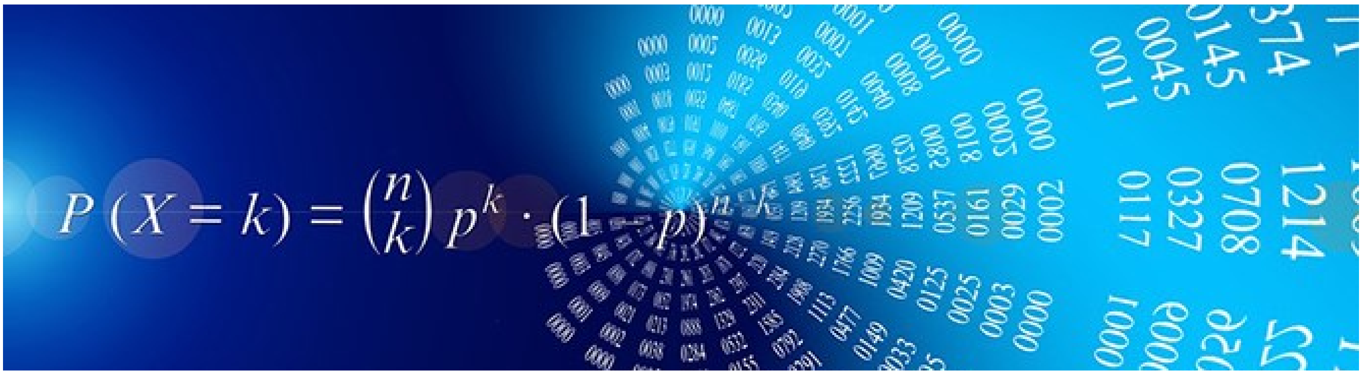
Energies basic numbers and geometry



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ABSTRACT

In this article the MINT-Wigris model of the author for deuteron states is investigated for a new interpretation of well known natural or physical numbers. Planck numbers are the start. For nucleons and protons the hedgehog geometry with six energies are presented. In the final section the changing deuteron states are directed through a switchboard for experiments. It is driven by three color charges bound (potential, strong, weak) forces which act like motors for the inner time crystal dynamics (figure 3) of deuteron. The neutral color charge of nucleons is defined as an rgb-graviton, making geometrical (stereographic or orthogonal) projections. This octonian world is projected down from the strong complex 3-dimensional strong coordinates to 4-dimensional weak spacetime coordinates which allows its rippling as experimentally detected for graviton waves. Beside including gravity in a unification of the four basic forces the methods are new symmetries, the Moebius transformations, the use of Gleason triples for measurements (figure 4) and homogeneous projective geometry.

KEYWORD:

energy, basic numbers, time crystal, geometry

I. INTRODUCTION

In physics, there are certain numbers of Planck size from which other also useful scalar constants arise. The MINT-Wigris model [1] of the author sets six basic energies in an octonian world H. The quantized Planck numbers (also for measuring space or time units) arise in it after a collision of energy systems which are annihilated and the universe developed newly from their energy in big heat. Quantum numbers are not discussed in this article, but relations of some basic numbers to symmetries, different often homogeneous geometries and Gleason measuring triples GF. The hedgehog geometry in figure 1 is for the six basic color charge energies, figure 2 is a suggested control panel for local octonian vector spaces coordinates or field quantums to the six energies, figure 3 for a deuteron time crystal, figure 4 is for octonian Gleason measures. The geometries allow often rescalings of numbers in homogeneous coordinates where also a projecting point at infiniity, a projective line or space at infinity can be changed such that other geometries and characters for the energies and their numbers attached apply. For instance, potentials can be replaced by distance measures, frequencies by time intervals, wave, whirl, particle characters of energies can change. In the small energy range, numbers come often through numerical orbits under symmetries, for instance the three basic spin length for fermions, bosons and gravitons or the six basic masses for the two fermionic series. The measures come often in form of orthogonal 3-dimensional Gleason frame triples of the octonian Fanomemo lines like the Pauli spin triples for space coordinates, measuring length. Einstein metrics can rescale this measure. As energies quantized lower bounds different geometries are in use: a winding number either along a circle or as one winding of a helix line generated in time generated a lower bound for circular/angular or wave frequency with a circles radius or a linear space interval is added to this energy measure for the quantization in time. Energy in not stored without a full winding along a circle. For conic/whirl rotating vectors like spin, magnetic momentum, color charges, *rgb*-graviton whirls or point rotating vectors for charge carrying vectors like mass or electrical charges also winding numbers quantize the energy content on the cones boundary or on a loop. Geometrically a rotating (a scalar or vector carrying) point can also be blown up in a fiber bundle geometry to a loop rotating on a torus, for instance in the SU(2) Hopf fibre bundle geometry for electrical or neutral charge. For the strong ineractions SU(3) trivial fiber bundle geometry S^3xS^5 the quantized gluon, *rgb*-graviton, color charges energy and quantized electrical charges generates the octonian grid location of a nucleon or deuteron in spacetime. The grid is an inner spacetime of this system arising from projectively norming S^5 to a complex 2-dimensional complex space time crystal with the hedgehog boundary S^2.

