Exploration

Elemental Chemistry for Moscovium (Element 115)

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Abstract

This article explores a general formula for the Magic Numbers describing nucleonic arrangements in shells, such as Element 115 (Moscovium), for exceptional nuclear stability found in a Unification Polynomial in 11-dimensional M-space from the SEps-Algorithm of creation.

Keywords: Element 115, Magic Number, moscovium, chemistry.

The Feynman-Path-Integral T(n)+2 = n(n+1)+2 from the mathematical identity XY=X+Y=-1=i^2=$e^{i\pi}$ sets the mapping or projection of SEps onto Super-SEps or SEps*(Sequence or Series of Energy-Prime-Sourcesink) in super parity and as super symmetric extension of the relative primeness of the 'Experience Fibonacci-Lucas Factors'. SEps* in 12-dimensional F-space differs by the Fermat Identity "2" from SEps in 10-dimensional C-space to denote a union between the binary and decimal number systems in $a^0+b^0=c^0 = 1 \Rightarrow 2 \Rightarrow 10$ for a, b and c as integers. The Unification Polynomial $f(x) = ax^3+bx^2+cx+d$ subtracted from f(x+1) then specifies the MAGIC NUMBERS describing the shell arrangement of nucleons (protons and neutrons) within an atomic nucleus as a mapping or projection of T(n)+2 in the formulation:

$$3ax^2+(3a+2b)x+a+b+c = 0 = n^2+n+2 \text{ for } n=x \text{ and } a=1/3, b=0 \text{ and } c=5/3$$

$$\mathbf{N_{Magic}(n) = n(n^2+5)/3}$$

and primary and secondary sequences: 0,2,6,14,28,50,82,126,184.... and

0,2,(2),6,(8),14,(20),28,(42),50,(78),82,(stop command),126...

As 50+82 = 132 > 126; the MAGIC NUMBER for n=7; this 'Out-of-Order' sets a natural limit on the nuclear stability in the generation of the PERODIC TABLE of the ATOMIC ELEMENTS as a consequence of fundamental principles and in the specification of Lead at #82 and of Bismuth with Bismuth-209 as the last stable isotope at #83 of Group 15, which is the Nitrogen Group. The next member of this group is element #115 named Moscovium and so relates the chemical and physical properties of natural radioactivity to this threshold for the weak nuclear interaction as one of the fundamental 'forces' of the natural world and universal cosmology.

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The MAGIC NUMBERS define the 'most stable' nucleonic arrangements in a nucleus, such as in the Helium-4 nucleus or 'alpha particle'. The latter then form intrinsic "Conifold Transformations" of 3-Tori and Möbian-Klein Bottle manifolds of Calabi-Yau surfaces, root reduced to form the 3-sphere of Poincare and the hypersphere of Riemann in the topologies of geometric surfaces in the inhabited space times The combined geometries of C-M-F-space give perfect Euclidean flatness for the multiverse as a macro quantum entanglement, which reflects however in the micro quantization of the elementary particles, such as in Ikeda shapes of the multiplicity of the Helium-4 nucleus. Alpha chains, like Magnesium-24, Beryllium-8 or Carbon-12 assume shapes of minimal energy density in the form of tori, dumbbells and ellipsoids.

For the Helium-4 nucleus, a circular ring of four nucleons (m_c's) of 2 protons with 2 neutrons combine as a quarkian chain u.d.u.d.u.d.u.d.u.d.u.d = proton.neutron.proton.neutron and as a multi-dimensional Calabi-Yau manifold form of the quark content of the Helium-4 nucleus in a lower dimensional representation of the EpsEss supermembrane as the multi-dimensional progenitor and dimensional generator. The quantum physics of angular momentum in properties of orbit and spin then can be defined in the Pauli Exclusion Principle, the Bohr atom, Heisenberg Uncertainty and Complementarity; de Broglie wave mechanics and quantum entanglement in terms of wave-particle duality.

Magnetic- and electric constant definitions from T(n)=n(n+1) then allow the construction of the PERIODIC TABLE of the Elements in their Electronic Configurations in an AUFBAU Principle in electron shells 2(2n+1) or 2,(6),8,(10),18,(14),32,(18),50,...

