Acta Scientific Women's Health

Volume 1 Issue 2 July 2019

Short Communication

Octonian System

Gudrun Kalmbach HE*

Mathematic Informatics Naturewissenchaften, Technic, Germany

***Corresponding Author:** Gudrun Kalmbach HE, Mathematic Informatics Naturewissenchaften, Technic, Germany.

Received: June 14, 2019; **Published:** June 27, 2019

Introduction

In the sciences biology and chemistry there are basic tables or geometries for pure elements from where the theory evolves. In biology the DNA components A,C,G,T are aranged along a left- or right-handed helix where the binding between the two helix elements AT or CG on a diameter of their common cylinder is through sugar. As driving forces are named mutation,neutral and selection.

In chemistry the periodic table is in rows (periodic) and columns (s,f,d,p shells for electrons) of a table according to the number of protons or electrons of an atom, chemical properties and some groupings of atoms with similar chemical properties. From the evolution inventor Darwin is taken for the octonian system the Feigenbaum evolution equation for generated physical energies and forces, From the biological DNA is taken the light helix expanding as complex exponential function exp of time along its world line as axis of the cylinder: Observables are its cosine projection as a wave function which has one helix winding along th cylinder as wave length and its frequency as energy, tracing out the helix.

Physics has many classifications for its subsystems. In order to reduce them to an understandable curriculum for highschool students age 15-19, the MINT-Wigris Tool Bags contain technical demonstrations in 3 dimensions. The models work with projections. The originals live in an octonian vector space. Classifiactions are added in the sense of the chemistry periodic table.

The reason for choosing a vector space is clear: the university teaching of students starts with the 4-vectors of spacetime as our observable environment. If states or phases of systems are considered, these coordinates are doubled to the 8 phase space coordinates. The 8 octonian coordinates are not this phase space. But the dimension reflects the fact that in the octonian system states of a deuteron atomic kernel can be described. Some well established old theories need in 2019 some revisions, also for the Tool Bags. The author thinks that her presentation is acceptable for teaching. The complicated physical theories, not understandable for high-school students, are only partly demonstrated such that a basic set of instructions arise for teaching them the essentials from the nano range for particles, interactions, dynamics, symmetries and their tiny geometries.

A first demonstation: In the figure cube the octonian coordinates, names 0,1,2,...,7 are the vertices of the cube, here reduced to points.

In the Fano figure the point 0 is taken separately as an input vector on the left and the other coodinates are point on the seven lines of the projective Fano figure. This is a minimal projective geometry where the seven lines are triples as for space the coordinates x,y,z on the 123 line (a circle in the figure). Their measure is for length in space, also in the coordinate directions. The other orthogonal seven triples measure not length, they measure for instance on 145 the cross pruduct for induction when the area of a rotating electrical loop current is transversally crossed by an outer magnetic field.

A third example is for a mass triple on 257. The three masses are hanging on springs with 1,2,3 of spin coordinates as initial points and are rotating with spin, for instance counterclockwise in the spin triangle 123 as dihedral disk with symmetry D3. As a pendulum motion the three weights have as dynamics a symmetry of order 12 where the arrangement repeats periodically. Newly added to physical symmetries are for this the group D3xZ2. Z2 has two elelments, the conjugation operator C of physics and its square as identity operator. This group generates the fermions particle series, the building blocks for matter in the universe. The group D3 of order 6 consists of the six invariant cross ratios under Moebius transformations MT amd can have as character an energy attached

to a color charge vector. The MT are the symmetry of a ball surface S^2 for a deuteron atomic kernel where it exchanges its energies with the environment. In the figure hedgehog are drawn the input-output vectors in their coupling along the xyz-coordinates acccording to the Heisenberg uncertainties.

There are three items new in the octonian system for physics: these MT symmetries with six invariant energies, the Fano triples as Gleason operators for quantum measures, new, often projective or projection geometries with different geometrical shapes for subsystems. The mass pendulum can also demonstrate as central or stereographic projection the length rescaling thorugh gravity waves: in the figure deuteron its bounding sphere is projected down onto the floor and it hangs on a telescopbic stick which changes the distance of deuteron to the floor when graviton energies are absorbed or emitted. The shadow figures of S^2 show the length contraction or expansion.

For reference after this introduction, the 6-roll mill on the title page is figure 1, the gluon exchange on p. T2 figure 2, figure 3 on p. T3 are the barycentrical triangle items, the 2 rings and the wheel, figure 4 on p. T3 is the deuteron (also on the front page) and figure 5 the pulsation on p. T3.

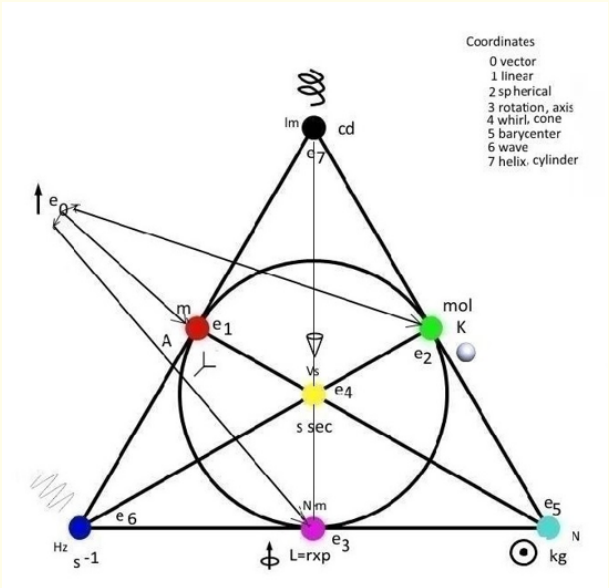

Figure 1: Fano memo for Gleason frame GF triples as octonian 3-dimensional subspaces; below: 257 pendulum motion of a mass triple with spin.