Transferring or transforming energy is mostly due to the matrix, spinor and tensor actions (which are arranged in symmetry groups) on the local energy systems including their geometry and also geometrical motivated or due to field presentations for energy. The strong S^5 geometry is for instance a 5-dimensional combined electrical and mass (gravity) potential field in [5]. Beside the standard symmetry U(1)xSU(2)x SU(3) the hedgehog S^2 as Riemannian sphere contributes the Moebius transformation symmetry. This allows the unification for the four basic interactions, gravity included to the standard model.

II. MATERIALS AND METHODS

1. Early Universe

First a 5-dimensional sphere H is generated it is a common electrical-mass potential field of [5] where the author of this book has deleted a point at infinity of the sphere S^5 and uses projective geometry. This real field splits into two fields for electromagnetism and for Einstein gravity. A third scalar field is also generated, all of them in 4 dimensions.

In a crystal development for particles, quarks are generated after the potential of [5] is inverted according to [1] into a Planck size length and an electrical charge.

1. Constants are then Planck length l(P) for the distance between the two mass and electrical charge poles of quarks: three basic numbers are introduced, the Planck number h for energy as E=hf, the gravitational constant γG and speed c of light.
2. Temperature E(heat) with the constant Kelvin k, directly associated to energy in T = E/k.
3. Planck time, directly associated to Planck length in t(P) = l(P)/c.
4. Planck electrical charge EM(pot) as Coulomb constant $1/4\pi\varepsilon_o$, electrical field constant ε_o.
5. Planck mass m E(pot), directly associated with energy in $mc^2 = E$.

Derived are constants for

6. momentum as E(kin) in p = mc = h/2πl(P).
7. angular momentum E(rot) in angular frequency as ω = 1/t(P)

Also mentioned is magnetic flow density, using 4., a volume or area measure and γG in

8. $B(P)^2 = \pi c\ ^9\varepsilon_o/h\gamma G$ as energy E(magn).

For the above Planck mass m ~ $2/10^5$g holds that the Schwarzschild radius Rs= $2m\gamma G/c^2$ as escape speed equals the Compton wave length h/mc ~ $2/10^{12}$m. Quarks have a mass of mq ~ $0.6/10^{27}$kg which is much smaller than the Planck mass. As a consequence all particle series have a very small mass, including the weak WI bosons. A MINT-Wigris interpretation is that in the universes development only extremely small mass particles are generated. Mass is decaying and releases energy in other form and with reduced mass for the decay particles. One reason may be that at the big bang potentials (also dark matter) as functions of 1/r, r radius, are mathematical inverted to radius or length at the Schwarzschild radius. The length of a quark is at most $1/10^{15}$m because of their decay, observed also in mesons. The strong interaction SI keeps quarks confined in hadrons through gluon exchanges. If they are pulled further apart, they double up through intermediate generated weak bosons. Hence the above mentioned Compton wave length cannot been reached by quarks. They have no wave presentation. Concerning dark energy radiation after a big bang, in the field decay of [5] the strength of the two electrical and mass potentials (with two poles for quarks) can be compared using 1 Joule ~ $1/10^{18}$kg and 1eV ~ $1/10^{19}$J. In case the Coulomb force is compared with the centrifugal force inside a quark with mass mq, one can compute a kind of frequency for quarks energy exchanges with a speed ~ $1/10^7$ and a frequency ~ 10^8 (Roentgen radiation). But this computation can also be done differently through length which is then more like a cosmic radiation.