Monatomic Superconductivity

When scientists analyze substances chemically, they often attempt to break up the substances into smaller and smaller pieces to study the properties of the substance. Normal nuclei are roughly spherical in shape, held in place by the overwhelming strong nuclear force, but the nuclei of monatomic elements with only partially filled outer orbitals in the nucleus become deformed when the lack of dipole-dipole interactions with surrounding nuclei causes the protons and neutrons in the partially filled orbitals to be excluded introducing a wobble in the nucleus.

This deformity increases the particle distance thereby weakening the strong nuclear force (which falls off very rapidly) and allows the electromagnetic repulsion between the protons to begin to overshadow it. So the nuclei of these atoms are more unstable than normal nuclei. If the deformity exceeds a 2:1 ratio the nuclei is classified as super deformed and can spontaneously fission or break up into nuclei of lower atomic number. The naturally occurring, and therefore stable, monatomic elements as long lived super heavy nuclei probably do not have super deformed nuclei, but attain nuclear stability in the ‘island of stability’ region of the periodic table near the nucleon neutron number N = 184. The synthetic noble gas Organesson (or #118 = Ununoctium = Uuo = Radon.5f14.6d10.7s2p6 - mapping #86 as (Eka)Radon) at atomic number Z = 118, has been ‘synthetically created’ in particle accelerators with a neutron number of 177, so approaching the MAGIC NUMBER 184.

The electron configuration for the six final elements #113=Nihonium=Radon.5f14.6d10.7s2p1 and #114=Flerovium=Radon.5f14.6d10.7s2p2 and #115=Moscovium=Radon.5f14.6d10.7s2p3 and #116=Livermorium=Radon.5f14.6d10.7s2p4 and #117 = Tennessine = Radon. 5f14.6d 10.7s2p5 with #118=Radon.5f14.6d10.7s2p6 then define the 'region of stability for super heavy nuclei' and for which an extraterrestrial physics, say engaged in a micro-gravitational environment might be appropriate: https://en.wikipedia.org/wiki/Island_of_stability & https://en.wikipedia.org/wiki/Oganesson

Not much is known about the circumstances which contribute to spontaneous transmutation, but has been observed to exist. It is no longer a matter of whether transmutation does or does not exist but under what circumstances such transmutation occurs. As stated ET physics uses an micro-gravitational environment, indicating that the manipulation of a gravitational field will allow particular radioactive elements and isotopes to attain nuclear stability, then subject to controllable conditions by superconductive and super-magnetic confinement under utility of appropriate technology.

Particular experiments undertaken on the International Space Station or ISS have shown the advantages of performing elemental chemistry and interactions in the absence of strong gravitational fields. Changes in chemical properties and the technological application of those properties, say in advanced medicines and the propagation of crystalline materials, have however become 'blacklisted' or 'black budgeted and deep-stated' and are therefore not accessible to the general public until disclosure becomes happenstance.

To understand the nature of monatomic elements, we must consider the nature of the metallic state in general. A bulk metal consists of a large number of metal atoms that share electrons. This communal sharing of electrons is what gives a bulk metal most of its chemical and electrical properties. However, when the metal atoms become separated from one another, and assume the form of a small micro-cluster or monatomic configuration, the ordinary chemical and electrical properties normally associated with that metal disappear.

There is evidence that certain isolated metal atoms may assume what is referred to as a high-spin state. In the late 80's, nuclear physicists at a number of renowned laboratories around the world discovered that 12 transition group metals can be stimulated to assume a unique nuclear configuration, designated as a high-spin nucleus. The 12 metals are listed below in accordance with their columns in the periodic table.