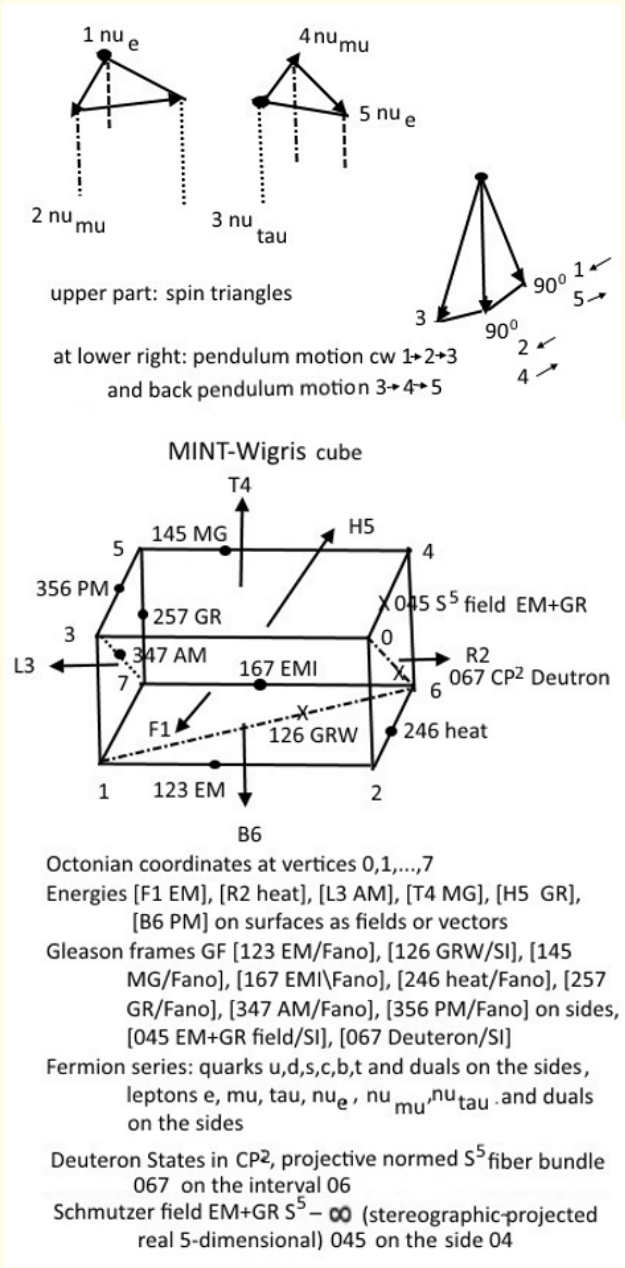

Figure 2: Cube, the explanation is given later on.

Abbreviations are EM electromagnetism, EMI electromagnetic interaction, GR gravity, MG magnetic energy, AM rotational energy/angular momentum, PM kinetic energy/momentum, SI strong interaction, WI weak interaction, MT Moebius transformations.

Quantizations occur as follows

The angle-angular momentum uncertainty forces the three rotational momentum spin S, orbital L = rxp and J = S + L to rotate about an axis. Spin rotates on a Moebius strip by π for getting an orthogonal (90 degree) postition and a fermions spin length |sx| = h/4π; rotated by 2π it gets spin length h/2π in down position (180 degree) for bosons and rotated by 4π to its original position for rgb-gravitons spin length h/π. The energy-time uncertainty forces frequency to rotate as EMI helix line with a expoential wave function ψ = exp(-i(ωt-kx)) description on a cylinder, observable in its space extension as cosine function. For the third quantization position-momentum the SI rotor of MINT-Wigris has the nucleon triangles symmetry D3 for color charge vectors. There are two superpositions of three color charges observed: rgb-gravions are the neurtal observed color charge of nucleons, the dual is tmy, turquoise, magenta, yellow. They have as vectorial rotating whirls attached three energies for quarks q. The energy vector red r is for the electrical potential as force, also for the SI rotor exchanged by the turquoise vector for the mass potential as force, for green the rotation vector L as force, replacing heat as stochastic energy and blue has the momentum vector p = mv attached as dual of the magnetic momentum as force vector yellow. The thee barycenters of the nucleons quarks form the vertices of the nucleon triangle and they rotate in a time cycle with D3 about the angle bisectors of the triangle as axes, setting this way barycentrical coordinates with a barycenter of the nucleon in the middle as their intersection. A harmonic standing wave is also obtained by the conic rotations. Masses as weights are set as scalars by a Gleason frame GF through a Higgs field crossing the nucleon. The GF are orthogonal triples like spin. In this case spin kength of the vector is replaced by the mass weight and can be threefold for the fermionic series. For quarks there are two such GF, for leptons also, one for electrical charged, the second for neutral leptons. These masses are small in comparison with the mass of a nucleon, set by another Higgs field which rescales mass special relativistic for high inner flow speeds and a common group speed of the nucleons parts. The nucleon mass is not responsible for the small quark masses, set by a GF. It is responsible for setting a Schwarzschild radius Rs of the nucleon. Setting Rs equal to the Compton wave length length λ= h/mc, m mass, of quarks, mass is computed as m^2 = hc/2G, G the gravitational constant. By using the first not second cosmic speed for the SI rotor cycles circular rotation about the circumference of the nucleon triangle, the factor 2 is deleted in the formula for the Planck mass. It can be special relativistic rescaled for (matter) wave descriptions of systems. Also in this case, this rescaling of mass is for generating a common groups speed of the mass system. Concerning the mass GF for fermions, for neutrinos it is an ocsillation in time where the GF changes its observable mass vector in 90 degree angles. The three values change then the momentum pj = mj·v, j =1,2,3. This vector is helicity aligned with spin and has also the rgb-graviton whirls spiralic length contraction/expansion because of the Heisenberg uncertainty position-momentum. The three scalars mj arise stretching or squeezing the particles Compton wave length through projection: project on three rays from 0 in equal angles of 30 degree this length (normed to gravitons spin length 2) orthogonal down by a spirali turn in time to spin length 1 of bosons and project this in a second step down to spin length ½ of fermions. This computation applies to all fermion series for their mass GF.