2. Nucleons and deuteron

When nucleons and matter is generated from quark systems, the confinement of quarks inside through SI is extended through WI and gravitational interactions GR. MINT-Wigris postulates three time cycles which form time crystals, for instance of a deuteron atomic kernel DAK having a proton and a neutron inside. No time computation for the cycles is done in [1]. Important is that for the generation of nucleons the common mass w of the three quarks is measured at a barycenter in SI barycentrical coordinates. w is smaller than the sum of the masses of the three quarks measured in Euclidean WI coordinates. The difference is used for a common group speed with which the system can move in its universes environment. Otherwise nuclear decays occur. Energy exchanges are done vectorial through input-output energy vectors at six poles on a bounding Riemannian surface of a DAK. The poles are arranged in pairs according to the Heisenberg uncertainties HU. Length GR (gravity) contraction-expansion (or electrical potential/force exchange) is on the octonian projected coordinate 1, the Euclidean (+x) axis, mass rescaling or potential on the (-x) axis with the HU pair position-momentum in $\lambda \cdot p = h$. The former described radius-potential inversion at the Schwarzschild radius relies to this. Another such inversion at a circle of radius one is between a time interval and frequency in $E = hf = h/\Delta t$, $E \cdot \Delta t = h$ as HU time-energy which is projected to the (+z) axis for time and to the (-z) axis for E(kin). The third inversion (HU angle-angular momentum) between heat as entropy inside a deuteron location and angular momentum as E(rot) energy with angular speed $\omega = d\varphi/dt$ (see item 7. above) is not vectorial. Heat has a stochastic theory and is measured by a (decay) pressure inside a (DAK) volume. Inverted are not their numerical (often huge) values but two Moebius transformations MT which act on the DAK hedgehog surface S^2. In MINT-Wigris they are called α^2 (measured as length of the angular momentum j in $\Delta j \cdot d\varphi \geq h/4\pi$) for a rotation of the quark triangle covering itself by applying this rotation and $\alpha \cdot \sigma 1$ (in coordinates a measured angle $d\varphi$ for item 2. above) where $\sigma 1$ is the first Pauli matrix. The triangle symmetry D3 is generated by these two MT: the identity id, $\alpha^2 \alpha \cdot \sigma 1 = \sigma 1$, $\alpha \cdot \sigma 1\ \alpha^2 = \alpha^2 \sigma 1$ and $\alpha = \alpha \cdot \sigma 1 \sigma 1$. Added in [1] is that the description of magnetic field quantums $\phi_o = h/2e_o$ in physics is formally also a kind of HU belonging to the items 4., 8. above.

There are six invariants under the MT, in MINT-Wigris named by ***energies*** and ***color charges***: the cross ratios written as complex fractions z or 1/z for EM(pot) red, or E(pot) turquoise, (z-1) and 1/(z-1) for E(magn)+time yellow and E(kin)+ frequency blue and z/(z-1) for E(heat) green, (z-1)/z for E(rot) magenta. One can use the permutation group of four elements S4 to generate D3 by factorizing out a commutative SU(2) group, used in physics as Klein group V4 for the CPT symmetries (adding a scalar identity id matrix). Every D3 symmetry η comes from four S4 permutations. Beside energy (use TεV4 as inverted frequency) and color charge (use CεV4) η can have two more properties, carrying for instance a scalar as ***temporary weight*** (use idεV4) for a Gleason frame (a measuring apparatus) like length, mass, electrical charge (nucleons isospin exchange for instance in deuteron), magnetic momentum, spin, momentum E(kin), phonon/heat energy exchange (numerical or as pseudo-particles), changes in an angular frequency ω as E(rot). A ***coordinate presentation*** (use PεV4) with a ***polar cap*** where a ***vector*** indicates the direction for the temporary energy transfer of the six invariants is also added. The hedgehog geometry (figure 1) belongs to this.

