

Gravity with Color Charges

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Abstract

Einstein invented two relativities. One is an affine geometry. In this article it is extended to projectivity. The nucleons neutral color charge *rgb*-graviton geometry is for mass and gravity, treated in the quantum range. The energy momentum tensor of Einstein is needed for computing 4-dimensionanal the precise formulas. Qualitative explained this belongs to projective geometrical central projections in higher dimensions. The author uses octonians. In [11] another author uses a linearized 5-dimensional projector for getting the gravitational field as projection. The different properties, also for mass, are treated and formulated as postulates.

Keywords: Gleason Measure, Neutrino, Oscillation

INTRODUCTION

Postulate E1 The special relativistic affine scaling factor is a speed v in $\sin \theta = v/c$, c the speed of light. It rescales mass. For nucleons mass it is shown that nearly 90 percent is added to its three quarks mass coming from inner frequencies and speeds by using $mc^2 = hf$.

For getting a matter wave package, nucleons rescale then its mass and the speed v becomes its momentums group speed when travelling on its world line.

Differentiation by v is needed and the calculation is by the optical version. Inside nucleons there is no fixed distance measure as in outer space. Speed v is used as a variable, not depending on a distance measure between the nucleons quarks.

Higgs bosons are existing as particles which attribute locally as mass field a mass to a nucleon. The setting of a barycenter for the mass requires a dynamical presentation of the quark triangle dihedral symmetry D_3 , of order 6. This is described by the strong interaction SI rotor [1]. There is a conic whirl rotation of the triangles side where one quark vertex P is the tip of a cone and the side is rotated to the other side of the triangle with the quark as tip P . The rotation axis of the cone is one barycentrical coordinate. The dynamics is repeated in a cycle which presents D_3 .

This happens in six steps. The barycenter B of the nucleon is the intersection point of the three generated barycentrical coordinates.

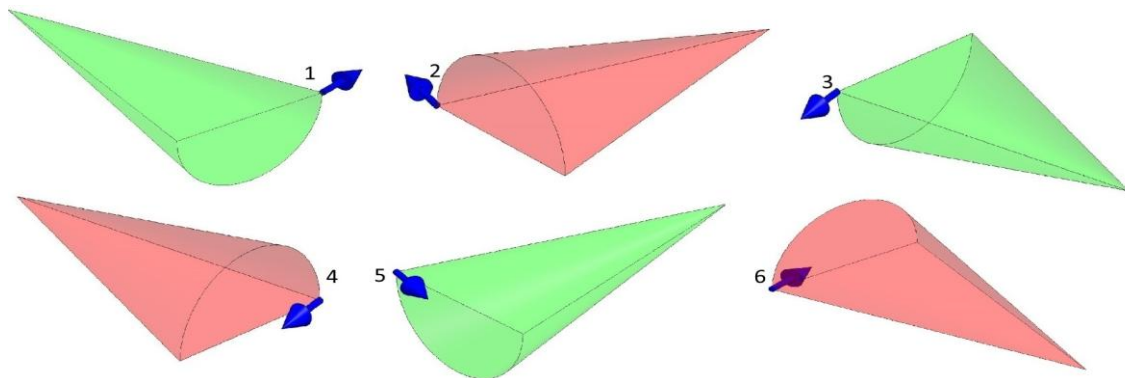


Figure 1 membran oscillation as half cones, a blue momentum vector rotates in every step

Postulate E2 The flat nucleon quark triangle is extended. There is a tetrahedron figure for the nucleon where an *rgb*-graviton sits at the tip and the opposite side is the quark triangle. The *rgb*-graviton is a superposition of three color charges red, green, blue, the neutral color charge of nucleons. They make the rotational conic whirls. Red as color turns

clockwise cw, green counterclockwise mpo and blue moves in every step of the dynamical 6-cycle. The 6-cycle uses a G-compass. G is the scaled general relativistic scaling matrix with first row (1 -1) and second row (1 0). A corresponding special relativistic scaling matrix for E1 is M where the rows of G are interchanged.