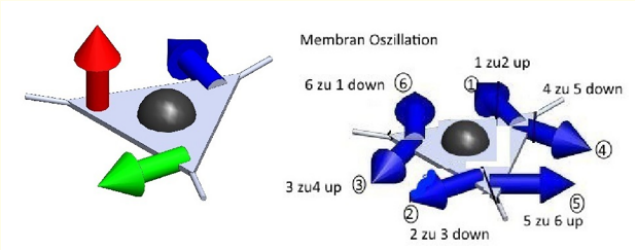

Figure 3: SI rotor.

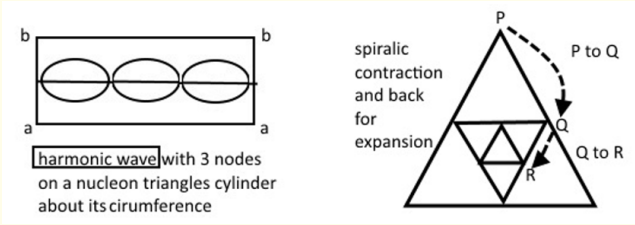

Figure 4: Harmonic wave, mass GF with three weights arising from Compton wavelength scalings.

Section 2 A first classification scheme and the 8 Tool Bag models

In the first section some models are presented in a suitable way for the MINT-Wigris theory.

In the first line of the table are the spherical SI coordinates, possibly 7- (not 8-)dimensional extended with exponential/polar coordinates. In the second line are the linear Pauli/Euclidean coordinates, in the third line a distribution of color charges to the SI coordinates. The fourth (fifth) line contains the D_3 (SU(2)/Pauli) MTs as cross ratios. Their matrix names are in the sixth line, together with the Einstein matrices. The following line is a numbering for a strong 6-fold integration series (not the Fano figures numbers which are for octonians). The next line contains the Planck numbers. Energy vectors are in the second to last line and the last line contains natural constants and three more operators, C (conjugation for quantum numbers), T (time reversal) and P (space parity) of physics.

r or $re^{i\varphi_1}$	φ	θ	ict	iu	iw
$x \in \mathbb{R}$	$iy \in i\mathbb{R}$	$z \in \mathbb{R}$			
r	g	$\overline{g}$	$\overline{b}$	b	$\overline{r}$
z	$\frac{z}{-z-1}$	$\frac{-z-1}{z}$	$(-z-1)$	$\frac{1}{-z-1}$	$\frac{1}{z}$
$\frac{1}{z}$	$-\frac{1}{z}$	$-z$	z		
$id;\sigma_1$	$\alpha\sigma_1;\sigma_2$	$\alpha^2;\sigma_3$	$\alpha^2\sigma_1;id$	$\alpha;\delta$	$\sigma_1;id;\beta$
1	6	4	2	5	3
length λ_P	temp. T_P	dens. ρ_P	time t_P	ener. E_P	mass m_P
EM_{pot}	E_{heat}	E_{rot}	E_{magn}	E_{kin}	E_{pot}
c, e_0, ϵ_0	k,C	N_A,T	μ_0	h	γ_G, R_S,P

Figure 5

The first model in the Tool Bag (figure 3 Above are mentioned the 6 color charges of the particles (anti-)quarks. The scaled factor of the Schwarzschuld metric is presented for them as a MT of order 6 in D3xZ2. Z2 is the group of order 2, D3 the symmetry of a triangle (cubic roots). The dihedral group in figure 8 is D6 for the sixth roots of unity. The needle of the compass turns only dicrete between these six values on the circle. Beside covering with the radius an area in six segments as location for a color charge the needle can set with its endpoints on the circumference of the compass the six electrical charges, measured through the arc length 2πk/6, k = 1,...,6, 6 masses for the fermionic series, six energies etc.. In the first classification table below it sets six octonian coordinates. They are listed in a row 1,...,6 for the strong interaction. This complex space C^3 contains as unit sphere S^5 in the octonians. It is homogeneously normed to the complex inner spacetime CP^2 of a deuteron atomic kernel as described later on.

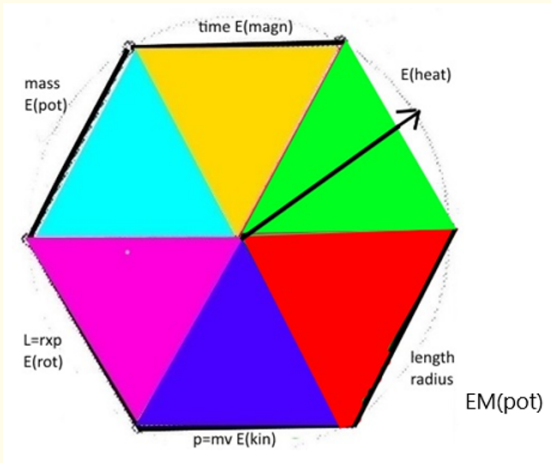

Figure 6: G-compass, the matrix G of order 6 has the coordinates a11 = 1, a12 = -1, a21 = 1, a22 = 0.