.....8.....9.....10.....11.....12
----------Cobalt----------Nickel---------Copper----------
-Ruthenium----Rhodium-------Palladium-----Silver----------
-Osmium-------Iridium---------Platinum-------Gold-------Mercury

Unlike ordinary atomic nuclei, which display spherical symmetry, the nuclei of these specially prepared metals possess an elongated nucleus, resembling the shape of a football or a banana. In the technical literature such nuclei are called deformed or super deformed nuclei. Excerpts from: www.crucible.org/monatomic_elements.htm

Unbeknown to so called 'mainstream orthodox mensuration science'; the fundamental physics of the inner atom is structurally related to the much better understood physics of the outer atom. The latter is rigorously defined in electron configurations as the basis for all chemistry and its biological derivatives, say in biochemistry and radiation physics. Various models for the nucleus 'compete' in the forms of 'drop-models' and 'shell-models' in the attempt to find a theoretical foundation for the experimentally observed nucleons, which are themselves substructures in quarks, mesons and leptonic energy levels. The elementary physics of the outer atom is based on the interaction of electrons; in the valence sharing and the various types of bonding, which connect atoms to each other to form molecules and atomic conglomerations.

Using the AUFBAU principle for electronic configurations in orbitals spdfg.. via quantization 2(2n+1) for shells KLMNO...The n-counter is n=0,1,2,3...for the sequence: 2,6,10,14,18..for a shell filling of: 2,(6),8,(10),18,(14),32,(18),50,..

This links to the Magic Number Formula of the five folded symmetry in: 0,2,6,14,28,50,82,126, 184 and its mapping 0,2,(2),6,{8},14,(20),28, (42),50,(78),82,(stop command),126 as derived below. The filling of shells proceeds as: 1s,2s,2p,3s,3p,4s,3d,4p,5s,4d,5p,6s,4f,5d,6p,7s,5f,6d,7p. This yields the 'Noble Gases' (of column 18), renowned for their filled outer shells and subsequently able to display exceptional relative stability.

Helium=1s2
Neon=1s2.2s2p6=Helium.2s2p6
Argon=1s2.2s2p6.3s2p6=Neon.3s2p6
Krypton=1s2.2s2p6.3s2p6d10.4s2p6=Argon.3d10.4s2p6
Xenon=Krypton.4d10.5s2p6
Radon=Xenon.4f14.5d10.6s2p6
Ununquadium=#114=Radon.5f14.6d10.7s2p6

#101=Mendelevium=Md=Radon.5f12.7s2----------maps Cesium/Alkalis/H
#102=Nobelium=No=Radon.5f14.7s2----------maps Barium/Alkalis
#103=Lawrencium=Lr=Radon.5f14.6d1.7s2----------maps Lanth./Yttrium
#104=Rutherfordium=Rf=Radon.5f14.6d2.7s2-------maps #72 Hafnium
#105=Dubnium=Db=Radon.5f14.6d3.7s2----------maps #73 Tantalum
#106=Seaborgium=Sg=Radon.5f14.6d4.7s2----------maps #74 Tungsten
#107=Bohrium=Bh=Radon.5f14.6d5.7s2----------maps #75 Rhenium
#108=Hassium=Hs=Radon.5f14.6d6.7s2----------maps #76 Osmium
#109=Meitnerium=Mt=Radon.5f14.6d7.7s2----------maps #77 Iridium
#110=Darmstadtium=Ds==Radon.5f14.6d8.7s2-------maps #78 Platinum
#111=Roentgenium=Rg=Radon.5f14.6d9.7s2----------maps #79 Gold
#112=Ununbium=Uub=Radon.5f14.6d10.7s2----------maps #80 Mercury
#113=Ununtritium=Uut=Radon.5f14.6d10.7s2p1-------maps #81 Thallium
#114=Ununquadium=Uuq=Radon.5f14.6d10.7s2p2----maps #82 as (Eka)Lead
#115=Ununpentium=Uup=Radon.5f14.6d10.7s2p3-----maps #83 Bismuth
#116=Ununhexium=Uuh=Radon.5f14.6d10.7s2p4------maps #84 Polonium

#117=Ununseptium=Uus=Radon.5f14.6d10.7s2p5-----maps #85 Astatine
#118=Ununoctium=Uuo=Radon.5f14.6d10.7s2p6------maps #86 as (Eka)Radon

The generalised 'shape' for the universal topological deformation of a 'Hollow Sphere with an opening to infinity' and as a minimal surface (plane, catenoid and helicoid) can be utilized to model the shape of the 'holofractal' universe. This manifests as Klein Bottle toroidal derivative of the Black Hole event horizon becoming 'wormholed' in the higher-D Klein Bottle connection. A 'Turning Inside Out' of the spacial vortex geometry via the magnetic flux properties intrinsic to the unified field of quantum relativity can so be indicated.