The G-compass generates the six color charges by rotation and sets the charges on the sixth roots of unity segments of its disk as condenser plates. When cut out, each color charge has its two radial sides identified and forms a conic rotating whirl like magnetic field quantum. The G-compass needle for the six radial intervals is set by the first octonian coordinate. The circumference of the G-compass disk is set by the electromagnetic interaction $U(1)$

symmetry, a circle. It is a Kaluza-Klein stereographic projective closed last linear octonian coordinate. Six color charge whirls are available. The duals to r, g, b arise by using the conjugation operator C of physics. In the hedgehog caps they are used for presenting three energy polar caps in the Heisenberg uncertainties couplings with red (position-momentum), green (angle- angular momentum), blue (energy-time) (see figure 5), three duals are added.

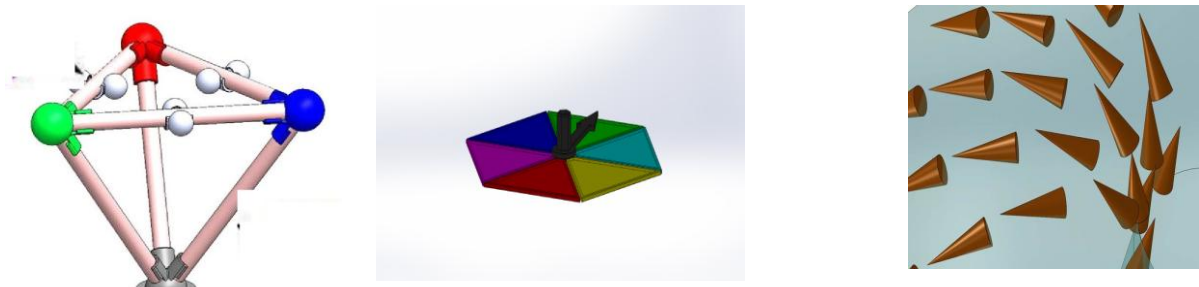


Figure 2 tetrahedron, G-compass , magnetic field quanta

Postulate E 3 When the Higgs boson has set a new mass m for the nucleon, it sets also a Schwarzschild radius $R_s = 2Gm/c^2$, G the gravitational constant. The radius of a nucleon has $r > R_s$. According to experiments, r is variable in bounds through the gluon exchange as confinement of quarks in a nucleon. The interpretation is that the

gluons act like springs and the length of the spring can be stretched or squeezed, according to added or released energy. In the tetrahedron figure it means that the stretching or squeezing of a triangle side can be attributed to a rgb -graviton. It can change the strength of the gluon action for changing distances between quarks.

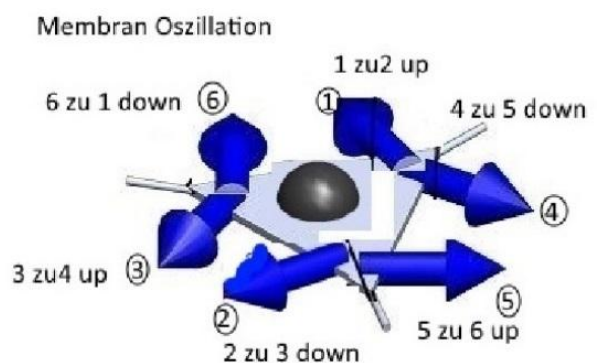
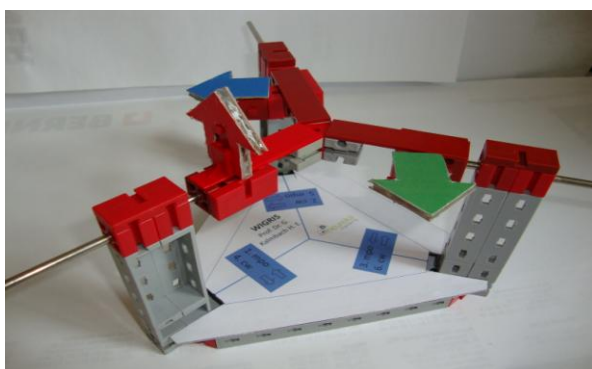


Figure 3 SI rotor, the barycentrical coordinates are set single and are turned cw or mpo alternatively, the blue vector fixes the observable position for the quark triangles vertices