We add now for the two figures Fano and cube from section 1 missing information. In the Fano memo the indices 1,2,...,6 of the octonian coordinates are in the first table, first row the coordinates x or r for 1, φ or iy for 2, θ or z for 3, ict time for 4, iu frequency for 6 and iw mass for 5. The geometrical shapes indicate for which Gleason operator GF measurement triple this coordinate is responsible. The theory is described in [1]. The logo spin triple at 1 is for the three Euclidean spin coordinates of space measured are length m (meter), and for electricity A (ampere).The logo ball at 2 is for measuring a volume and heat inside with the equation for pressure, volume, temperature K (Kelvin). The logo axis plus orbit at 3 is for rotational energy with the angular momentum equation L = rxp Nm. The logo cone at 4 is for a magnetic field quantum cone with measure Vs and for time on the same coordinate the measure is in s (seconds). For frequency at 6 is drawn a wave as cosine function, measured in Hz or inverse seconds. The logo barycenter inside a circle is for mass in a barycenter, measured in kg or N (Newton). The octonian coordinates 0, 7 are not in the above SI table. In the Fano memo at the top of the triangle for light waves a cylindrical helix line is drawn with measures in lm or cd. The 0 input vector for all these energies sets vectors anywhere in the octonian vector space where some energies are present. At its initial or endpoint such a vector can carry a numerical scalar as weight in order to be active as force in the vectors direction.

The cube figure has as vertices all eight octonian coordinates. For adding information it is suitable to draw the lines as points. Informations for 0 on the edge 04 of the cube: There exists for SI the SU(3) geometry as trivial fiber bundle as a product of a 3-dimensional with a 5-dimensional sphere. The 5-dimensional one can be used for a common field of Schmutzer for EM and GR. On the diagonal 06 of the side R is listed that the former mentioned 5-dimensional unit sphere in the C^3 SI space which can be homogeneously normed to the CP^2. As fiber bundle the fiber for this norming is a loop/circle S^1. For 1 the list of items is on the edge 12 for Euclidean space coordinates 123, on the bottom sides diagonal on 16 for rgb-graviton whirls. They transfer GR and have also a wave character recently detected. As matrices they are presented by the first three SI GellMann 3x3-matrices. Deleting their third row and column of the rgb-graviton whirls project the S^3 factor of the SI geometry down to the Pauli matrices weak interaction WI Hopf sphere S^3 of the SU(2) symmetry. A third GF for 1 is found on the edge 45 as 145. This is for the magnetic field MG crossing the area of an elctrical currents loop as boundary. The magnetic induction arises through this as an angular momentum, integration is on the area of the loop. On the edge 67 is 167 for generating EMI, light, emitted from atomic kernels. At 2 is new on the edge 26 the integration of heat which is for different kinds of 3-dimensional shapes with boundaries, not only the sphere boundary as in the Fano memo. 257 is found on the edge 57 and means the setting of barycenters and barycentrical coordinates. For 3 are menioned on a sides diagonal 347 which sets angular momentum as rotational energy in L = rxp, r radius. On the edge 35 is listed 356 for the setting of momentum p = mv, m mass, v speed.. The cube presentation has for future use also names for the sides added at their midpoint vector F1 front 1 is a polar red (color charge) cap in the hedgehog figure for EM, R2 is a green polar cap in the hedgehog figure for heat, and so on: L3 magenta cap for angular momentum, T4 yellow cap for magnetism, H5 turquoise cap for mass, B6 blue cap for kinetic energy and momentum.

In the hedgehog figure the caps can be seen as an area about which mathematically is complex integrated along its contour. These SI integrations are for an inner dynamics of the deuteron and nucleon kernels. The description follows in another section. Also winding numbers can be complex computed where in the poles a special function has a residuum. Winding numbers are responsible for the discrete spin length values measured by natural numbers and multiplied to the three basic spin length ½ (fermions), 1 bosons, 2 graviton. The energy exchange of a deuteron atomic kernel with its environment is at the polar input-output directed vectors in the middle of the caps. The sphere in the middle part of the hedgehog (also as 3-dimensional model constructed in the Tool bag) is for the formerly mentioned inner spacetime of deuteron with a Riemannian sphere S^2 as boundary. The pairing of the color charge caps is according to the Heisenberg uncertainties position-momentum on the x-axis (F1, H5 sides of the cube), angle-angular momentum on the y-axis (R2, L3 sides of the cube) and energy-time in E =hf, h Planck constant, f frequency, on the z-axis (B6, T4 sides in the cube).

Figure 7 hedgehog with a deuteron atomic kernel in the middle and the polar caps with input-output vectors for the kernels energy exchange with the environment.

The roll mill is a new demonstration found already in catastrophe theory, avialable as a potential description for an elliptic umbilic catastrophe where six rolled up color charge whirls on the rays of the sixth roots of unity as whirl boundaries are driving a polymer flow. Taught in a course are that two rolls, named red r, turquoise t

rotate both clockwise cw and have in between a roll yellow rotating counterclockwise mpo. The next roll to t is magenta m and rolls like the roll beside r as green mpo. The last roll opposite to y is blue b and rotates cw, Some gravitational machines described in the book [4] can be constructed where for instance the Zeeman gravitational machine is showing the cusps as geometry of the ellliptic umbilic in a simplified version. The 6 roll mill in the tool bag is driven by 3 motors POT, SI, WI having as rolls r,t and g,m and b,y. These are also presenting the Heisenberg uncertainties with r presenting a position coordinate x, t presenting a momentum, connencted by the equation $\lambda p = h$, h the Planck constant. λ is taken for a wave length replacing x. In the SI case g presents an angle and m presents an angular momentum J in a similar equation $\varphi J = h$ while in the WI case the rolls present energy and a time interval Δt for frequency as $f = 1/\Delta t$ in the equation $E = hf$. What the Heisenberg uncertainties are doing for physics are found in internet articles to be taught.

