103}Pd	7/2	4.47 NMM
^{104}Ag	69 m	EC to ^{104}Pd	5	3.92 NMM
^{105}Ag	41.3 d	EC to ^{105}Pd	½	0.1014 NMM

^{106}Ag	8.4 d	EC to ^{106}Pd	6	3.71 NMM
		β^- to ^{106}Cd		
^{108}Ag	2.39 m	EC to ^{108}Pd	1	2.69 NMM
		β^- to ^{108}Cd		
^{110}Ag.	124.6 s	EC to ^{110}Pd	1	2.72 NMM
		β^- to ^{110}Cd		
^{111}Ag.	7.47 d	β^- to ^{111}Cd	½	-0.146 NMM
^{112}Ag	13.13 h	β^- to ^{112}Cd	2	0.0547 NMM
^{113}Ag	5.3 h	β^- to ^{113}Cd	½	0.159 NMM

Compounding transmutations of ^{103}Rh to ^{103}Pd to ^{103}Ag of large 4.47 NMM for novel chemistry and catalysis.

Note the drop in life time of ^{108}Ag and ^{110}Ag of large positive NMMs and greater proclivity of formations. ^{108}Pd (27% RA) and ^{108}Cd and ^{110}Pd (12% RA) and ^{110}Cd (12.5% RA) forming these silver radio nuclei and there carcinogenic and catalysis.

Cadmium

^{110}Cd	12.5%	0	0
^{111}Cd	12.8%	½	-.59
^{112}Cd	24.1%	0	0
^{113}Cd	12.2%	½	-.62
^{114}Cd	28.7%	0	0
^{116}Cd	7.5	0	0

^{107}Cd	6.52 h	EC to ^{107}Ag	5/2	-0.615 NMM
^{109}Cd	462 d	EC to ^{109}Ag	5/2	-0.827 NMM
^{115}Cd	2.22 h	β^- to ^{115}In	½	-1/087 NMM
^{117}Cd	2.49 h	β^- to ^{117}In	½	0 NMM

With cadmium there is sudden drop in radio isotopes. Note energized Ag as RBL used in 2004 at NHMFL in coil of electromagnet can transmute to Cd and large negative NMMs for novel catalysis, superconductivity, transmutations.

Indium

^{113}In	4.3%	9/2	5.53
^{115}In	95.7%	9/2	5.54

^{109}In	4.2 h	EC to ^{109}Cd	9/2	5.54 NMM
^{110}In	1.15 h	EC to ^{110}Cd	2	4.37 NMM
^{111}In	2.8 d	EC to ^{111}Cd	9/2	5.50 NMM
^{112}In	14.4 m	EC to ^{112}Cd β^- to ^{112}Sn	1	2.82 NMM
^{114}In	1.19 m	EC to ^{114}Cd β^- to ^{114}Sn	1	2.82 NMM
^{115}In	4.4X10^{14}	β^- to ^{115}Sn	9/2	5.54 NMM

Note unusual drop in life time of ^{112}In and ^{114}In as formed from ^{114}Sn and ^{112}Sn and unusual catalytic activities of Sn and also carcinogenic Cd and its transmuting to ^{112}Cd to ^{112}In of positive NMM.

Tin

^{116}Sn	14.5%	0	0
^{117}Sn	7.7	½	-1.00
^{118}Sn	24.2%	0	0
^{119}Sn	8.6%	½	-1.04
^{120}Sn	32.6%	0	0
^{122}Sn	4.6%	0	0
^{124}Sn	5.8%	0	0

^{110}Sn	4.1 h	EC to ^{110}In	0	0 NMM
^{111}Sn	35 m	EC to ^{111}In	7/2	0.61 NMM
^{113}Sn	115.1 d	EC to ^{113}In	½	-0.879 NMM
^{121}Sn	1.28 d	β^- to ^{121}Sb	3/2	0.698 NMM
^{123}Sn	129.2 d	β^- to ^{123}Sb	11/2	-1.370 NMM
^{125}Sn	9.63 d	β^- to ^{125}Sb	11/2	-1.35 NMM
^{126}Sn	100000 y	β^- to ^{126}Sb	0	0 NMM
^{127}Sn	2.12 h	β^- to ^{127}Sb	11/2	0 NMM

^{123}Sb and ^{125}Sb from ^{125}Te is 43% RA and can transmute to ^{123}Sn of large – 1.4 NMM for novel properties.

Antimony

^{121}Sb	57.2%	5/2	3.36 NMM

	^{123}Sb		42.8%		7/2		2.55 NMM
		^{117}Sb	2.80 h	EC to ^{117}Sn		5/2	0 NMM
		^{118}Sb	2.6 m	EC to ^{118}Sn		1	0 NMM
		^{119}Sb	38.1 h	EC to ^{119}Sn		5/2	3.45 NMM
		^{120}Sb	15.89 m	EC to ^{120}Sn		1	2.3 NMM
		^{122}Sb	2.72 d	EC to ^{122}Sn		2	-1.90 NMM
				β^- to ^{122}Te			
		^{124}Sb	60.3 d	β^- to ^{124}Te		3	1.2 NMM
		^{125}Sb	2.7 y	β^- to ^{125}Te		7/2	2.63 NMM
		^{126}Sb	12.4 d	β^- to ^{126}Te		8	1.3 NMM
		^{127}Sb	3.84 d	β^- to ^{127}Te		7/2	2.7 NMM
		^{128}Sb	9.1 h	β^- to ^{128}Te		8	1.3 NMM
		^{129}Sb	4.4 h	β^- to ^{129}Te		7/2	o NMM
Tellerium							
	^{122}Te		2.5%		0		0
	^{123}Te		0.9%		½		-0.7
	^{124}Te		4.7%		0		0
	^{125}Te		7.1%		½		-.89
	^{126}Te		18.8%		0		0
	^{128}Te		31.7%		0		0
	^{130}Te		34.1%		0		0
		^{116}Te	2.49 h	EC to ^{116}Sb		0	0 NMM
		^{117}Te	1.03 h	EC to ^{117}Sb		½	0 NMM
		^{118}Te	6 d	EC to ^{118}Sb		0	0 NMM
		^{119}Te 16 h		EC to ^{119}Sb		1/2	0.25 NMM
		^{121}Te	16.8 d	EC to ^{121}Sb		½	0 NMM
		^{127}Te	9.4 h	β^- to ^{127}I		3/2	0.64 NMM
		^{129}Te	33.6 d	β^- to ^{129}I		3/2	0.70 NMM
Iodine							
	^{127}I		100%		5/2		2.81