Chemically, this would engage the properties of Helium-4, not only as the most stable Magic Element at N=2, but also its superfluid properties, having the lowest melting- and boiling points of all the elements. This inside-out deformation must engage unification physics with precise material parameters as given in the abstract definitions. Then it should become possible, to directly relate Helium-4 to element #118, most likely in attaining superfluid status at room temperatures in the application and manipulation of intersecting magnetic fields and the supersymmetric nature of Maxwell's equations under agency of the Magneto Charge and the Magnetic Monopoles as mass-equivalences from the superbrane dimensions.

Open any physics dictionary and look under MAGIC NUMBERS. You will find the following sequence of numbers: 2,8,20,28,50,82,126,184,.. where the numbers relate to the number of protons or neutrons, making up the nucleus. This also relates to Bismuth at atomic number #83 in the following analysis. A general formula for the Magic Numbers of nucleonic arrangements in shells is given by the SE_{ps}-algorithm {Sequence of Energy primary sourcesink=Heterotic supermembrane $E_{ps}E_{ss}$=HE(8x8) in M-space}. This can be derived from the M-Space Unification Polynomial:

$ax^3+bx^2+cx+d=0$ and the Feynman-Path-Integral T(n)+2=0 sets the mapping of SE_{ps} onto Super-SE_{ps} as the relative primeness of the Experience-Factors in SE_{ps} superparitive to SE_{ps}* in extension.

Subtracting polynomial f(x) from polynomial f(x+1) for the Feynman Identity $n^2+n+2=0$ for {T(n)=n(n+1)} gives:

$3ax^2+(3a+2b)x+(a+b+c)=0$ and specifies a=1/3 and b=0 and c=5/3 as the coefficients for the unification polynomial.

This directly gives the Magic Number Formula:

$T_{MagicNumbers}=N(N^2+5)/3$ for N=0,1,2,3,...,N

Primary Series: 0,2,6,14,28,50,126,184,...
Secondary Series: 0,2,(2),6,{8},14,(20),28,(42),50,(78),82,(Stop Command),126,...

The secondary series uses the Fibonacci mechanism of the five folded supersymmetry to add successive terms to generate the New State from the Experience added to the Old State. This is how I discovered the Fibonacci Series on January 18th, 1985, during a great hailstorm, wrecking parts of Brisbane, Australia. I thought I had discovered a NEW MATHEMATICAL SERIES, unaware at the time, that it had already been discovered by Leonardo de Pisa/Fibonacci in the Renaissance.

As 50+82=132 > 126; the Magic Number for N=7; this Out-of-Order sets a natural limit on the nuclear stability in the generation of the periodic table of the atomic elements as consequence of fundamental principles in the specification of Lead at #82 and Bismuth-209 the last stable isotope at #83. The secondary series or the Lucas-Numbers; reflects the Fibonacci/Francom mechanism of always adding successive terms as the Experience-Factors in the 'Information-Gathering-Parameter'. The 2-branes of Helium-4 or Alpha-Particles so become topological surface mappings from M-space into C-space of 4D with added Calabi-Yau-manifolds in 6D as the 'collapsed/conifold' superstring dimensions of 3-Torus transformations into the 3-Sphere of Riemann (Hypersphere); root reduced as Moebian-Klein Bottle-Manifold in 2D.

This 'jargon' means that the quantum geometry of minimally connected surface topologies (there are only three ways for a plane to fold into a sphere with an opening to infinity, namely the Plane, the Catenoid (hourglass, two cones apex to apex) and the Helicoid), is then defined via the SEps-Identity:

$XY=X+Y=-1=i^2=\exp^{i\pi}$crystallization of PLATONIC SOLIDS in the five folded symmetry across omnispace (Tetrahedron, Cube, Octagon, Dodecahedron, Icosahedron). Now science knows those as the IKEDA-SHAPES, relating to the exceptional stability of the Helium-Nucleus with N=2.