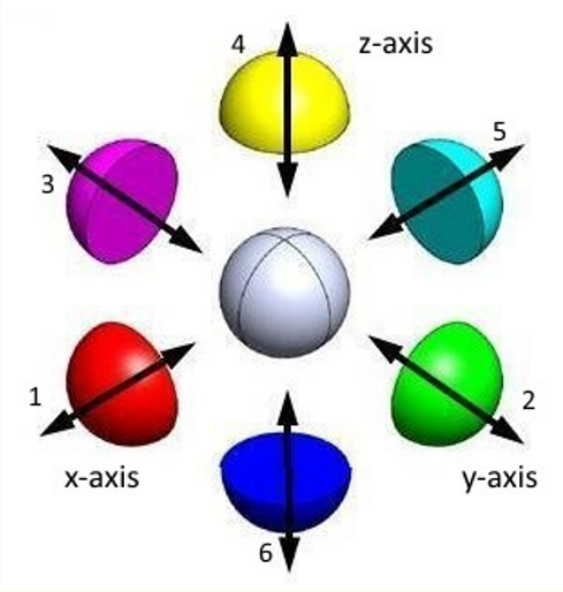

Figure 7

Another model deuteron shows this ball hanging an a telescopic stick. The rgb-graviton action for length contraction or expansion is demonstrated by the shadow figures when deuteron is at a higher or lower position about the floor. The bounding Riemannian sphere of deuteron has as symmetry the applied scaling matrix a·id which changes length through different hights of the deuteron ball about the floor. In figure 6 is a similar model described where a pendulum motion attached to the spin rotation generates measures for three masses attached at the spin triangles vertices, They present the endpoints of the three spin coordinates sx, sy, sz. - For the inner structure in deuteron is available the model octahedron gluon exchange. The six quarks of the deuteron sit in two nucleons as vertices at F1, R2, B6 which are confined by gluon exchanges, marked on the tetrahedron sides on 12, 25 and 16 for one nucleon and for the other nucleon with vertices on H5, L3, T4 on the sides 35, 45 and 34. There is an SI rotor described later on and in a video on the DVD which is a representation of the nucleon triangle symmetry. It generates barycentrical coordinates such that in their intersection a Higgs field can attribute to a nucleon mass at this point. In the Tool bag are 4 triangles and 6 sticks with which the barycentrical coordinates location can be constructed. The lever law can set opposite to a vertex on a triangle side for the other two quarks of the nucleon a barycenter carrying a common mass. The stick goes through this barycenter and the vertex. There is a template in the Tool Bag such that drawings can be made on paper. For instance helix lines for light can be drawn as parallel lines and the strip of paper can be rolled to a cylinder in order to show a location for lights exponential function, expanding in time with its frequency on the helix. There are two spring models for dark mass and dark energy. When projectively a light cylinder is closed at infinity the figure for dark energy is obtained by setting at the two folded ends of the light cylinder a Minkowski double cone. This Horn torus has the helix lines not touching. The speed inside the Horn torus is inverted from our speeds $v<c$ at speed of light to dark energy speed $v'>c$. For the dark mass or matter geometry it is assumed that in a tiny radius a frequency as mass representative (in $mc^2 = hf$) is rotating along the spring, possibly in two strings not only one as demonstrated. The two helix lines can be kept together through graviton whirls in diametrical position between them. The singularity of this model is in the middle of the Horn torus where all windings of the helix touch or come attracted very close to one another If a big heat is assumed the spring figure can change and be like a melted plasma flow with thinner accelerating rgb-graviton whirls in between. There is also a description arising from the Hopf geometry for electrons: the spring is replaced by a leaning circle on the tube as a fiber S^1 on which the mass is located as a charge similar to an electrical charge, but having a different quality as energy. In the Hopf geometry S^1 rotates on the tube. For mass it is assumed that a very dense set of such mass charged loops S^1 are on the tube in rotation.

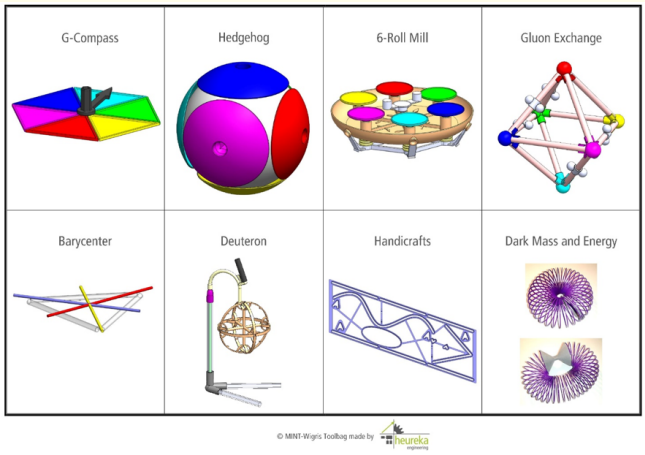

Figure 8: The 8 tools.

Section 3: The octonian dimension

The octonian system is described by using 8-vectors, doubling up the 4-vectors of physics. This replaces the infinite dimensions of Hilbert space for quantum structures. It allows to decsribe deuteron and deuteron states.

The construction has many octonian subspaces available which need no additional vector extension.

The subspace coordinates are constructed geomertically and not necessarily linear. It is useful to arrange them like the logarithmic surfaces, called branches, where the complex function log z has a unique value. The log z function is inverse to the exponential function exp with period 2π. For exp its coordinate (x,ct)-plane is devided in infinite strips of diameter 2π with the line at x = 0 identified with the line x = 2π. This provides for instance an infinite cylinder where the electromagnetic interactions EMI energy, presented as wave, or other exp parametric wave functions f(t) have their energy expanding in time on the cylinder. The example shows, that for EMI no new coordinates are needed beside the xy-plane in space transversal to the cylinder, cutting it in a circel U(1) ≈ S^1, a 1-dimensional sphere, a central axis in direction of the space z-axis which coincides with the time axis for the expansion of the EMI energy. Waves of this kind live in spacetime.