^{120}I	1.35h	EC to ^{120}Te	2	1.23 NMM
^{121}I	2.12 h	EC to ^{121}Te	5/2	2.3 NMM
^{122}I	3.6 m	EC to ^{122}Te	1	0.94 NMM
^{123}I	13.2 h	EC to ^{123}Te	5/2	2.82 NMM
^{124}I	4.18 d	EC to ^{124}I	2	1.44 NMM
^{125}I	59 d	EC to ^{125}Te	5/2	2.82 NMM
^{126}I	13 d	EC to ^{126}Te β^- to ^{126}Xe	2	1.44 NMM
^{128}I	25 m	EC to ^{128}Te β^- to ^{128}Xe	1	0 NMM
^{129}I	1.7X107 y	β^- to ^{129}Xe	7/2	2.62 NMM
^{130}I	12.4 h	β^- to ^{130}Xe	5	3.35 NMM
^{131}I	8.0 d	β^- to ^{131}Xe	7/2	2.74 NMM
^{132}I	2.28 h	β^- to ^{132}Xe	4	0 NMM
^{133}I	20.8 h	β^- to ^{133}Xe	7/2	2.86 NMM
^{134}I	52.6 m	β^- to ^{134}Xe	4	0 NMM
^{135}I	6.57 h	β^- to ^{135}Xe	7/2	0 NMM

^{122}Te can be very reactive as it transmutes to ^{122}I with positive NMM to explain superconductivity of Te .

Xenon

^{128}Xe	1.9%	0	0
^{129}Xe	26.4%	1/2	-0.78
^{130}Xe	4.1%	0	0
^{131}Xe	21.2%	3/2	0.69
^{132}Xe	26.9%	0	0
^{134}Xe	10.4%	0	0
^{136}Xe	8.9%	0	0

^{122}Xe	20.1 h	EC to ^{122}I	0	0 NMM
^{123}Xe	2 h	EC to ^{123}I	½	0 NMM

^{125}Xe	17.1 h	EC to ^{125}I	½	0 NMM
^{127}Xe	36.4 d	EC to ^{127}I	½	-0.504 NMM
^{133}Xe	5.2 d	β^- to ^{133}Cs	3/2	0.813 NMM
^{135}Xe	9.10 h	β^- to ^{135}Cs	3/2	0.903 NMM

Is there a large change in NMM right where EC goes to β^- ?

Cesium

^{133}Cs		100%		7/2	2.58
	^{129}Cs	1.33 d	EC to ^{129}Xe	½	1.49 NMM
	^{130}Cs	29.2 m	EC to ^{130}Xe β^- to ^{130}Ba	1	1.46 NMM
	^{131}Cs	9.7 d	EC to ^{131}Xe	5/2	3.54 NMM
	^{132}Cs	6.5 d	EC to ^{132}Xe β^- to ^{132}Ba	2	2.22 NMM
	^{134}Cs	2.07 y	EC to ^{134}Xe β^- to ^{134}Ba	4	2.99 NMM
	^{135}Cs	2.3X106 y	β^- to ^{135}Ba	7/2	2.73 NMM
	^{136}Cs	13.16 d	β^- to ^{136}Ba	5	3.71 NMM
	^{137}Cs	30.2 y	β^- to ^{137}Ba	7/2	2.84 NMM

Barium

^{134}Ba		2.4%		0	0
^{135}Ba		6.6%		3/2	.83
^{136}Ba		7.9%		0	0
^{137}Ba		11.2%		3/2	0.93
^{138}Ba		71.7%		0	0
	^{128}Ba	2.43 d	EC to ^{128}Cs	0	0 NMM
	^{129}Ba	2.2 h	EC to ^{129}Cs	½	-0.4 NMM
	^{131}Ba	11.7 d	EC to ^{131}Cs	½	0.708 NMM
	^{133}Ba	10.5 y	EC to ^{133}Cs	½	0.77 NMM

^{129}Ba	1.396 h	β^- to ^{139}La	7/2	-0.97 NMM
^{140}Ba	12. 75 d	β^- to ^{140}La	0	0 NMM

^{139}La is 99% RA and at high pressures it transmutes by e^- collapse on ^{139}La nuclei to ^{129}Ba of -0.97 NMM!

Lanthanum

^{138}La	0.1%	5	3.7
^{139}La	99.9	7/2	2.7

^{132}La	4.8 h	EC to ^{132}Ba	2	0 NMM
^{133}La	3.91 h	EC to ^{133}Ba	5/2	0 NMM
^{134}La	6.5 m	EC to ^{134}Ba	1	0 NMM
^{135}La	19.5 h	EC to ^{135}Ba	5/2	0 NMM
^{136}La	9.87 m	EC to ^{136}Ba	1	0 NMM
^{137}La	60000 y	EC to ^{137}Ba	7/2	2.70 NMM
^{140}La	1.678 d	β^- to ^{140}Ce	3	0 NMM

Note general trend as transform from EC to β^- , the half life increases then decreases NMM abruptly largely changes. Increasing neutrons cause sudden increase instability of nuclei and large stabilization and large binding energy. Large activation energy and binding energy causes inability of chemical to compound the activation energy. Smaller half life then less stabile and binding so easily fragmented and chemical energies can compound to break the nuclei. Negative NMM favors loss of e- by beta decay. Such are usually neutron rich.