In 1954 Fred Hoyle thought about the energy levels of hydrogen fusion in the sun. He predicted an excited state for Carbon at 7.6 MeV above ground state and to the astonishment of the experimenters it was found. This is the basis for the Ikeda Shapes.

Denote the basic building block for the nucleon stability as N=2, that is He-4; adding those in chains, we get: Be-8, C-12, O-16, Ne-20, Mg-24, Si-28. So Beryllium becomes part of Oxygen, Neon, Magnesium and Silicon in iterative nesting, separated by energy levels, all in MeV.

According to Ikeda-Data (Ref.: New Scientist, May1,1999,p.37): Carbon level (7.16MeV); Oxygen (14,.44 & 7.16); Neon (19.17 & 11.89 & 4.73); Magnesium (28.48 & 21.21 & 14.05 & 13.93 & 9.31) and Silicon (38.46 & 31.19 & 24.03 & 23.91 & 19.29 & 16.75 & 9.98).

Why does this work? Because the Neutrons bind the alpha particles in the inner atom together, just like the electrons do in the outer atom. So the alpha-particles join up in sausage/torus shapes to minimize their space and energies, described above in topological jargonautics. The origins for this enfoldment is the quark geometry, say as indicated in the Nobel Prize 1998 posting. The Alpha-Particles quarkian geometry links up the individual 12 quarks about their common magneto axis in a precise order. u.d.u →d.

So the large scale atomic stability becomes a direct derivative from the nucleon arrangements, which originates from the algorithmic encoding as given by the Magic Numbers and its mathematical/abstract foundation in the pentagonal symmetry of unification physics. This is illustrated in an Energy formulation based on a higher dimensional 'supercharge' becoming mapped into the lower dimensions and the Action Law of Action=Charge^2, underpinning superconductivity in the natural current flow of magneto charges as inertia equivalents and as indicated in the following. The physics of the monatomic elements is related to a fundamental supersymmetry between fermionic half spin (Fermi-Maxwell) statistics and bosonic integral spin (Einstein-Bose) statistics.

A number of Bose-Einstein Condensates or BECs have been reproduced in laboratories around the world, with pioneering work undertaken about a decade ago. Wolfgang Ketterle at MIT; May 18th, 1996 described condensates, surviving for more than 20 seconds as and containing so 5 million sodium atoms for dimensions of 8 and 150 microns in breath and length. Antonio Bianconi of La Sapienza University in Rome proposed 'Stripes' as superconducting wires separated by insulating materials and in the effort to increase the superconducting transition temperatures.

Vic Emery of Brookhaven National Laboratory in New York and Steven Kivelson of UCLA believe 'Stripes' hold the key to 'High-Temperature-Superconductivity' (HTSC) and thought the introduction of charge carriers, say transition metals, could produce positively charged 'holes' as ferromagnetic bands in between antiferromagnetic 'isolators'. The 'Stripes' induce single holes to 'pair-up', trapping the single holes by the isolating boundaries.

According to quantum mechanics, confined 'particles' tap Vacuum-Energy (ZPE aka VPE) and which increases for like quantum spin, that is the Bosonification of leptonic fermions. Opposite quantum spins decrease the energy levels for a 0-spin boson and the mechanism of Higgs-Template inertia induction allow the interaction of the supersymmetry in the equivalence principle of general relativity, coupled to the nature of the electropolar Coulomb charges and their magnetocharged string precursors from the M-Space. Within 'Stripes' large charge oscillations can build up and a team from MIT has used radio waves to excite the nuclei of copper atoms to show clear evidence of 'nearby charges' as proposed by Bianconi, Emery and Kivelson (Physical Review L. 82: p4300).

In the 1957 (Bardeen, Cooper and Schrieffer) BCS-Theory for 'ordinary' superconductivity; Cooper-Paired electrons behave like phonons as the exchange of vibrational quanta of energy between atomic lattices, attracting the passing electrons. This is known as S-Wave-Symmetry for the Cooper-pairings. The alignment of quantum spins of 'spin fluctuations' between passing electrons and spin-flip magnetized atoms is Corollarily known as a D-Wave-Symmetry. The latter symmetry exhibits a 'clover-leaf' shape in comparison with the 'circle' shape of the S-Wave.