Nucleons are observed as projections in spacetime, a bubble for the base of a fiber bundle S^5 , a 5-dimensional sphere belonging to the geometry of the strong interaction. The fiber is a circle $U(1)$ and S^5 is projected down to a complex projective 2-dimensional space CP^2 with a bounding Riemannian sphere S^2 at projective infinity. The bubble in spacetime R^4 is not CP^2 which hangs in octonians

above R^4 (figure 5). There is a central gravity projection which allows changing distances between CP^2 and R^4 . If for the three r, g, b color charges is assumed that they allow in proportions for the rescaling the three basic spin values $\frac{1}{2} : 1 : 2$, in the quark triangles projection it means that its diameter is changable in three sizes (figure 5).

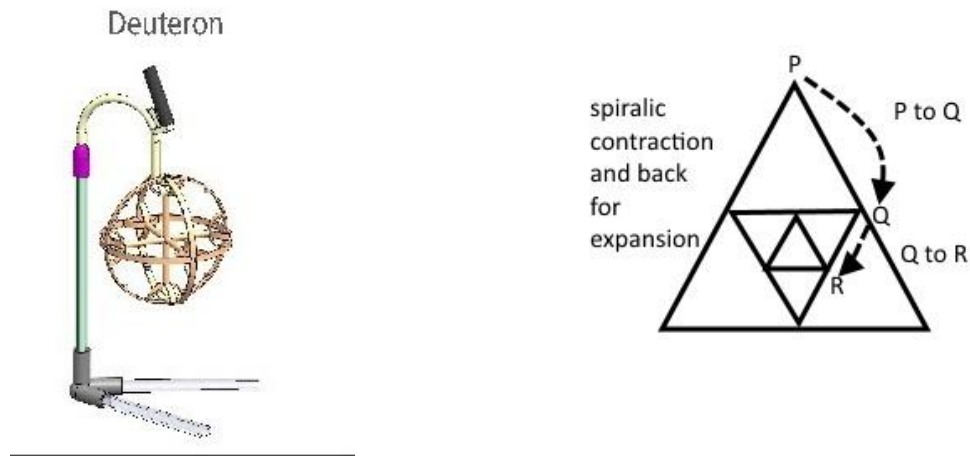


Figure 4 CP^2 in octonians hanging above R^4 and projected down to R^4 , quarks distances changing in spiralic, rotational whirl projections; the length rescalings are observed for graviton waves

Postulate E 4 The speed of the nucleon is kept constant and linear in space. In case a force is acting on its momentum, the mass is treated as *inertial mass* and differentiated as function to b/r^2 , b a known real constant. Its direction as vector is set against the force such that energy is needed to move the nucleon away from its momentum world line.

When integrated to a potential $-a/r$ by the SI rotors action it sets a potential field POT outside the

nucleon. It is inside the bubble a unified potential field for its quarks potentials. Quarks are energy systems for this, having a mass and an electrical charge (see also [11]). In the localized version, POT has two systems: EM(pot) is presented as nucleons positron for a proton and as a neutrino for a neutron. They are sitting on a Bohr shell above the nucleon as a kernel. E(pot) is the nucleon masses potential field, generated by the *rgb*-graviton in the nucleons outer environment.

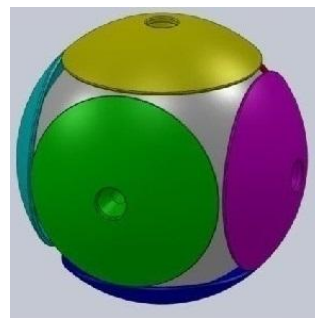
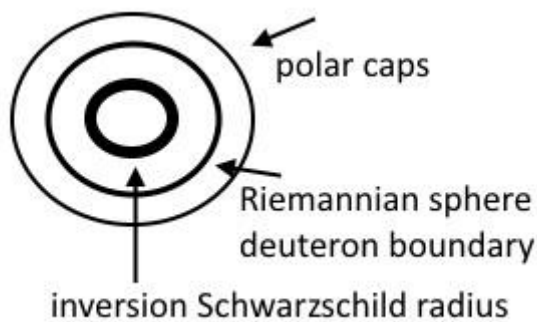


Figure 5 transversal section with deuteron replacing a nucleon and a Bohr shell for its six color charge caps; its the hedgehog geometry is at right

Postulate E 5 The Schwarzschild radius is used for inversion from a nucleons 3-dimensional quarks to their 1-dimensional lemniscate inside a black hole where R_s is in this case the Schwarzschild radius of the black hole and the radius r of a quark is r'

inverted by $r'r = R_s^2$. The foci of the lemniscate are for its mass and electrical point charges [1].