The octonian dimension of the q = (x,y,z,ct) Minkowski space of physics is done by the Cayley-Dickson construction of octonians: q is written in 2x2-matrix form where in the first row the coordinates are z_1 = z+ict, z_2 = x + iy. Then the octonian coordinates have in the first row the coordinates q_1 = x + iy + jz + k(ct) and q_2 = u + iv + jw + ks. i,j,k and 1 are the quaternionic unit vectors, written as octonian e1, e2, e3, e4 unit vectors . The q_2 unit vectors are written as e0,e5,e6,e7. These unit vectors are for setting vectors in the octonian spaace with e0, having a weight and a direction, for instance for speeds or forces as energies, for mass measured in kg units, for freqeuncy measured in inverse seconds as 1/Δt and for the EMI Kaluza-Klein circle U(1) as a rolled linear e7real R coordinate which is closed by a stereogarphic point at infinity ∞ to the projective line P^1 = R U ∞.

The otonian dimension equals the strong interations SI dimension 8 which has as geometry the toroidal product S^3xS^5 of a 3- with a 5-dimensional sphere. As coordinate units are available the eight GellMann 3x3-matricse λ_j: This is a second branch SI8 for the octonian branch O8 and used for describing eight gluons and other important energy or space distributions or coordinates. The GellMann matrices are not using two quaternions as O8 does. They are extended as projection matrices from the three Pauli matrices σ_j, j =1,2,3 by adding a row and column with coordinates 0. There are not 9 but only 8 such matrices because the three extended σ3 matrices are linearly dependent and generate only a plane for 2 gluons, not a 3-dimensional space. The first three λ1,2,3 matrices are for rgb-gravitons, generating a space for a deuteron atomic kernel with quarks mass sitting at the endpoints of these three pairwise orthogonal vectors. Projected down to the quaternions spacetime, they have the three scaled spin-coordinates s = (s_x,s_y,s_z) unit vectors for space. rgb-gravitons are whirls like spin, but present with their coordinate units 3 of the 6 color charges of the strong interactions QCD theory.. SI has as symmetry SU(3) with 3x3GellMann matrices presenting the SI gluon field quantums and the weak interaction WI as well as electromagnetism EM has the quaternionic spacetime 2x2-matrices for its W+,W-,Z0 field quantums with an identiy 2x2-matrix id = id_2 added. These field quantums have as geometry the Hopf sphere S^3 as unit sphere in spacetime R^4. Also this geometry needs no coordinate extension like the cylinder for EMI. It is projected down from the S^3 factor of the SU(3), SI geometry which was used for rgb-gravitons. Through the Hopf map h the Hopf sphere is projected down to a Riemannian sphere S^2 where a complex numbers plane C is closed to a complex projective line by a point ∞ to S^2 = C U ∞. The stereographic map st_2: S^2 → C maps it down from ∞ to the C-plane.

The reader is aware that additional linear coordinates for describing states of a deuteron atomic kernel can use real or complex projections. Instead of using an infinite dimensional Hilbert space

the linear projective space extension is using the n-dimensional cross product. In 2 dimensions the cross product is replaced by the map (x,y) → (y,-x), using the multiplication with the Pauli matrix σ2. In the construction for complex numbers C in matrix form x·id presents the real nmber line in C and y · σ2 presents the imaginary line where i = σ2 as imaginary unit with i^2 = -1 is introduced for presenting zεC as z = x + iy. In polar coordinates for zεC, the map f: φ →exp(iφ) introduces an angle towards the x-axis for the line through z = r·exp(iφ) and the radius r is measured as the Euclidean length of z in $r^2 = x^2 + y^2$.

In projective notion, the x-line is extended to an xy-plane. The further extensions are by the real cross product c = axb, renaming for its description x =a, y = b and z = c for space coordinates. The 3-dimensional cross product is t = axbxc for a time coordinate and the 4-dimensional cross product is e0= u = axbxcxt for the octonian e0 coordinate, listed as unit vectros. In octonains set e1 for the x-line as unit vector, e2 for y, e3 for z, e4 for t, Sparing more coordinates, these are now homoeneous coordinates of a 5-dimensional vector fields space R^5. One such field is described by Schmutzer as a unified EM GR (gravity) potential field POT. This is one of three driving motors for energies together with an WI and a SI motor, In describing the 6 color charges of QCD/SI, the conjugation operator C with C^2 = id can be used. It extends the red r, green g, blue b color charge whirls of rgb-gravitons to the duals turquoise t, magenta m, yellow y. The G-compass sets them by turning its needle in the discrete steps of π/3 angles. The disk of the G-compass ahs then 6 segments covered by the color charge energy where the dual color charge sits on the opposite segment to r,g,b. The color charges are whirls and need no dimension. They have a 2x2-matrix presentation like the Pauli matrices. All of them, also the G-matrix are Moebius ranssformations MT. They are the symmetry of the complex Riemannian sphere S^2. As symmetry group they are the symmetry of a nucleons quark triangle. There matrices can be put in octonian coordinates to 1,2,3,4,5,6 where we abbriviate now for simplicity the ej coordinates by their index j.