^{141}La	3.90 h	β^- to ^{141}Ce	7/2	0 NMM
^{142}La	1.54 h	β^- to ^{142}Ce	2	0 NMM

Cerium

^{136}Ce	0.185%	0	0
^{138}Ce	0.251%	0	0
^{140}Ce	88.4%	0	0
^{142}Ce	11.1%	0	0

^{134}Ce	3.16 d	EC to ^{134}La	0	0 NMM
^{135}Ce	17.7 h	EC to ^{135}La	½	0 NMM
^{137}Ce	9 h	EC to ^{137}La	3/2	0 NMM
^{139}Ce	137.6 d	EC to ^{139}La	3/2	0.9 NMM
^{141}Ce	32.5 d	β^- to ^{139}La	7/2	1.1

		^{143}Ce	1.38 d	β^- to ^{143}La		3/2		0 NMM
		^{144}Ce	284 d	β^- to ^{144}La		0		0 NMM
Praseodymium								
	^{141}Pr		100%		5/2		4.136	
		^{137}Pr	1.28 h	EC to ^{137}La		5/2		0 NMM
		^{138}Pr	1.45 m	EC to ^{138}Ce		1		0 NMM
		^{139}Pr	4.41 h	EC to ^{139}Ce		5/2		0 NMM
		^{140}Pr	3.39 m	EC to ^{140}Ce		1		0 NMM
		^{142}Pr	19.12 h	EC to ^{142}Ce β^- to ^{142}Nd		2		0.234 NMM
		^{143}Pr	13.57 d	β^- to ^{143}Nd		7/2		2.7 NMM
		^{144}Pr	17.28 m	β^- to ^{144}Nd		0		0 NMM
		^{145}Pr	5.98 h	β^- to ^{145}Nd		7/2		0
Neodymium								
	^{142}Nd		27.2%		0		0	
	^{143}Nd		12.2%		7/2		-1.065	
	^{144}Nd		23.8		0		0	
	^{145}Nd		8.3		7/2		-0.65	
	^{146}Nd		17.2%		0		0	
	^{148}Nd		5.7		0		0	
	^{150}Nd		5.6		0		0	
		^{138}Nd	5.1 h	EC to ^{138}Pr		0		0 NMM
		^{139}Nd	5.5 h	EC to ^{139}Pr		11/2		0 NMM
		^{140}Nd	3.37d	EC to ^{140}Pr		0		0 NMM
		^{141}Nd	2.49 h	EC to ^{141}Pr		3/2		1.01 NMM
		^{147}Nd	10.98 d	β^- to ^{147}Pm		5/2		0.58 NMM
		^{149}Nd	1.73 h	β^- to ^{149}Pm		5/2		0.35 NMM
Promethium								
	Null							

	^{143}Pm	265 d	EC to ^{143}Nd	5/2	3.8 NMM
	^{144}Pm	360 d	EC to ^{144}Nd	5	1.7 NMM
	^{145}Pm	17.7 y	EC to ^{145}Nd Alpha to ^{141}Pr	5/2	0 NMM
	^{146}Pm	5.53 y	EC to ^{146}Nd β^- to ^{146}Sm	3	0 NMM
	^{147}Pm	2.62 y	β^- to ^{147}Sm	7/2	2.6 NMM
	^{148}Pm	5.37 d	β^- to ^{148}Sm	1	2.0 NMM
	^{149}Pm	2.21 d	β^- to ^{14}9 Sm	7/2	3.3 NMM
	^{150}Pm	2.68 h	β^- to ^{150}Sm	1	0 NMM
	^{151}Pm	1.18 d	β^- to ^{151}Sm	5/2	1.8 NMM
Samarium					
^{147}Sm		15%		7/2	-0.81
^{148}Sm		11.2%		0	0
^{149}Sm		13.8%		7/2	-0.67
^{150}Sm		7.38%		0	0
^{152}Sm		26.75		0	0
^{154}Sm		22.75%		0	0
	^{145}Sm	340 d	EC to ^{145}Pm	7/2	-1.1 NMM
	^{146}Sm	1.03X108 y	alpha to ^{142}Nd	0	0 NMM
	^{151}Sm	90 y	β^- to ^{151}Eu	5/2	-0.363 NMM
	^{153}Sm	1.93 d	β^- to ^{153}Eu	3/2	-0.0216 NMM
	^{155}Sm	22.2 m	β^- to ^{155}Eu	3/2	0 NMM
	^{156}Sm	9.4 h	β^- to ^{156}Eu	0	0 NMM
Europium					
^{151}Eu		47.8%		5/2	3.4
^{153}Eu		52.2%		5/2	1.53

^{145}Eu	5.93 d	EC to ^{145}Sm	5/2	3.99 NMM
^{146}Eu	4.57 d	EC to ^{146}Sm	4	1.43 NMM
^{147}Eu	24.4 d	EC to ^{147}Sm	5/2	3.72 NMM
		Alpha to ^{143}Pm		
^{148}Eu	54.5 d	EC to ^{148}Sm	5	2.34 NMM
		Alpha to ^{143}Pm		
^{149}Eu	93.1 d	EC to ^{149}Sm	5/2	3.57 NMM
^{150}Eu	36 y	EC to ^{150}Sm	5	2.71 NMM
^{152}Eu	13.5 y	EC to ^{152}Sm	3	-1.91 NMM
		β^- to ^{152}Gd		
^{154}Eu	8.5 y	EC to ^{154}Sm	3	2.00 NMM
		β^- to ^{154}Gd		
^{155}Eu	4.76 y	β^- to ^{155}Gd	5/2	1.6 NMM
^{156}Eu	15.2 d	β^- to ^{156}Gd	3	-2.01NMM
Gadolinium				
^{154}Gd	2.18		0	0
^{155}Gd	14,8%		3/2	-.26
^{156}Gd	20.5%		0	0
^{157}Gd	15.7%		3/2	-.34
^{158}Gd	24.8%		0	0
^{160}Gd	21.8%		0	0
^{146}Gd	48.3 d	EC to ^{146}Eu	0	0 NMM
^{147}Gd	1.58 d	EC to ^{147}Eu	7/2	1.0 NMM
^{148}Gd	75 y	alpha to ^{144}Sm	0	0 NMM
^{149}Gd	9.3 d	EC to ^{149}Eu	7/2	0.9 NMM
		Alpha to ^{145}Sm		
^{150}Gd	1.8X106 y.	alpha to ^{146}Sm	0	0 NMM
^{151}Gd	124 d	EC to ^{151}Gd	7/2	0.8 NMM
		Alpha to ^{147}Sm		
^{153}Gd	241 d	EC to ^{153}Eu	3/2	0.4 NMM