Experiments by Donald Ginsberg (University of Illinois) revealed clear evidence of D-Wave symmetry in 1993 and many other researchers (Leggett, Pines, Van Harlingen) adopted this revised model for HTSC engaging 'exotic ceramics', such as Yttrium-Barium-Copper-Oxide ($YBa_2Cu_3O_7$). Combining the S-Wave and D-Wave symmetries results in a crystallization for a

Flow of 'Natural Current'; where it is frequency, that 'flows' as a parameter and not inertial particles like electrons or positive holes (positrons).

The equation for 'Normal Current' as I=dQ/dt=Change of Charge flow/Time so reduces as differential equation from second order to first (for integral count N of Cooper-pairings): $\{V_o(t)=L.dI/dt+RI+Q/C=L.d^2Q/dt^2+R.dQ/dt+Q/C\} \rightarrow V_o(f)=2eNL.df/dt+2eNRf+2eN/C\}$. Mueller, Jahn and Teller proposed the Polaron of 'Electron Degeneracy' in the 1930's and defined as two electron eigenstates in the same identical minimum energy configuration. The electron polarizes the atomic pattern as its environment of dynamic interaction. By distorting itself, the crystal lattice slightly alters the two quantum states of the polaron. As long as the electron energy is lowered more than the lattice energy is raised, the polaron manifests spontaneously and becomes enabled to 'freely' move about as a Quasiparticle within the 'Stripes' of the superconducting material.

The Polaron of Jahn and Teller is identical to a 'Monatomically produced Photon' and couples in terms of a 'changing inertial mass' to a mass-equivalent current element, which can be labeled as a 'Magnetic Monopole' in self-duality. This Magnetic Monopole, manifesting as quasiparticle in the omni physics of the superconductivity, is itself defined from the Quantum Big Bang Cosmogenesis, which emerged the parameter of inertial mass from its gravitational progenitor. {It is transformed from the Planck-String in T-duality to the Cosmic Ray spectra, encompassed in Edward Witten's IIA supersymmetry class coupling the 10D-superstrings to the 11D-supermembranes}.

The phenomenon of electron degeneracy at the elementary level so renders the phonons or 'spin-flippers' of the D-Wave symmetry capable of binding polarons together and as verified by the BECs. Greater vibrational eigenenergy, tapped from the ZPE, then results in stronger Cooper bonding and LTSC manifests at higher temperatures. The concept of the 'optical computer' further illustrates the nature of the magneto charges as a 'missing link' between the parameters of mass and electromagnetic radiation and between the null-state of the vacuum and the gravitational potential.

Achim Wixforth from the University of Munich {vol78,p4099,PhysicalReviewL}, has 'caught' light beams in optoelectronics, converting the dynamics of electrons, which shunt between valence- and conduction bands in semiconductors via acoustic sound waves into optical memories of piezoelectric crystals. Distorting the electric environment in application of an alternating voltage to a piezoelectric material such as Lithium Niobate, creates a pressure wave along the crystalline surface, which then utilizes the generated electric field to capture and store electrons.

The electric field distorts the flat conduction and valence bands into sinusoidal waveforms, to 'peak' electrons and 'trough' positrons/holes in such a way, as to render this maximum separation in excess of the distance required for instant recombination. Only when the electric field is 'turned off' can the 'trapped light' of the electron-positron energy be released in the linearization of the electrical environment. The electron-hole pairings, spawned say by infrared laser light, so form an effective 'optical memory'. But in elementary terms, the electron-hole energy is 'magnetocharged' in the form of quasiparticles, say a polaron or a phonon or a monatomic

photon. The fundamental formulations indicate that mass as a parameter is NOT fundamental, but is a derivative from the string energy, causative of the Big Bang and the creation of the spacetime matrices themselves.