The real field space R^5 is now homogeneously closed to R^5 U P^4. This real 4-dimensional space is in homogeneous coordinates a discrete union of spaces $P^4 = R^4$ U R^3 U R^2 U R U ∞. Spacetime is homogeneously normed from 01234 (u,x,y,z,t) octonian coordaintes to spacetime coordinates (1,x,y,z,t)ϵR^4 which mostly are written as (x,y,z,ct), resacling time with speed of light c. The projective closure is for (0,x,y,z,t), homogeneously normed t = 1 to (xλ1,yλ2,zλ3) εR^3 for the rgb-graviton space in the SI branch, not the octonian branch. The projective closure is (0,x,y,z,0), in reduced and projectively normed form (y·e5,z·e6) form with octonian units e5, e6 for measuring mass m in kg and frequency h in invesre seconds. It contains the Einstein line mc^2 = hf, h the Planck constant (not the Hopf map from above). The last two normings are then for (0,1,z·e7) for the z-axis of the light/EMI cylinder, closed at infinity ∞ to a circle U(1), the symmetry of EMI. Welist againe the normings (u,x,y,z,t) →(1,x,y,z,t) = (x,y,z,t)→(0,x,y,z,1) = (xλ1,yλ2,zλ3) →(0,x,y,z,0) = (1,y·e5,z·e6) →(0,0,1,z·e7,0) = z·e7→ (0,0,0,1,0) = ∞.

There is no need for extending the two branches of SI and octonian coordinates, but the point ∞ is added for topological 1-point compactifications of real spaces R^n to unit spheres $S^n = R^n$ U ∞ in an (n+1)-dimensional real space. The field space is this way closed to the S^5 factor of the SU(3) geometry and sits in the SI branch on the λ_j, j = 0,4,5,6,7 generated coordinates. S^5 is projectively normed by a scalar (fiber S^1) to the complex cpace CP^2 for the inner 4-dimensional space of a deuteron atomic kernel with a bounding S^2 sphere. This is a fiber bundle similar to the Hopf fiber bundle which has an S^1 fiber in S^3 projected down to a point in S^3 by the Hopf map. Also the rgb-graviton space in the SI branch is closed and is then the SU(3) geometry factor S^3. A complex plane was closed to the Riemannian sphere and a real line to a circle. If wanted, for spacetime can be added ∞ as barycenter of a black hole which is inverted at its Schwarzschild radius, generating newly spacetime coordinates $S^4 = R^4$ U ∞.

The universes evolution and the energies acting in it can be described this way by 8-vecors of the octonian or SI branches.

Spherical coordinates measure a radius r and two angles φ, θ in Euclidean xyz-space. This allows different kinds of expansions for energy. In the MINT-Wigris model they are for the

- **SI-rotor:** conic whirls, transversal rotating about barycetrical generated coordinates in a nucleons quark triangle and setting in their intersection a barycenter for the nucleon. The position-momentum uncertainty forces then the momentum blue vector of a quark to rotate in every change of the nucleon state, for instance counterclockwise mpo along the triangles circumference. The transversal θ-angle rotation for a harmonic wave as vibrating strings of the triangles sides torates alternatively mpo and clockwise cw. After six changes its intial point has fixed the measurable quark masses positions. This is a repsrese-

nation of the triangles D3 symmetry with these invariants, arising as the cross ratio invariants of the Moebius transformations on a 2-dimensional sphere S^2 as bounding surface of a deuteron, having six quarks inside.