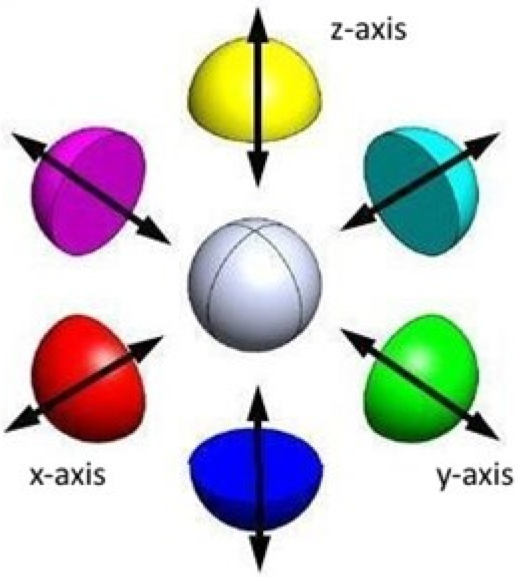

Figure 1 : Hedgehog

The S4 symmetry for the D3 symmetry MTs can be described by three numbers $0,1,\infty$ and a variable complex number z. In case two frequencies hit orthogonal in proportion 1:1 their energy is newly located as a kind of charge on a loop/circle C. This is not a string which can present the frequencies. The hit on the Lissajous figure C marks the points 0,1 and a stereographic projection point ∞ on C is used for projecting this real projective space as 1-point compactification onto a real line for scalar measures as weights of energies.

In [1] the numerical blow up for energies is described in detail: after real numbers, constructed projectively can be used, the Pauli spin symmetry matrices add complex numbers; the quaternions are also generated. The octonian use is not numerical but coordinate based. The six basic energies are in a complex 3-dimensional world 123456, vectors need an additional coordinate as input 0 for vectorial fields, force, speed vectors and so on. As output an octonian 8th coordinate 7 as rolled Kaluza Klein coordinate, a circle U(1) is generated. Light uses exponential functions and loops C.

Concerning the reverse process to the Lissajous figure above: If two charged loops are like photons time-extended as a finite helix line on a cylinder with transversal circle C in a plane E and the rotation of their exponential functions $r \cdot \exp(i\omega t)$, $r \cdot \exp(-i\omega t)$ on C is oppositely oriented, the loops energy is generating by addition or subtraction of the exp-functions two orthogonal projection vectors $x = r \cdot \cos(\omega t)$, $iy = ir \cdot \sin(\omega t)$. The new symmetry for E is then for the area invariance as maximal length r of the two vectors, the 3-dimensional cross product and parallelity is preserved. The before mentioned MT group on S^2 is replaced by affine transformations on E as an affine plane, spanned by the two vectors (with length x and time t dimensions for instance) belonging to the Minkowski metric. Differentials dx, dt, $d\varphi$ for derivatives of functions f (geometrical as tangents to f-curves in a plane like E, also for use in metrics) can be attributed in figure 1 to the turquoise cap opposite the red cap, also as d/dx or d/dr, dt or d/dt to the blue frequency cap and angular frequency $\omega = d\varphi/dt$ to the magenta cap.

3. Time Crystal, Control Panel, Gleason measures and field quantums

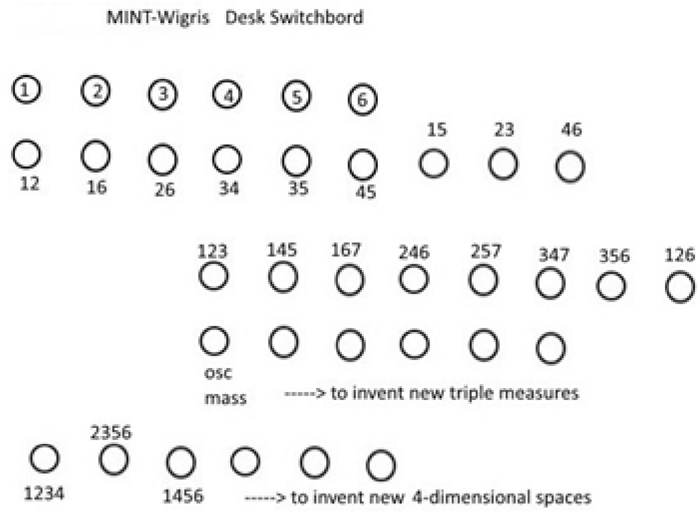

Figure 2 : Control panel for energy 1,...,6 transfer through field quantums and in subspace

In the switch board spaces projections the weak WI S^3 and the strong SI S^5 factor are not included. For WI the Hopf geometry applies with the fiber bundle S^3 projected down to S^2.