The inversion keeps the 3 quarks joined at a black hole singularity like a butterfly.

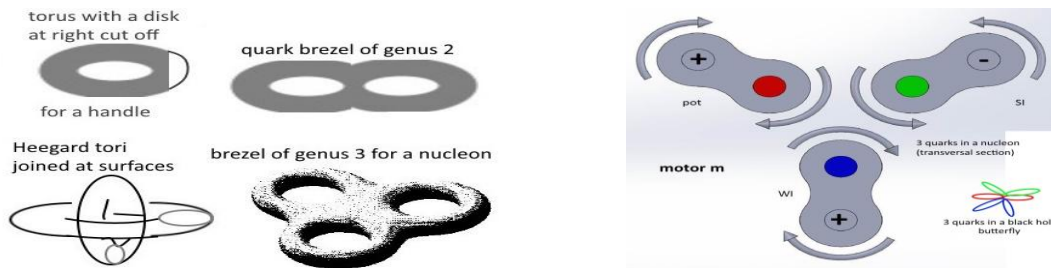


Figure 6 at left the weak interactions Heegard decompositions of the 3-dimensional Hopf sphere for a leptonic torus of genus 1, in the middle a quark brezel of genus 2 and a nucleon brezel of genus 3, at right a transversal section through a nucleon with 3 quarks and at the lower part a black hole nucleon lemniscate butterfly; the *rgb*-graviton is preserved

Postulate E 6 For a deuteron, having two nucleons inside, there is a color charges *cc* Bohr sphere as in the hedgehog figure 5. They are hemispheres, but projective closed to a plane P^2 like the Einstein plane for mass. The planes have energy octonian coordinates $[e_0 = cc, p, q]$ where *q* is a line at infinity and *p* is one energy from EM(pot), *E*(pot) and *E*(heat), *E*(kin), *E*(magn), *E*(rot) for heat, kinetic, magnetic, rotational energies.

They are added as a central vector on the xyz-coordinate axes of the hedgehog and turn on a P^2 Moebius strip by 360 degree rotations their spin-like direction between out/up and down/in for emitting or absorbing the energy from the environments energy by integrations.

The speed for the rotations is between the first and second cosmic speed of the nucleon such that the caps are not escaping. The outer gravity potential field of a nucleon has outer two cosmic speeds, due to the Schwarzschild radius.

Postulate E 7 Collisions of nucleons with other mass systems are described in figure 7 for two protons in the fusion states model. The protons have first their 6 complex energy octonian vectors $e_j, j = 1, \dots, 6$, in three Heisenberg projected planes. The upper proton reverses slowly on a Moebius strip its location and decays one u-quark in this fusion experiment which is above another u-quark. It emits a positron and a neutrino

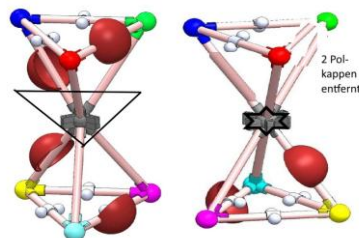


Figure 7 the nucleon triangles are parallel projected in the center, at left a triangle, at right a hexagon; the positron is at left drawn as two caps and removed at right for deuteron

The mass systems collisions are more general occurring for macroscopic matter or treated by the weak interactions bosons decays. In the weak case above one model for the S^3 sphere decay is shown (figure 6). Brezels of different genus are joined and

decompose into two particles. The other cases are often shown by Feynman diagrams or are chaotic or spiralic like the collision of two galaxies where a new world is generated from an intermediately stored and exploding black hole [2].

