

Gravitational Symmetry, GF Measures and Projective Geometry

*Gudrun Kalmbach**

MINT Verlag, PF 1533, D-86818 Bad Woerishofen, Germany

**Corresponding author: Gudrun Kalmbach, MINT Verlag, PF 1533, D-86818 Bad Woerishofen, Germany, Email: mint-01@maxi-dsl.de*

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Introduction

It is a recent request from science that the new symmetry added to those of the standard model is the group of Moebius transformation acting on a 2-dimensional sphere. In the book [1] the author proposed an octonian space for gravity, linearizing Einstein's general relativity. This is possible by extending the Minkowski 4-dimensional spacetime geometry of physics complex to 8 dimensions. One linear octonian coordinate for electromagnetism is rolled up to a Kaluza-Klein circle and serves for periodic exponential e -function. Geometrically it serves for cylindrical coordinates: lights frequency f expands in time on a helix line on the cylinders surface where one winding represents the quantized energy $E = hf$, h the Plank constant, for a photon. Lights description as complex e -function gives its wave length. Observable is in projection for time dependent waves the real part of the e -function. Taken time derivatives also the waves speed is observable. Its force is measured by the second time derivative. The Kaluza-Klein coordinate is set on the octonian coordinate e_7 , space on the e_1 as x or radius r , e_2 as y or angle φ , e_3 as z or [spherical] angle θ as coordinates. e_4 is a (mostly used scaled with speed of light c) time coordinate.

The loop e_7 acts also as 1-dimensional charge carrier. In projective geometry not only, coordinates can be normed to 1 or 0, but there is also the possibility to change dimensions. If usually mass m as Higgs field is taken for setting a mass scalar it is presented as a point. For particles it can be vectorial expanded as scalar of a force vector, for instance in the linear $p = mf$ or angular momentum $L = r \times p$. As known for magnetic rolled field lines, the north N-south poles are identical on e_7 and get only a vectorial direction as magnetic momentum μ attached to spin at N. These three momenta need separate octonian coordinates: linear frequency expanding with p is the e_6 octonian vector coordinate and e_3 is for (rolled) angular frequency. Since μ is mostly spin attached it is vectorial aligned with time on the octonian e_4 coordinate. In the coordinate description is added a basic energy which for e_1 is electrical EM charge e_0 , for e_2 heat (phonons, stochastic entropy), for e_5 it is mass which can also be set as Schwarzschild radius R_s of a mass system in different dimensions.

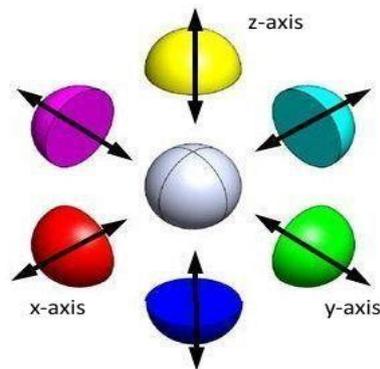
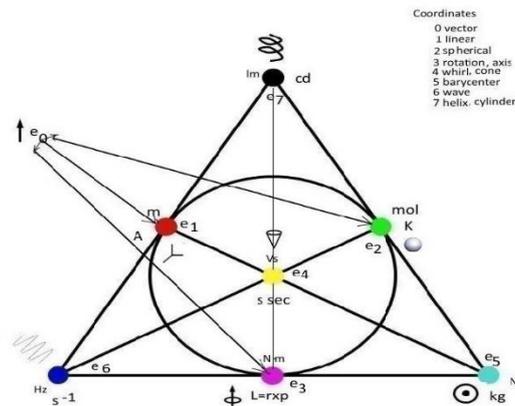
To avoid confusion between EM charges like e_0 , for the last octonian coordinate the index is listed as a vector setting 0 coordinate and this is also used for combinations of coordinates:

beside the MT symmetry group the author introduced in [2] Gleason measures through spin-triple like GF Gleason frames. There are in octonians 7 GF not only spin 123 coordinates. If the strong interaction SI in nucleons generates through the energy exchange between quarks integrations of energy forces to speed vectors or potentials, then 145 is for the known linear independent triple: μ as field crossing a charged EM loop which adds orthogonal induction. This model is taken for the six QCD color charges r,g,b,t,m,y. In the hedgehog the six fields are arranged as 2-dimensional half spheres on a nucleons bounding Riemannian sphere S^2 . The projected linear coordinate pairing is according to the Heisenberg uncertainties: position r , mass m with the momentum p are as r,t color charges on the x -axis; the in-out vectors show that the energy exchange of the nucleon is for them discrete in vector direction; heat and angular rotation frequency are as green magenta g,m on the y -axis and on the z -axis as b,y linear frequency and magnetism.

Beside new measuring GF devices and the MT symmetry the gravity is put on many projections. Important are orthogonal and central projections. In [5] a nucleon or deuteron 2 projection with bounding S^2 sphere can change in a stereographic projection the length between S^2 and the projection complex plane E, deleting the point ∞ in S^2 . This can explain the experimentally found change of length through graviton waves. For this purpose the neutral color charge of nucleons was named a particle *rgb-graviton* whirl which generates the integrating SI cycle of the nucleons 7 GF. The whirl is geometrically a projection where the 3 Pauli matrices are expanded to the first 3 GellMann matrices λ (1,2,3) bordered by a third row and column with coordinates 0. Projective normed is an S^3 sphere of the SI geometry $S^3 \times S^5$ by the complex coordinate $z^3 = (e5.e6)$ to the Hopf spacetime $z^1 = z + ict$, $z^2 = x + iy$ of the geometry for the weak interaction WI or without own energy. The toroidal SI geometry as trivial fiber bundle has a 5-dimensional unit sphere of the complex (z^1, z^2, z^3) SI space. In [4] the author presents a unification of the EM and mass/gravity potentials in a projective 5-dimensional vector space. This is taken in the hedgehog figure as a driving motor POT which has in nucleons the presentation through quarks as particles. The second driving motor SI on the y -axis has gluons as particles and heat transfer through phonons for the energy exchange. These motors run with the same speed and include the linear higher dimensional presentation for general relativity by using *rgb-graviton* whirls. The third driving WI motor on the z -axis has a different speed. This needs the GF rescaling of the u-quark mass which generates a common group speed v for the different WI/SI parts in a deuteron atomic kernel through Minkowski (special) relativity. There are two metrical Einstein rescaling factors: the above Rs for rolled coordinates or as an angle $\sin^2\beta = Rs/r$ and the light cone factor $\sin\theta = v/c$. Both are orthogonal projections for GF measures of x (or r), t , m , f . The WI motor adds through the Hopf geometry for the light cone that it can be closed at infinity to a Horn torus. Its local geometry can have c inverted speed as dark energy inside which moves with speed $v > c$. This is not measurable by Minkowski metric. At R_s as radius is inverted quark or atomic matter to dark matter inside a tiny radius carrying its dark mass energy. Both kinds of energy are assumed in the universe today by astronomy.

The author suggests: look for sponsors such that a scientific MINT-Wigris Academy can be financed in the future where this model is worked out for future use and can replace the last centuries quantum mechanical view. ψ waves are for GFs provided with a measure extending to a wave-whirl-particle character of energies. These measures have a support which replaces probability distributions. Heat cannot reach its support 0, but frequency and mass for instance can be completely transformed in $mc^2 = hf$, they reach their support 0. Neither the old ψ waves

are sufficient to describe today the quantum range nor the use of infinite dimensions. The finite basic states for a deuteron can be described by octonians.



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Preface

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Wigris Song and Vita MINT, PF 1533, D-86818 Bad Woerishofen, Germany, Email: mint-01@maxi-dsl.de

7. GF as octonian Fano lines