For the trivial fiber bundle S^3x S^5 of SI the second factor is in octonians the unit sphere in the complex space C^3 123456. The first S^3 factor of the SI geometry has an GR presentation through *rgb*-gravitons and the first 3 Gell-Mann matrices λj, j = 1,2,3. If a complex identity projection matrix $\lambda 0$ diag[1,1,0,0] is added, the GR projection of C^3 is the spacetime as vacuum 1234 into which energies 56 as mass and frequency and energy fields can be projected. The complex coordinates in 2x2-matrix form are $z\cdot\lambda 0$, $ict\cdot\lambda 3$, $x\cdot\lambda 2$, $iy\cdot\lambda 1$, in C^2 version $z1 = z + ict$, $z2 = x + iy$. For the folllowing dynamics in a deuteron time crystal it is mentioned that field presentations of energies guide the energy integrations of the SI rotor and also of the WI rotor. The energy transfer is through field quantums. In numbers there are 8 SI gluons which can be used and also 8 SU(3) representing matrices. For WI are 3 field quantums and the representing 3 Pauli matrices of SU(2). For light exists one representing field quantum, the photon. Its symmetry U(1) is a rolled circular coordinate. If an associated matrix is wanted, the presentation of its $\exp(i\varphi 0)$ function as a 2x2-rotation matrix A on complex $z=r\cdot\exp(i\varphi)=x+iy$ coordinates can be taken. Since gravity is included in this model for a unification of the four basic interactions with the standard model of physics, it is added that the postulated field quantum *rgb*-graviton whirl for the GR interaction has associated as normed matrix G from general relativity. The MT symmetry of S^2 used for the time crystal is not generated by G. The MT have three color charge whirl generators MT red *r*, green *g*, blue *b*. As complex fractions they are z, 1/z and z+1 for scalings (of numerical units), inversion (reversing inner and outer of S^2) and translation (momentum). Rotation matrices A of S^2 are generated by them.

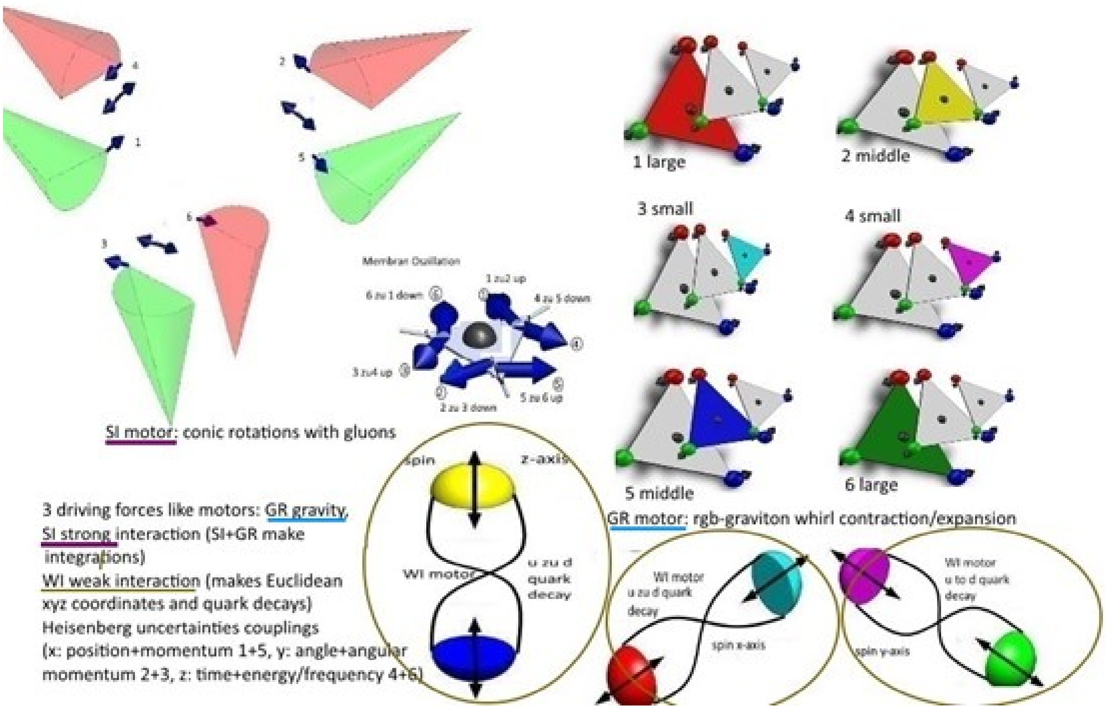

Figure 3 : From the deuteron model, at left is the generation of six half cones by the SI rotor. The blue vector rotation of the SI rotor fixes the quark vertices of a nucleon triangle (middle figure), at right is the rgb-graviton/heat contraction/expansion of the nucleon triangle in the SI rotors six cycle for energy integrations. Below are the WI rotor exchanges of isospin from a u-to a d-quark with the pairing as in the Heisenberg uncertainties.