What is however elementary is the string energy given in the Modular Duality of the Source-Sink Coupling of the 11-dimensional Witten Mother-Membrane. It is this Source-Sink manifesting as the Zero-Point-Vortex-Energy from the minimized Planck-String-Quasi-Singularity, which initially defines the extent of the universe as a Planck-Nugget aka the 'Primeval Atom' of Lemaitre. Because this initial energy configuration was a quantum eigenstate; the subsequent Cosmo evolution of the universe had itself to become quantized in all parameters and including the parameter of mass. To expand, the universe, the size of a Planck-Nugget, so had to multiply quantitatively and as there was no primeval spacetime into which to expand into, the Planck-Nugget required dimensional extension from string to brane to volumar or from point to line to manifold to volume in a form of dimensional-holofractal nesting.

The origin of the universe became mathematically structured in a self-mapping of a 'point' or Null-Dimension as itself, hitherto allowing the concept of the Infinity-Dimension to become prerequisite for the mathematical realization of a physical non-zero and finitized complex of interwoven dimensionalities. Mathematically, this allowed a 'Point' to 'unknot' itself as a double point and so define the primordial metric as a space of separation between two image points.

Self-relativity between the images now allowed the introduction of curved linespace from the rotational freedom of the straight linespace and the 'Complex Plane' could become a 'Complex Riemann Sphere' and introducing the 'twisting' potential for the manifolds of the 2-dimensional surfaces. In terms of the Planck-Nugget, two Planck-Nuggets could now adjoin and define a coupling between themselves, becoming the minimum string energy configuration as the ZPE=VPE. Many details of the cosmogenesis indicated in the above can be found on the linked website. But the manifestation of the ZPE as the minimum sourcesink energy of the Quantum Big Bang itself now and by necessity, crystallizes all subsequent physical parameters, describing the physical universe, as emergent properties of this initialization.

Space became defined in a de Broglie 'Matter Wave', which 'inflated' the Planck-Nugget as a super dimensional Witten-Membrane to a size of the so called Hubble-Horizon at 16.9 billion lightyears and as a corresponding 'quantum count' which can be defined algorithmically, based on an underpinning pentagonal supersymmetry. This Witten-Universe is 11-dimensional and so circumscribes a 10-dimensional super universe in mathematical root reduction just as a manifold or 2-Sphere encompasses a as an 'Inner Space' (3-Ball) and an 'Outer Space' both in a dimension higher by one as its dividing boundary condition (your skin or the surface of the earth or the surface of the universe).

Well known formulations encompass the quantum formulations for the eigenstates of energy and momentum of this Witten-Universe. The Laws of Stefan-Boltzmann, Planck and Einstein (in that order and linked to the initializing quantum geometry) gave a basis for the SI-units of temperature, time, displacement, mass, molarity, luminosity and charge to become subject to definition.

In particular $E=kT=hf=mc^2$ crystallized energy proportionalities for the parameters of entropy, frequency and mass. In terms of the Planck-Nugget, the primeval quantum definition became:

Energy $E=hf=mc^2$
$E=hf$ iff $m=0$; with $c=ff^*=R_{Hubble}H_o$
$E=mc^2$ iff $f=f_o=f_{min}$ with $f_o=1/f^*$ under modular duality for $f^*=f_{max}$.

This definition associates every mass m with a quantum count of minimum frequencies f_o (as $m=Nf_o=f$(monopole masses as monopolar current $I_{min}=2ef_o$), and so QUANTISES all inertia in terms of the modular dual of the source frequency f*, causative eigenstate of the Quantum Big Bang.

The Eigenfrequency for Mass as a Sink-Frequency, modular dual to the Source-Frequency so becomes defined in the decomposition of the heterotic HE(8x8) supermembrane $E_{Source}E_{Sink}=E$ (manifesting):

Source-String: $E_{Source}= hf^*$
Sink-String: $E_{Sink} = hf_o$

With Witten-Coupling Constants:

$E_{Source}E_{Sink}= h^2$ (as 'Squared' Energy parameter in Witten-Spacetime)
and $E_{Source}/E_{Sink}= f^{*2}=1/f_o^2$ (as dimensionless entropy count)

The definition for the stringed mass as a monopolar current so becomes:

As Planck-String-Oscillation (PSO) for the generalised Action-Law is defined in:
$\sqrt{(Alpha)}.L_{Planck}=e/c^2=\lambda_{PSO}$/with h/e^2=constant (Quantum Hall Effect)
as the Planck-Stoney-Unification in the Witten spacetime with:

$m=Nm_{min}=Nhf_{min}/c^2 =NhI_{min}/2ec^2 = Nhf_{min}\lambda_{PSO}/e \rightarrow e^2c/e=[ec]$ (transformation)

for a GUT Dirac-Monopole Eigenstate described as Monopolar Current Element $ef_i\lambda_i$:

$m_{monopole}=m_m=hf_m/c^2=[ec]=2.7x10^{25}$ GeV (as c^3)

The quasiparticles in superconductivity, characterised in the Quantum-Hall-Effect {$h/e^2=f$(Free Space Impedance $Z_o=\sqrt{(\mu_o/\varepsilon_o)}$)}; Josephson Junctions {frequencies as f(2e/h)} and the Conductance-Quantum {$G_o=2e^2/h$} so become lower dimensional and inertialized manifestations for higher dimensional gravitational natural current elements, identical to lower-D masses by the Equivalence Principle and the interdimensional mapping transformations between Coulombic Electropoles 'e' and Monopolar Magnetopoles 'e*'.

The encompassing identity for this mapping is:

Coulomb Charge Quantum: 'e' = $c^2(\lambda_{PSO}/L_{Planck}.c^2.\sqrt{(Alpha)}$
↔ Membrane Charge Quantum: 'e*' =$c^2(2R_e)$=NCL.c^2

where NCL=Nucleon Confinement Limit as the 'Classical Electron Radius' as the quarkian magnetic asymptote, the 'size' of the weakons and the Higgs Boson and a most fundamentally as a function of the electromagnetic finestructure constant alpha and hence the physics of the subatomic Compton nucleus, the Bohr atom and the extended Rydberg atom. As $\{m_ec^2=ke^2/R_e\}$ for $R_e=hAlpha.R_{compton}=Alpha^2.R_{bohr1}=Alpha^3/R\infty\}$.

The crucial transition from the superstring scenario in 11 dimensions and the Planck-length specifies the heterotic membrane class $E_{source}E_{sink}$ in the 'Wormhole' or Weyl-Scale of the magneto charge $e^*=1/E^*=1/E_{source}$ and through its definition as Finestructure of Planck's Constant in: $h=E^*f_o=f_oe^*c=1/$Unification Monopole Current. Planck's Constant so relates directly to the Classical Electron Radius and Alpha and to the Mass-Eigenfrequency in the Identity (using the modular identity $f_o\lambda_o=1/c$):

$h=E^*/f_o=f_o/e^*=f_o/2R_ec^2*/[2R_ec^3]$, showing that the inertial self-state becomes 'absorbed' in the wormhole perimeter in a cancellation*/$2R_e$)=$180/10^{10}=hc^3$ in conjunction with the 'unified' monopole unification mass [ec]~$4.8x10^{-11}$ kg manifesting as the monopolar unification 'Rydberg' energy:

$$E'=hc/L=hc^3/Lc^2(\lambda_{PSO}/Le)=(R_{PSO}e)\rightarrow 1/e\leftrightarrow \text{Identity } E^*e^*=1$$

so represents the transformation or transduction potential between the transformed string-scale from the Weylian boundary of quantized spacetime and the manifestation of the nuclear interaction scale (~ 3 Fermi).

The transition into biovital scales, especially those of DNA/RNA induction potentials occurs at the 'infrared atmospheric window' of 9 microns and a scale, which characterizes the width of the BECs. The infrared unification $\lambda_{infrared}/hcc^2$ so occurs at that region of the electromagnetic spectrum, where atmospheric water droplets do not absorb the infrared wavelengths. An optical unification is found at 6000 Angstroems of Orange Light and the Ultraviolet Unification at 179.9 nanometers becomes the piezoelectric window for Mercury and the crystalline transducer of (fused) Quartz (Silicon Dioxide).