	^{159}Gd	18.6 h	$\boldsymbol{\beta}^-$ to ^{159}Tb	3/2	-0.44 NMM
Terbium					
^{159}Tb		100%		3/2	2.014
	^{153}Tb	2.34 d	EC to ^{153}Gd	5/2	3.5 NMM
	154Tb	21.5 h	EC to ^{154}Gd	0	0.9 NMM
	^{155}Tb	5.3 d	EC to ^{155}Gd	3/2	2.0 NMM
	^{156}Tb	5.3 d	EC to ^{156}Gd	3	1.4 NMM
			$\boldsymbol{\beta}^-$ to ^{156}Dy		
	^{157}Tb	110 y	EC to ^{157}Gd	3/2	2.0 NMM
	^{158}Tb	180 y	EC to ^{158}Gd	3	1.76 NMM
			$\boldsymbol{\beta}^-$ to ^{158}Dy		
	^{160}Tb	72.3 d	$\boldsymbol{\beta}^-$ to ^{160}Dy	3	1.79 NMM
	^{161}Tb	6.91 d	$\boldsymbol{\beta}^-$ to ^{161}Dy	3/2	2.2 NMM
Dysprosium					
^{160}Dy		2.34%		0	0
^{161}Dy		18.91%		5/2	-0.4806
^{162}Dy		25.51%		0	0
^{163}Dy		24.90%		5/2	0.6726
^{164}Dy		28.18%		0	0
	^{152}Dy	2.37 h	EC to ^{152}Tb	0	0 NMM
			Alpha to ^{148}Gd		
	^{153}Dy	6.3 h	EC to ^{153}Tb	7/2	-0.78 NMM
			Alpha to ^{149}Gd		
	^{154}Dy	3X10^{6} y.	alpha to ^{150}Gd	0	0 NMM
	^{155}Dy	9.9 h	EC to ^{155}Tb	3/2	-0.385 NMM
	^{157}Dy	8.1 h	EC to ^{157}Tb	3/2	-0.301 NMM
	^{159}Dy	144 d	EC to ^{159}Tb	3/2	-0.354 NMM

		^{165}Dy	2.33 h	$\boldsymbol{\beta}^{-}$ to ^{165}Ho		7/2		-0.52 NMM
		^{166}Dy	3.4 d	$\boldsymbol{\beta}^{-}$ to ^{166} Ho		0		0 NMM
Holmium								
	^{165}Ho		100%		7/2		4.173	
		^{161}Ho	2.48 h	EC to ^{161}Dy		7/2		4.25 NMM
		^{162}Ho	15 m	EC to ^{161}Dy		1		0 NMM
		^{163}Ho	4570 y	EC to ^{161}Dy		7/2		4.23 NMM
		^{164}Ho	29 m	EC to ^{161}Dy		1		0 NMM
				$\boldsymbol{\beta}^{-}$ to ^{164}Er				
		^{166}Ho	1.1 d	$\boldsymbol{\beta}^{-}$ to ^{166}Er		0		0 NMM
		^{167}Ho	3.1 h	$\boldsymbol{\beta}^{-}$ to ^{167}Er		7/2		0 NMM
Erbium								
	^{164}Er		1.61%		0		0	
	^{166}Er		33.61%		0		0	
	^{167}Er		22.93%		7/2		-0.56	
	^{168}Er		26.78%		0		0	
	^{170}Er		14.93%		0		0	
		^{160}Er	1.19 d	EC to ^{160}Ho		0		0 NMM
		^{161}Er	3.21 h	EC to ^{161}Ho		3/2		-0.37 NMM
		^{163}Er	1.25 h	EC to ^{163}Ho		5/2		0.557 NMM
		^{165}Er	10.3 h	EC to ^{165}Ho		5/2		0.643 NMM
		^{169}Er	9.4 d	β^{-} to ^{169}Tm		½		0.515 NMM
		^{171}Er	7.52 h	β^{-} to ^{171}Tm		5/2		0.66 NMM
		^{172}Er	2.05 d	β^{-} to ^{172}Tm		0		0 NMM
Thulium								
	^{169}Tm		100%		½		-0.2316	
		^{165}Tm	1.2 d	EC to ^{165}Er		½		0.139 NMM

		^{166}Tm	7.7 h	EC to ^{166}Er	2	0.092 NMM
		^{167}Tm	9.24 d	EC to ^{167}Er	½	-0.197 NMM
		^{168}Tm	93.1 d	EC to ^{168}Er β^- to ^{168}Yb	3	0.23 NMM
		^{170}Tm	128.6 d	EC to ^{170}Er β^- to ^{170}Yb	1	0.247 NMM
		^{171}Tm	1.92 y	β^- to ^{171}Yb	½	-0.23 NMM
		^{172}Tm	2.65 d	β^- to ^{172}Yb	2	0 NMM
Ytterbium						
	^{170}Yb		3.04%		0	0
	^{171}Yb		14.28%		½	0.4919
	^{172}Yb		21.83%		0	0
	^{173}Yb		16.13%		5/2	-0.6776
	^{174}Yb		31.83%		0	0
	^{176}Yb		12.76%		0	0
		^{166}Yb	2.3 d	EC to ^{166}Tm	0	0 NMM
		^{167}Yb	17.5 m	EC to ^{167}Tm	5/2	0.62 NMM
		^{169}Yb	32 d	EC to ^{169}Tm	7/2	-0.63 NMM
		^{175}Yb	4.19 d	β^- to ^{175}Lu	7/2	0.6 NMM
		^{177}Yb	1.9 h	β^- to ^{177}Lu	9/2	0 NMM
Lutetium						
	^{173}Lu		97.41%		7/2	2.23
	^{176}Lu		2.59%		7	3.19
		^{169}Lu	1.419	EC to ^{169}Yb	7/2	0 NMM
		^{170}Lu	2.01 d	EC to ^{170}Yb	0	0 NMM
		^{171}Lu	8.24 d	EC to ^{171}Yb	7/2	2.0 NMM
		^{172}Lu	6.70 d	EC to ^{172}Yb	4	2.25 NMM