From physics is quoted for XY-decays with not experimentally found X,Y bosons:
X Boson → u-quark + u-quark decay
X Boson → (e+) + d-quark decay (quark lepton decays)

Where the two decay products in each process have opposite chirality. The Y decays are:
Y Boson →(e+) + u-quark (quark lepton decays
Y Boson → d-quark + u-quark
Y Boson → d-quark + electron antineutrino (quark lepton decays)

These bosons are used in the Georgi–Glashow model (grand unification theory GUT) where the standard model gauge groups SU(3) × SU(2) × U(1) are combined into a simple Lie group SU(5).

The second Y action is in figure 3 (last line) used for the isospin exchange of a proton-neutron pair in an atomic kernel (deuteron) as a W+-boson exchange. Maybe an Y boson is needed for the u-quark decay into a d-quark, generating this W+-boson from it. Reversely, in the Y decay the paired d-quark absorbs then this W+-boson energy for becoming a u-quark. A weak WI motor was postulated in the MINT-Wigris model for this energy exchange which generates the Euclidean space SU(2) xyz-coordinates.

The (experimentally found) Higgs boson(s) H are used for attributing mass scalars to particles. In the MINT-Wigris model they are generating measuring Gleason operator GF triples, which for instance carry the six masses of the two fermionic series. Rescalings of weights are done through Gleason measure operators. Octonians have seven of them and other ones can be added from the SI symmetry or when needed. Physics does this for particles when it needs a new particle like Y. The H particle scaled Higgs compass G can move its needle with the sixth' roots of unity. Roots of unity are encountered for spin distributions. They are also for $n = 2$ as ± 1 charges or orientations for space coordinates, $n = 3$ for G eigenvalues or as numerical D3 orbit (also the basic spin values ½,1,2 and 0,1,∞ arise as D3 orbit), $n = 4$ for SU(2) complex numbers or matrix eigenvalues (also 8th roots of unity as magnetic symmetry), $n = 6$ as order of G for electrical charges orbit.

Central projections and projective geometry with homogeneous coordinates are useful for gravity in figure 3. Octonian 1234 coordinates are then in two WI and SI versions for spacetime (4 for time) and 56 is an energy plane with the Einstein line $hf = E = mc^2$. The GR projection rescales the Minkowski to the Schwarzschild metric by adding with an area invariance for differentials $dr' \cdot dt' = dr \cdot dt$ the Schwarzschild scaling factor $\cos^2\beta$, $\sin^2\beta = Rs/r$ in $dr' = dr/\cos\beta$. The projective (scaled G matrix) MT (r-Rs)/r arises through an unsymmetric distance measure between a central mass system Q and a mass system P in GR interaction with Q and rotating about Q with $|QP| = r$, $|PQ| = r - Rs$, Rs the Schwarzschild radius of Q. The homogeneous projective norming to G is through a central projection. For the Minkowski rescaling matrix $M = G \cdot \sigma 1$ the MINT-Wigris model has no boson presentation or GF triple associated. In the deuteron model M rescales the u-quark mass for generating a common optical group speed of the time crystal in space. Maybe the above X bosons first decay can be used for this as the u-quarks mass defect measured in nucleons. The same Minkowski factor generation of a common group speed was postulated in physics for electron waves ψ. They move in space in an atoms shell together with the atomic kernel. A third rescaling of neutrons n mass in an atomic kernels can also be attributed to the generation of a common group speed in space of atomic kernels. This way the X bosons would have additional decays associated (e-) + (e-) decay as the e- mass defect measured in atoms shells and an n + n decay as the n mass defect measured in atomic kernels, both not mentioned in GUT.