- **WI-rotor**: linear Euclidean, pairwise orthogonal spin coordinates x, y, z are generated. The orbital rotation is for a flat φ-angle rotating charge on a circle along a latitude circle of the sphere S^2. It presents an isospin exchange between paired quarks where a u-quark is decaying into a d-quark and on the same Euclidean coordinate an opposite located d-quark absorbes the released weak boson energy and becomes a u-quark. In every cyclic change of states the energy-time uncertainty forces the angular frequency and its orthogonal magnetic momentum μ to change the orientation between cw, mpo for the electrical charge and for the coupled μ changing its + or – charge sign towards the spin in the gyromagnetic relation. For neutral charges, the magnetic momentum is replaced by momentum with the indicated change of the sign, observed as helicity of neutral leptons. This is a D4 representation with the three Pauli spin matrices for the three x-, y-, z-coordinates of space. The invariant is a measuring Gleason frame GF carrying a spin length as unit on the three axes. Rotating a GF means in space that only one of the three vectors and the weight of the GF as sum of the three vectors length are measurable. Changing a state means that the three vectors rotate in 90 degree angles and use left- (or right-) handed screws in space for rotation. In addition 180 degree rotations are allowed for (spin) up -down state changes. This uses as symmetry the dihedral, commutative D2 instead of the non-commuting SU(2) Pauli matrices.
- **GR-scalings**: gravity is newly interpreted in the MINT-Wigris model. The angle-angular momentum uncertainty forces a radius length scaling as sstretching or sqeezing in apendulum motion. The scaling arises as two orthogonal spiralic projections of rgb-gravtions: length ½ projection measures fermions spin length and introduces the Pauli principle, length 1 projection measures gluon or bosons spin length where (wave-like) superpositions are allowed at the same location in space, length 2 projection is for gravitons GR. While the fermionic case is for conic spins and the boson case for orbital spins, the GR spin is a sum for a common rotation. All three have to rotate about a central axis. In the above two rotor description, the D3 symmetry has as subgroup the triangles rotations with 120 or 240 degrees, the D4 or D2 symmetry uses 90, 180, 270 degree angles. As smallest common number, GR can rotate in 12th roots of unity angles, using D3xZ2 as symmetry. Z2 is generated by the conjugation operator C of physics of order 2. The same group is generated by the scaled Einstein factors G, M of general AR and special relativity SR where G is the G-compass AR Moebius transformation MT of order 6 and M is the SR factor as a MT of order 2 which has the rows of G interchanged by applying the Pauli σ1 matrix. This group is the symmetry for the 12 series of fermions. The use of spiralic projections operators is due to the fact that the rgb-gravitons measuring GF has as generators the first three λ1,2,3 matrices of SU(3), SI from its geometrical fiber S^3, projected down to the Hopf-Pauli SU(2), WI sphere S^3 in spacetime. For the Einstein metrics the projective norming from complex linear to MT fractional operators is used. In projective coordinates, the M matrix and SR scaling is obtained from [...,c-v,c,...] → [...,(c-v)/c,1,...] as a scaling for energy units, in the Minkowski watch an angle with $\sin \theta = v/c$ where the needle of the watch is in this angle towards the x-axis in an xy-plane and length r is rescaled to $r \cdot \cos \theta$ by an orthogonal projection downwards while mass, time are rescaled in an upwards direction with $\cos \theta$. For the GR rescaling of the SR metric, the projecive norming is nonlinear [...,r-Rs,r,...] → [...,(r-Rs)/r,1,...] as a scaling for metrical units dr, c·dt, r radius t time, c speed of light, Rs the Schwarzschild radius of a mass carrying energy system. The scaling is with $\sin^2\beta = Rs/r$ and the new metrical units for the Schwarzschild metric are tensorial $dr' = dr/\cos \beta$, $c \cdot dt' = \cos \beta \cdot cdt$. The linear, projective form of the $\sin^2\beta$ factor is used for field presentations. In a book of Schmutzer there is postulated a projector which projects his 5-dimensional linear real potential field R^5 down to three 4-dimensional potentials, including the GR field of Einstein.
- **EMI coordinates:** Electromagnetism as additional force to GR, SI, WI adds another time expansion for energy expansion as helix lines on a cylinder with the U(1) circle symmetry as base of the cylinder and with the central, time directed z-axis of the cylinder in spacetime. The phtons as particle invariants can rotate transversal like whirls or longitudinal along a world line. Observable is a cosine projection of the exponential wave description for travelling EMI waves. An invariant is the quantized E = h frequency f in E = hf for photons. It can be taken as one helix winding on the cylinder where the length along the cylinder of this winding is the wave length λ and the wave speed is $c = \lambda \cdot f$. Concerning particle presentations of the former rotors and GR scaling: for SI the 8 gluons are the generators of the SU(3) symmetry, the 3 weal bosons the generator of the SU(2) symmetry and rgb-graviton whirls are in the MINT-Wigris model the color charge whrils for gravity. They can decay into three whirls red, green, blue. Green is for the pseudo-particle phonon, heat which transfers energy (red or turquoise) and momentum (blue) to matter in its environment [1-23].

The transfer can arise transversal or longitudinal in spacetime.

Bibliography

1. G Kalmbach HE. MINT-WIGRIS, MINT Verlag, Bad Woerishofen, (2017).

2. Many related MINT articles and parts of books in the 104 items long list of the authors (mostly scientific) publications. Often they are stored in the internet and can be downloaded or are available in the authors MINT (Mathematik, Informatik, Naturwissenschaften, Technik) book editions 1-38, 1997-2018.

3. G Kalmbach and HE Deuteron States. Nessa Journal of Physics 1.2 (2017): 1-17

4. T Poston and I Stewart. Catastrophe theory and its applications, Pitman, London (1978).

5. E. Schmutzer., et al. The unified electrical and gravity fields is here 5-dimensional with three 4-dimensional projections similar to the above octonians coordintes in [1] into spacetime (e1,e2,e3,e4), the deuteron space (e2,e3,e5,e6) and a scalar field (e1,e4,e5,e6). (2014).

6. Internet video under YouTube: Moebius Transformations Revealed (2014)

7. "Cross products and Gleason frames". PJAAM 10 (2014): 1-15.

8. MINT-WIGRIS, in: Quantum Physics and Nuclear Engineering Conference, March 14-16, 2016, London, UK.

9. Projective and projection geometry for a new kind of unification, in: Quantum Physics and quantum technology Conference, September 25-26, 2017, Berlin Germany". Journal of Lasers, Optics and Photonics, "Deuteron States" in: Journal of Physics, Nessa Publ 1.2 (2017).

10. "Projective gravity". in: ijcrr Internat. Journal of Contemporary research and review 3.1 (2018).

11. "Deuteron States Model". in: Journal of Lasers, Optics and Photonics 5.1 (2018).

12. Projective coordinate construction for energies, to appear Nov. 2018, WCLOP conference proceedings.

13. "Social energies". in: Academy of Social Science Journal 3.6 (2018).

14. Gudrun Kalmbach HE. "A Deuteron Unification Model for gravity with the standard model of physics". *Journal of Physical Chemistry and Biophysics* 8.3 (2018).

15. "A Gleason probability for heat". *SCIFED Materials Research Letters* 12.3 (2018).

16. "A measuring mass triple for the neutrino oscillation" Advanced Research J. of Multidisc. Discoveries, vol. 27.1 (2018).

17. "Field Quantums for Deuteron States". *Biomedical Journal (BJSTR)* 7.1 (2018).

18. "Membran oscillations and Heisenberg uncertainties". *Journal of Membrane Science and Technology* 8.1 (2018).

19. "Generation and annihilation". *Journal of Physics and Astronomy* 6.2 (2018).

20. "Collisions of mass systems". *International Journal of Current Innovation Research* 4.6 (2018).

21. "Octonians for Astrophysics". *Journal of Astrophysics* 1.3 (2018).

22. "Energies basic numbers". *Advance Research Journal of Multi-Disciplinary Discoveries* 29.1 (2018).

23. "Einstein metrics and two projection maps". *Journal of Modern and Applied Physics* 2.2 (2018).

Volume 1 Issue 2 June 2019