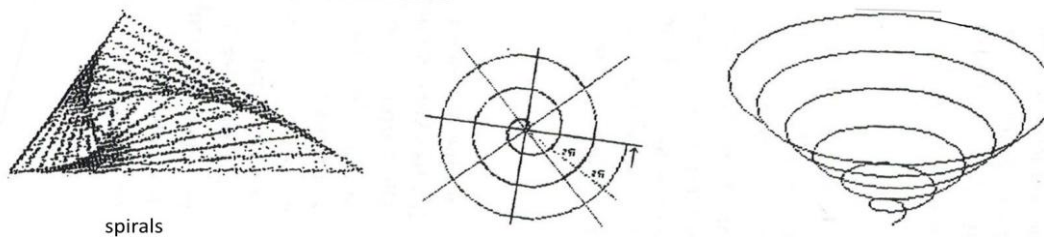


Figure 8 different shapes of spiralic expansions or contractions are shown

Postulate E 8 The spiralic whirls are added for energy presentations especially for quasiparticles

without mass (*rgb*-gravitons and spin for instance), there are three energy characters.



Figure 9 three energy characters for matter, quasiparticles and waves

In this figure is added the case for speed of light. The candela measure is on the last octonian coordinate with its rolled version, a cylinders circle. Energy extends on the cylinders surface as a helix line. One full winding above the circle can be stored as a quantized energy in $E = hf$, but no part. The cylinder is closed at projective infinity by one point to a pinched torus which is shown in the overview of existing models for the MINT-Wigris project [6]. It is for dark energy and a speed inversion at c in $v'v = c^2$ from universes speeds v to the insides dark energy speeds. Two conic whirls are similarly closed by a circle at infinity to a dark whirl presentation in the universe.

They have speed c . The above wave figure applies to them. Its *rgb*-graviton quantum is (similar to a photon or magnetic field quantum) a spin-like quasiparticle whirl.

Beside the fusion in figure 7 where six color charge dimensions are projected down to the three xyz -space dimensions there is a dimensional extension of the quaternionic four spacetime dimensions to octonians with coordinates $e_j, j = 0, 1, \dots, 7$. In a projective blow up *rgb*-gravitons extend the three Pauli 2×2 -matrices to the 3×3 -GellMann λ_j matrices of the strong interaction by inserting a row and column with coordinates 0.

Inside a big heat maybe stored which produces for instance in a black hole explosion background sound, existing in the todays world. A black hole explosion produces first a big heat and an inflation of space. The gravitational waves have been detected and shown the stretching/squeezing action.

Since the diagonal matrices of the third Pauli matrix are linearly dependent, only 8 not 9 dimensions are generated. Octonians have another multiplication than the $SU(3)$ λ_j . The change to octonians is due to the magnetic group, used as symmetry.

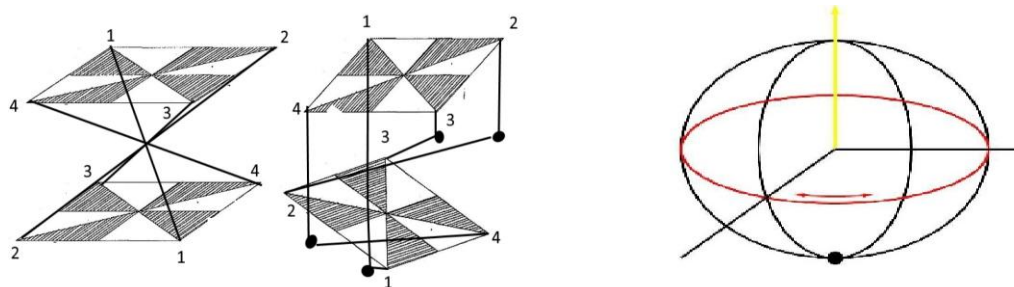


Figure 10 two nucleons are replaced by two magnetic group squares and shifted by 135 degrees for generating from the four spacetime diagonals at left the complex doubled eight octonian coordinates; the quark triangles of figure 7 are replaced; the four vertices are a leptons electrical charge, magnetic momentum, mass, oriented rotational angular speed; at right a Hopf sphere S^2 for the lepton geometry (south pole with mass, charge rotation on a latitude circle cw for -, mpo for +, north pole with spin plus magnetic momentum)