Concerning a GF triple (r,Δt,E(heat)) for the Minkowski case, it was suggested that there are three MT inversions at a big bang, due to a new Gleason operator: homogeneous inverting with σ1 high potentials (E(pot), EM(pot)) as scaled 1/r to a small radius r for space, inverting with σ1 frequency 1/Δt as E(kin) energy to a small time interval Δt and inverting angular frequency as energy E(rot) to huge heat energy E(heat). This pairing of energies or spacetime coordinates is presented according to the Heisenberg uncertainties in figure 1 as conjugation paired hedgehog polar color charge caps. The triple of three energy vectors E(pot), E(kin), E(rot) are presented in the first part of figure 3 as the SI motor red, green, blue with the D3 symmetry added.

MINT-Wigris postulates in addition to the SI and WI motors a POT motor for potentials EM(pot), E(pot). Associated is the common 5-dimensional Schmutzer field of [5]. A suggestion for a symmetry can be to use the GUT SU(5). As measuring 145 GF triple (EM(pot),Δt,E(pot)) is suggested. For the Hopf presentation of leptons (replacing bosons in the WI, SI motor case) on a Hopf sphere $h(S^3) = S^2$, the geometry is as a rotating electrical EM(pot) or neutral charge on a latitude circle, a spin plus magnetic momentum as vector pair attached at the north pole of S^2 and mass as scalar attached to the south pole of S^2.

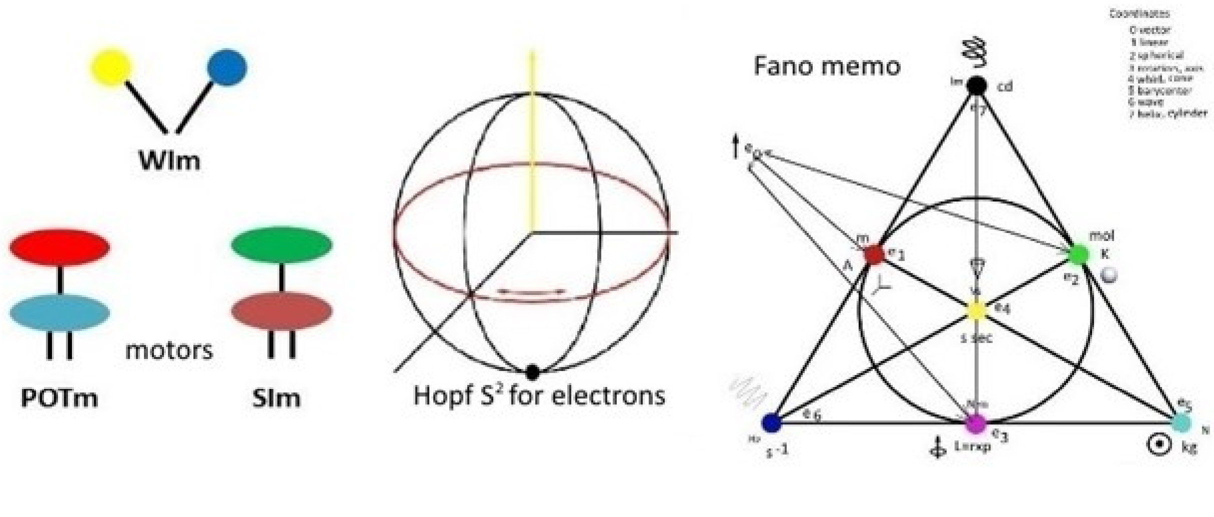

Figure 4 motors, Hopf S², Gleason measuring triples in the octonian Fano memo

III. RESULTS

The time crystal for deuteron states was described in the references. In new connections it allows to interprete a part of basic numbers used for energies in physics. The geometry for gravity is set on a new homogeneous base.

IV. DISCUSSION

In the references [1] the octonian world in which this deuteron states model lives was described. The model was published earlier and extended later on in several articles not listed in the references. They are not necessary for understanding this article. New observations for the basic numbers are complemented by geometrical remarks, additions to some field quantums, new symmetries used and the measuring Gleason operators as GF triples like spin triples in the octonian Fano memo.

V. CONCLUSION

There are new experiments needed as support for the mathematical deuteron states model. The verification for *rgb*-graviton whirls is in the authors opinion existing as the experimentally found neutral color charge of nucleons. The octonian vector space from the reference [1] allows many new applications for this article.

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[6] Internet video under YouTube: Moebius Transformations Revealed 2014

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