		^{173}Lu	1.37 y	EC to ^{173} Yb	7/2	2.3 NMM
		^{174}Lu	3.3 y	EC to ^{174}Yb	1	1.9 NMM
		^{177}Lu	6.75 d	β^- to ^{177}Hf	7/2	2.24 NMM
Hafnium						
	^{176}Hf		5.26%		0	0
	^{177}Hf		18.60%		7/2	0.7936
	^{178}Hf		27.28%		0	0
	^{179}Hf		13.62%		9/2	-0.6409
	^{180}Hf		35.08%		0	0
		^{172}Hf	1.87 y	EC to ^{172}Lu	0	0 NMM
		^{173}Hf	23.6 h	EC to ^{173}Lu	½	0 NMM
		^{175}Hf	70 d	EC to ^{175}Lu	5/2	0.54 NMM
		^{181}Hf	42 d	β^- to ^{181}Ta	½	0
		^{182}Hf	9X10^{6} y	β^- to ^{182}Ta	0	0 NMM
Tantalum						
	^{180}Ta		0.012%		8	---
	^{181}Ta		99.98%		7/2	2.31
		^{177}Ta	2.35 d	EC to ^{177}Hf	7/2	2.25 NMM
		^{178}Ta	9.29 m	EC to ^{178}Hf	1	2.74 NMM
		^{179}Ta	1.8 y	EC to ^{179}Hf	7/2	0 NMM
		^{180}Ta	8.15 h	EC to ^{180}Hf β^- to ^{180}W	1	0 NMM
		^{182}Ta	114.4 d	β^- to ^{182}W	3	3.02 NMM
		^{183}Ta	5.1 d	β^- to ^{183}W	7/2	2.36 NMM
Tungsten						
	^{182}W		26.50%		0	0
	^{183}W		14.31%		½	0.1177

^{184}W		30.64%		0		0	
^{186}W		28.43%		0		0	
	^{178}W	21.6 d	EC to ^{178}Ta		0		0 NMM
	^{179}W	38 m	EC to ^{179}Ta		7/2		0 NMM
	^{181}W	121.2 d	EC to ^{181}Ta		9/2		0 NMM
	^{185}W	74.8 d	β$^-$ to ^{185}Re		3/2		0 NMM
	^{187}W	23.9 h	β$^-$ to ^{187}Re		3/2		0.62 NMM
	^{188}W	69.4 d	β$^-$ to ^{188}Re		0		0 NMM

Tungsten hardness and its zero NMM?

Rhenium

^{185}Re		37.40%		5/2		3.18	
^{187}Re		62.60%		5/2		3.21	
	^{182}Re	2.67 d	EC to ^{182}W		7		2.8 NMM
	^{183}Re	70 d	EC to ^{183}W		5/2		3.17 NMM
	^{184}Re	38d	EC to ^{184}W		3		2.53 NMM
	^{186}Re	3.78 d	EC to ^{186}W		1		1.739 NMM
			β$^-$ to ^{186}Os				
	^{188}Re	16.9 h	β$^-$ to ^{188}Os		1		1.78 NMM
	^{189}Re	24 h	β$^-$ to ^{189}Os		5/2		0 NMM

Osmium

^{186}Os		1.59%		0		0	
^{187}Os		1.96%		½		0.064	
^{188}Os		13.24%		0		0	
^{189}Os		16.15%		3/2		0.66	
^{190}Os		26.26%		0		0	
^{192}Os		40.78%		0		0	
	^{182}Os	21.5 h	EC to ^{182}Re		0		0 NMM

	^{183}Os	13h	EC to ^{183}Re	9/2	0 NMM
	^{185}Os	93.6 d	EC to ^{185}Re	½	0 NMM
	^{191}Os	15.4 d	β^- to ^{191}Ir	9/2	0 NMM
	^{193}Os	30.5 h	β^- to ^{193}Ir	3/2	0.73 NMM
	^{194}Os	6 y	β^- to ^{194}Ir	0	0 NMM

Iridium

^{191}Ir		37.3%		3/2	0.146
^{193}Ir		62.7%		3/2	0.159
	^{188}Ir	1.72 d	EC to ^{188}Os	2	0.30 NMM
	^{189}Ir	13.2 d	EC to ^{189}Os	3/2	0.13 NMM
	^{190}Ir	11.8 d	EC to ^{190}Os	4	0.04 NMM
	^{192}Ir	73.8 d	β^- to ^{192}Pt	4	1.92 NMM

Why the drop in number of unstable isotopes?

Platinum

^{192}Pt		0.72%		0	0
^{194}Pt		32.97%		0	0
^{195}Pt		33.83%		½	0.61
^{196}Pt		25.24%		0	0
^{198}Pt		7.16%		0	0
	^{191}Pt	2.96 d	EC to ^{191}Ir	3/2	0.5 NMM
	^{193}Pt	60 y	EC to ^{193} Ir	½	0 NMM
	^{197}Pt	18.3 h	β^- to ^{197}Au	½	0.51 NMM

Sudden change in lifetime and change in capture and change in NMM

Gold

^{197}Au		100%		3/2	0.148
	^{194}Au	1.64 d	EC to ^{194}Pt	1	0.075 NMM
	^{195}Au	186 d	EC to ^{195}Pt	3/2	0.149 NMM
	^{196}Au	6.18 d	EC to ^{196}Pt β^- to ^{196}Hg	2	0.591 NMM

^{198}Au	2.69 d	β^- to ^{198}Hg	2	0.59 NMM
^{199}Au	3.14 d	β^- to ^{199}Hg	3/2	0.271 NMM

Catalytic properties of Pt may be explained by its most abundant isotopes transmuting by releasing electrons from nuclei reversibly to gold with large changes in NMMs such changes change the bonds of reactant to products!!!