Similar to the Heisenberg couplings in figure 7, the projected 8-edge has a 2-dimensional coupling of the diagonal 1 for the first Pauli matrix as space coordinate x (or radius r) with e_5 mass as in the Heisenberg case, also for 4 time t and frequency e_6 as

inverse time interval, while 2 is for the space coordinate y and complex polar angle ϕ and 3 is for the space coordinate z and the spherical angle θ . time is 4. This change from linear to spherical coordinates is due to the Hopf map for the weak interaction and

leptons. For 2 the new octonian coordinate is e_7 which adds for the electromagnetic interaction EMI the exponential function $\exp(i\varphi)$ and the symmetry $U(1)$. The frequency for EMI is emitted when in S^2 figure the Bohr radius for the lepton charges rotation jumps to another radius because its angular frequency has to fit the circle as known from the Schroedinger matter wave computation. For 3 the new coordinate is e_0 , the compass needle. This is due to the inverse Hopf map as fiber bundle where a point of S^2 is replaced by a leaning circle. The linear z-axis is getting for spin a leaning angle θ towards its positive direction. It is replaced by a general energy measuring unit vector e_0 which generates as G-compass color charge whirls. The vector is also used for two cosine rescalings of the Einstein metrics. For two matter systems P, Q not in gravitational interaction an e_0 vectors angle θ is set between their two e_5 lines, measuring masses m_P and m_Q . If one system acts for the Minkowski metrical rescalings as observer (at rest, for instance) P, the system Q is in motion against P with speed v and the m_Q mass is special relativistic rescaled to the observed new mass $m'_Q = m_Q / \cos \theta$ with $\sin \theta = v/c$, v relativistic speed. For the other coordinates of P, Q the known rules apply, for instance the coordinates (x,t) of P and (x',t') of Q use θ for the Lorentz transformations. There are eight energy measures, listed with indices of octonian coordinates: 0 is for color charge, 1 electrical charge, 2 heat, 3 (4) rotational (magnetic) energy, 5 mass, 6 frequency, 7 candela. Their units are set by the e_0 as vector in the octonian space.

Postulate E 9 Octonians allow new measures for the quantum range. Listed in spin-like orthogonal base triples through coordinate indices they are: 123 for the Pauli spin whirl, 145 for the electromagnetic induction as real cross product of 1,4; 167 for the electro-magnetic interaction having as wave length 1, frequency 6 and a $U(1)$ circle 7 as symmetry, 246 is for the formula *pressure times volume is scaled temperature*, 257 is setting barycenters, 356 is for the SI rotor, 347 is for rotations. The strong $SU(3)$ symmetry allows also such Gleason measuring frames GF: 126 is for *rgb-gravitons*.

They project the first three GellMann matrices down to the corresponding Pauli matrices in space. The $SU(3)$ geometry is a twisted fiber bundle $S^3 \times S^5$ where the factor S^3 is mapped to the Hopf S^3 of the weak interaction. The Hopf map is further projecting spacetime to space coordinates and S^3 to S^2 . A further stereographic projection is to a complex plane for a black holes aggreation disk or other complex (tangent) planes. Concerning the plane $st(S^2) = E$, provide it with normed z_2/z_1 , $z_1 \neq 0$, coordinates. The S^2 north pole for st is $z_1 = 0$. In the Pauli spin matrix notation for Spacetime coordinates, $z_2 = x + iy =$

$r \cdot \exp(i\varphi)$ and $z_1 = z + ict$, t time, xyz -space coordinates. The projection of the nucleon bubble in figure 4 can have E as plane and the boundary S^2 of the bubble moves up or down for the length contraction or expansion, measured in z_2 coordinates of space [4]. The GF list is not complete