The liquidity of mercury may be due to 74 % of its stable isotopes transmuting by electron release and capture to Tl and Au, respectively.

Mercury

^{196}Hg	0.15 %	0	0
^{198}Hg	9.97%	0	0
^{199}Hg	16.87%	½	0.506 NMM
^{200}Hg	23.1 %	0	0
^{201}Hg	13.18%	3/2	-0.56 NMM
^{202}Hg	29.86%	0	0 NMM
^{204}Hg	6.87 %	0	0

^{194}Hg	520y	EC to ^{194}Au	0	0 NMM
^{195}Hg	9.5 h	EC to ^{195}Au	½	0.5414 NMM
^{197}Hg	2.67 d	EC to ^{197}Au	½	0.527 NMM
^{203}Hg	46.6 d	β^- to ^{203}Tl	5/2	0.849 NMM

The liquidity of mercury may be due to 74 % of its stable isotopes transmuting by electron release and capture to Tl and Au, respectively.

Thallium

^{203}Tl	29.52%	½	1.62
^{205}Tl	70.48%	½	1.64

^{200}Tl	1.08 d	EC to ^{200}Hg	2	0.04 NMM
^{201}Tl	3.04 d	EC to ^{201}Hg	½	1.6 NMM
^{202}Tl	12.2 d	EC to ^{202}Hg	2	0.06 NMM
^{204}Tl	3.78 yr	EC to ^{204}Hg	2	0.09 NMM
		β^- to ^{204}Pb		

The liquidity of mercury may be due to 74 % of its stable isotopes transmuting by electron release and capture to Tl and Au, respectively.

Large positive NMMs of ^{203}Tl and ^{205}Tl and the Tl holding 6s e e pair as due to large positive NMMs! In has even larger positive (5.54 and 5.52) NMMs than (1.64 and 1.62) Tl, so In should have lone pair effect. So 4f orbital and large effective nuclear charge is helping Tl over In manifest lone pair effect.

Lead

^{204}Pb	1.4%	0	0
^{206}Pb	24.1%	0	0
^{207}Pb	22.1%	½	0.58
^{208}Pb	52.4%	0	0

^{200}Pb	21.5 h	EC to ^{200}Tl	0	0 NMM
^{201}Pb	9.3 hr	EC to ^{201}Tl	5/2	0.675 NMM
^{202}Pb	53000 y	EC to ^{202}Tl	0	0 NMM
		Alpha to ^{198}Hg		
^{203}Pb	2.16 d	EC to ^{203}Tl	5/2	0.69 NMM
^{205}Pb	1.51X10^{7} y	EC to ^{205}Tl	5/2	0.712 NMM
^{210}Pb	22.6 y	β^- to ^{210}Bi	0	0 NMM
		Alpha to ^{206}Hg		

Bismuth

^{209}Bi	100%	9/2	4.11

^{205}Bi	15.3 d	EC to ^{205}Pb	9/2	4.16 NMM
^{206}Bi	6.2 d	EC to ^{206}Pb	6	4.6 NMM
^{207}Bi	35 y	EC to ^{207}Pb	9/2	4.08 NMM
^{208}Bi	3.68X10^{5} y	EC to ^{208}Pb	5	0 NMM
^{210}Bi	5.01 d	β^- to ^{210}Po	1	-0.044 NMM
		Alpha to ^{206}Tl		

Polonium

Unstable

^{206}Po	8.8 d	EC to ^{206}Bi	0	0 NMM
		Alpha to ^{202}Pb		
^{207}Po	5.8 h	EC to ^{207}Bi	5/2	0.79 NMM

^{208}Po	2.89. y	EC to ^{208}Bi Alpha to ^{205}Pb	0	0 NMM
^{209}Po	102 y	EC to ^{209}Bi Alpha to ^{205}Pb	½	0.77 NMM
^{210}Po	138.3 d	alpha to ^{206}Pb	0	0 NMM

Astatine

unstable

^{207}At	1.81 h	EC to ^{207}Po Alpha to ^{203}Bi	9/2	0 NMM
^{208}At	1.63 h	EC to ^{208}Po Alpha to ^{204}Bi	6	0 NMM
^{209}At	5.4 h	EC to ^{209}Po Alpha to ^{205}Bi	6	0 NMM
^{210}At	8.1 h	EC to ^{210}Po Alpha to ^{206}Bi	5	0 NMM
^{211}At	7.21 h	EC to ^{211}Po Alpha to ^{207}Bi	9/2	0 NMM

Radon

Unstable

Many Unstable nuclei of very short half-lives

Francium

Unstable

Radium

Unstable

Actinium			
Unstable			
Thorium			
^{232}Th	100%	0	0
Protactinium			
^{231}Pa	100%	3/2	
Uranium			
^{235}U	0.72%	7/2	-0.35
^{238}U	99.27%	0	0
Lawrencium			
Unstable			
Rutherfordium			
Unstable			
Dubnium			
Unstable			
Seaborgium			
Unstable			

Supplementary - Math of Magic Numbers

Magic Number Nuclei

2 8 20 28 50 82 126

Bi-Clustering of Magic Numbers

2 + 2 = 4 Da ; magic number 2 nucleons cluster to form nucleon molecules inside nuclei. This may manifest for mass number 2 and mass number 4. But mass number 2 is more stable and the mass number 4 is a cluster or nucleon molecule. The nucleon cluster may be less stable and may manifest as radio nuclei of shorter half-lives and life times. The magic numbers may manifest as stable nuclei of long lifetimes.

8 + 8 = 16 Da Magic number 8 nucleon magic number cluster with another magic number 8.

The 8 magic number can also cluster with a smaller magic number 2. For 8 + 2 = 10 Da. But mass numbers 2 and 8 are more stable than clusters 10 and 16 Da. It seems smaller mass numbers have shorter life times. So clustering of smaller magic numbers are less stable. Clustering of larger magic numbers may be more stable of longer half-lives. So the possible masses are 2, 4, 8, 10, 16 for these nuclei. So are these ^{2}D, ^{4}He, ^{8}Li, ^{10}B, ^{16}O. What do these nuclides have in. common? It may not be just the mass number but the atomic number also as for as which nuclei are stable and which are unstable. In general, more balance number of protons and neutrons are more stable. But as increase either proton with fixed neutron numbers or neutron with fixed protons numbers, then the nuclei are less stable. It could be that these are more stable and the unstable nuclei are the other masses: 1, 3, 5, 6, 7, 9, 11, 12, 13, 14, 15.? The unstable nuclei here can gain or lose electrons, protons, neutrons, alpha particles to form stable nuclei. Transmutations of protons to neutrons or neutrons to protons by electron release or electron absorb may perturb more stable nuclei to less stable and vice versa for interesting dynamics as discovered here. It seems the less stable nuclei fiss and fuse to manifest hidden states that affect chemical reactivity, enzymatics and catalysis. Also superconductivity, transmutations, thermodynamics and optics.

Cluster 20 Bi-Magic Numbers: 20 + 20 = 40 Da

20 + 8 = 28 Da and 20 + 2 = 22 Da. 20 + 20 = 40 Da. All these are stable. But may see nano-size dynamics for transmuting between some of these stable nuclei. masses 16 Da to 20 Da to 22 Da to 28 Da to 40 Da to 50 Da. ^{14}O, ^{15}O, ^{19}O, ^{20}O, ^{21}O, ^{22}O for masses 14 Da to 22 Da. Na mass 22 all positive NMMs and the cluster of magic number at 22 Da. How does such cluster relate to properties of Na nuclei. Does clustering of magic number cause positive NMM? Does clustering of neutrons cause negative NMMs? ^{17}O has cluster of positive protons and clusters of neutrons and extra neutron for negative NMM of ^{17}O. But ^{18}O is null NMM as two neutrons cancel spins. So is it general the odd neutron cause negative NMM? As ^{18}O transmutes to ^{18}F then the net protons + net neutron causes positive NMM. So ^{31}P is in the range here. ^{31}P has positive NMM has $16n^0$ and $15p^+$, so the $16n^0$ is magic number and $15p^+$ has net proton and not magic $15p^+$ one short of $16p^+$ which causes positive NMM. Lose two neutrons for $14n^0$ and $15p^+$ then the p^+ and n are non-magic with balance n^0 and imbalance p^+ for positive NMM of ^{29}P as if lack one p^+ from magic number then positive NMM arises. ^{32}P has $17n^0$ and $15p^+$ for net neutron

beyond magic number and p^+ deficient below magic number p^+. the one excess n^0 causes negative NMM of ^{32}P. Net NMMs occur near magic numbers. The nuclei that are p+ deficient by 1p+ to magic number may be inclined to fiss n ↔ p+ + e- to increase atomic number more strongly $^{14}N \leftrightarrow {}^{14}C$ with $6p^+$ and $8n^0$. Thereby $^{14}N \leftrightarrow {}^{14}C$ to create magic number n^0 of $8n^o$ and reduced 0 NMM of ^{14}C and pushing e^- outward from nuclei. But ^{15}N of $8n^0$ and $7p^+$ may fiss $n \leftrightarrow p^+ + e^-$ to $8p^+$ for magic number p^+ and induced NMMs of ^{15}O of -.719 NMM to change NMM. ^{15}N can behave like ^{15}O of + NMM and ^{14}N of + NMM. So at high pressures, high temperatures, strong electric fields and/or strong magnetic fields ^{15}N behaves like ^{14}C at ambient and ^{14}N behaves like C at ambient. altered fields in cancer cause ^{14}N to behave like C and altered + NMMs in biomolecules for altered dynamics. ^{15}N can oppose such as under pressure ^{15}N behaves like ^{14}N. The nuclei that thereby $^{14}N \leftrightarrow {}^{14}C$ to create magic number n^0 of $8n^0$ and reduced 0 NMM of ^{14}C and pushing e^- outward from nuclei. That are n^0 deficient by $1n^0$ may be inclined to fuse e^- to for $p^+ + e^- \leftrightarrow n^0$. To reduce atomic number. ^{15}N has $7p^+$ and $8n^0$. Changing neutrons for same element and different isotopes; isotopes have different stabilities. ^{17}O has negative NMM with $8p^+$ and 10 neutrons. The 8+2 neutrons yield $10n^0$ for cluster of magic number of neutrons. 8p in ^{17}O and 8+2 neutrons causes cluster of neutrons and negative NMMs in ^{17}O. If ^{17}O transmutes to ^{17}P then $9p^+$ and 8 + 1 neutrons. The extra proton in ^{17}F overpowers the extra neutron for net positive NMM of ^{17}F. ^{20}F (+2.094 NMM) ↔ ^{20}Ne; ^{20}F has $9p^+$ and $11n^0$ so the extra (8+1) proton and (2+8) + 1 has extra p^+ and n^0 and p^+ dominates for positive NMM. The ^{19}Ne (-1.885 NMM) goes to ^{19}F and the ^{19}Ne has $10p^+$ and $9n^0$ for cluster of magic 2 + 8 p^+ and 8 + 1 extra n^0 s and the extra neutron has negative NMM. RBL just came upon the idea that ^{22}Ne may catalyze under high pressure or electric and/or magnetic field the conversion of $H_2O + CO_2$ to carbohydrates, CH_4, CH_3OH, carboxylic acids, aldehydes and/or ketones and other biomolecules. The catalyst Ne, Ar, He have never been tried. Scientists are not suspecting this catalytic noble gas properties. But the NMMs in some noble elements makes it possible and noble gases are full shells and have access to s orbitals for e^- capture and e^- release and unusual NMM induce.