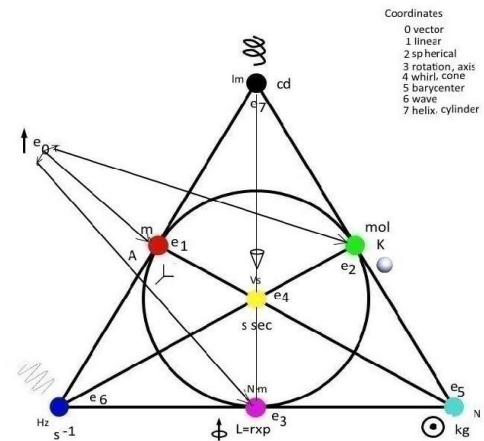


Figure 11 octonians seven GF with an input vector e_0 drawn at left; added are six color charges

Postulate E 10 The *rgb-gravitons* act as central acceleration of mass barycenters B. A measure for distances $|BP| = r$ from B to a rotating system P about B is not symmetric. A GF projective other measure from P to B is $|PB| = r - R_s$, R_s the Schwarzschild radius belonging to B. It is not assumed that this applies to the inner CP^2 space of nucleons.

It is outer for macroscopic matter in a projective geometrical version. Central projections are responsible for the nonlinear scalings. The maps quotient $(r-R_s)/r$ is computed as projective norming. The projective Einstein plane has in octonian extended coordinates 5 and 6 [m,f,u] where m is for mass, f for frequency and u is the P^2 projective line at infinity which is another octonian coordinate. The Einstein line $mc^2 = hf$ is used for the unsymmetric GF measure, located in its affine subplane [m,f,1]. For the radius $r = m$ is chosen, for the other $f = (r - R_s)$ and the projective norming is $[1, \cos \beta = (r-R_s)/r, 1]$ with $\sin \beta = R_s/r$ for a bending general relativistic angle β . (It can be shown for quarks in a cone form by moving the point B on its distance r upwards from the flat triangle and keep the quarks distance to B as $(r - R_s)$ lower on the cone. As a general relativistic curved membran its curvature is computed by the Einstein rescaled Minkowski metric $ds^2 = dr^2/\cos^2 \beta - dt^2 \cdot \cos^2 \beta$).

The macroscopic use of the metrical scaling is for instance observable as the rosette motion of planets P about a central sun Q. The *rgb-gravitons* potential is

here an acceleration for the speed of P which adds after one revolution an additional angle, turning the diameter of the Kepler ellipse as orbit of P. The

Kepler conic sections for planets orbits are obtained as normal projective forms belonging to P^2 .

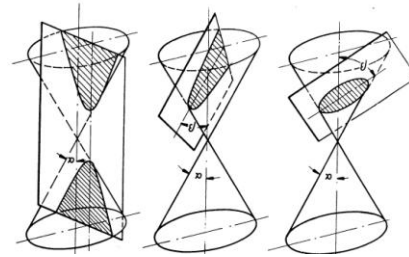
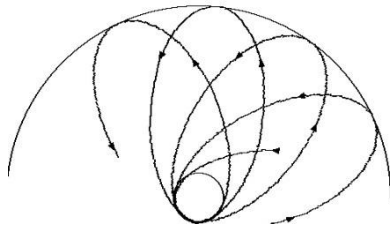


Figure 12 rosette, conic sections for Kepler orbits

Since the Einstein energy-momentum tensor computation for gravity is postulated, the two effects on the electromagnetic interaction need not an explanation. Added is that for the double lensing can be assumed that *rgb*-graviton energy from the mass system where light passes by, at the reflection of light is in this case adding transformed mass energy for a higher frequency. For the redshift a accelerating whirl scaling due to *rgb*-gravitons can change the frequency of light along its world line, its speed *c* is kept constant.

CONCLUSION

In these postulates the MINT-Wigris project is presented. Some macroscopic models which run technically when needed are available as in the last figure, in the former figures 2, 3, 7 or in videos. Suggested is that the Hilbert space use for the quantum range is replaced for gravity through this octonian based model. Projective geometry has to be used, not only affine geometry, finite symmetries are added and the measuring octonian and SU(3) GF triples extend the use of the SU(2) spin triple for space coordinates.

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APPENDIX

<p>G-Compass</p>	<p>Hedgehog</p>	<p>G-Roll Mill</p>	<p>Gluon Exchange</p>
<p>Barycenter</p>	<p>Deuteron</p>	<p>Handicrafts</p>	<p>Dark Mass and Energy</p>