Consideration of isotope of Ne: ^{20}Ne, ^{21}Ne, and ^{22}Ne. ^{20}Ne (of 90% relative abundance {RA}) can fuse e- to its nuclear momentarily to transmute to ^{20}F with large 2.09 NMM. ^{22}Ne (of 9.25% RA) can fuse e^- to its nucleus momentarily to transmute ^{22}F with 0 NMM. The momentary ^{22}F and ^{20}F will bind the reactants strongly to alter bonds for momentary catalytic activities. The power of this type catalysis is the momentary bonds are of halogen nature and extremely strong. The ^{22}Ne can also release e^- from its nucleus momentarily to transmute to ^{22}Na of = 1.746 NMM. The + NMMs of ^{22}Na and ^{20}F were ^{22}Na gives e^- to one reactant (A) and ^{20}F takes e^- from the other reactant (D), so the $A^- + D^+$ gives A-D. then ^{22}Na+. + $^{20}F \leftrightarrow {}^{22}Ne + {}^{20}Ne$. High pressure Ne ($^{22}Ne$ and ^{20}Ne) can interact with H_2O and CO_2, so ^{20}Ne takes e^- from C+-O_2 and ^{22}Ne gives e^- to H-OH. So hydride attacks c leading to $CH_4 + O_2$ + Ne or CH_3-OH + Ne. Maybe with $^{23}Na^{19}F$ (promotors) in the process with ^{20}Ne and ^{22}Ne catalysts, the ^{23}Na may fuse e^- to momentarily transmute to ^{23}Ne with large – NMM of -1.08 NMM. The ^{19}F may fiss to release e^- and momentarily increase atomic number to ^{19}Ne of large – NMMs of -1.885 NMMs. For these – NMMs induced by catalytic $^{23}Na^{19}F$ to couple with induced + NMMs of ^{20}Ne and ^{22}Ne for converting $CO_2 + H_2 \leftrightarrow CH_3OH$, the wavefunctions of Ne give basis for nucleating Ne noble configuration of C and O. Noble gas catalyst with alkali and halogen promoters. Fractional Fissing and Fusing Nuclei for Induced NMMs.

The Weak Interactions can ove power chemistry, Light, thermodynamics and biology! Weak interactions forward and reverse and fractional drive life processes as stimulated by heat bath!

^{12}N (0.4 NMM) goes to ^{12}C. ^{12}N has $7p^+$ or (2+2 + 2) + 1 and $5n^0$ or (2+2) + 1 n^0 for extra neutron and extra p+ and the extra proton dominates for net positive NMM. Only few isotopes have no net proton and extra neutron so they have net negative NMMs! ^{13}N (0.32 NMM) goes to ^{13}C. ^{13}N has 7p$^+$ and 6n^0 for (2+2+2) + 1 p$^+$ and 2+2+2 n^0 for net p$^+$ and positive NMM. The moving neutron has moving magnetic field and the moving magnetic field manifest a changing magnetic field and such manifest electric field about nucleus. Consider ^{23}Ne (-1.08 NMM) has 10p$^+$ and 13n^0 and the (2+8) p$^+$ and (2+8) + (2+1) n^0 has extra neutrons moving unbalanced beyond magnetic numbers for net negative NMM of ^{23}Ne. But what if there are nonmagic numbers and imbalanced? The collisions and external fields can disrupt balance of p$^+$ --- p$^+$ and/or n^0 --- n^0 motions and fields for causing momentary net fields and the net fields escape the nuclei for altering surrounding electronic shells, subshells and orbitals for altering chemistry, catalysis and enzymatics. But can change protons for same mass number for different elements, changing protons may lead to greater stability as too many neutrons cause isotopes to be unstable. But too many neutrons typically more stable than too many protons and few neutrons.

So ^{25}Mg has negative NMM and the ^{25}Mg has 12p$^+$ and 13n^0 so (8+2+2) p$^+$ and (8+2+2)+1 neutrons (n^0) for negative NMM of ^{25}Mg . The moving neutron in the nucleus gives opposing electric field from proton positive charge to modify Nuclear charge (nuclear pressure) of Mg for different isotope effect. Surrounding perturbations can intensify nuclear pressures.

Cluster 28 bi-magic numbers; 28 + 28 = 56 Da

28+ 28 = 56 Da ; 28 + 2 = 30 Da ; 28 + 8 = 36 Da ; 28 + 20 = 48 Da;

28 ---- 30 --- 36 ---- 48 ---- 56. ^{31}P can transmute to ^{31}Si (0 NMM) for novel dynamics of ^{31}P (100 RA) by ^{31}P nucleus capture electrons to reduce atomic number to ^{31}Si and reduce NMM. Transmutation may help ATP break and form phosphate bonds to store energy. ^{32}S transmuting to ^{32}P (-0.252 NMM) can be useful new technology as and this is occurring for sulfur as ^{32}S (is 95% RA). This can explain H_2S under pressure undergoes beta by capture e$^-$ to its nucleus to reduce its atomic number to ^{32}P to alter NMM as the resulting ^{32}P has negative NMM and this correlates to RBL theory of – NMMs being needles in Haystack. The ^{32}P has 15 = (8 + 2 + 2 + 2) + 1 p and 17 = [(8+8) + 1]n^0. So both p$^+$ and n^0 are one more than the magic number but there are 2 more n^0 than protons. The neutrons out number the p$^+$ for net negative NMMs.

At this point in periodic table, I have considered most elements of life. So I stop. Nobel gas catalysis, elements of life, basis for isotope recovery by clumping isotopes rewiring glycolysis, Kreb cycle, replication, transcription and translation.

Cluster 50 for bi-magic numbers; 50 + 50 = 100 Da

After bi-cluster I note the tri-cluster. Then compare the numbers to data on half-lives of measured nuclides. I may see pattern. By such pattern I may be able to explain new catalysis, enzymatics and superconductivity.