Evidence for Strong Short-Range Emergent Hologram Gravity in Rotating Superconductors

The de Matos-Beck (aka MB) gravimagnetic superconducting equations as modified by me are[1]

$$\vec{p} = m\vec{v} + e\vec{A} + m\vec{A}_g \qquad \text{MB (9)}$$

In my theory[2]

$$\begin{aligned} &\vec{A}_g \equiv \left\{ A^a{}_i P_a / m, i = 1,2,3 \right\} \\ &P_a \to \frac{\hbar}{i}\partial_a \end{aligned} \tag{1.1}$$

The four *world hologram* tetrad 1-form fields are

$$e^a = I^a + \left(\frac{1}{N}\right)^{1/3} A^a \tag{1.2}$$

Localizing only the rigid T_4 spacetime translation group to $T_4(x)$ gives the *compensating* spin 1 "Yang-Mills" type Lorentz group vector field 1-form gauge potential "warp" connection

$$A^a = A^a_m dx^m \tag{1.3}$$

$$N \equiv \frac{1}{L_P^2 \Lambda_{zpf}} = \frac{c^3}{\hbar G \Lambda_{zpf}} \sim \frac{10^{66}}{\Lambda_{zpf}}(cgs) \tag{1.4}$$

Only if there is a null geodesic horizon with Bekenstein entropy and Hawking radiation temperature can we use

$$\Lambda_{zpf} \sim \frac{1}{NL_P^2} \tag{1.5}$$

We cannot use this for an arbitrary surface surrounding an interior "volume without volume" holographic image. We can use it for the retrocausal future de Sitter horizon of our pocket universe in the multiverse and for tiny strong-short range Kerr black hole models of hadron "bags" with the "bags" as micro causal horizons. The zero point energy density here is

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[1] gr-qc/0707.1797v1 12 Jul 2007
[2] gr-qc/062022

$$T_{00}(zpf) \sim \frac{c^4}{G_{Newton}} \Lambda_{zpf} = \frac{\hbar c}{N L_P^4}$$
$$N_{deSitter} \sim 10^{122} \rightarrow T_{00}(zpf) \sim 10^{-29} \frac{gm}{cc} \sim \frac{\hbar c}{(10^{-2} cm)^4} \quad (1.6)$$
$$10^{-2} cm \sim \sqrt{10^{28} cm 10^{-33} cm}$$

For Abdus Salam's 1973 f-gravity

$$N_f \sim 10^{66} 10^{-26} = 10^{40}$$
$$T_{00}(f) \sim \frac{\hbar c}{10^{40} L_P^4} \quad (1.7)$$

If leptons and quarks are micro Kerr black hole Bohm hidden variables with horizon scale 10^{-17}cm then $N_{quark} \sim 10^{66} 10^{-34} \sim 10^{32}$. Orders of magnitude for entropy, temperature and excited state lifetimes for no rotation and no electric charge are given by John Baez as[3]

$$S_{Bekenstein} \sim N k_B$$
$$T_{Hawking} \sim surface - gravity \equiv k \sim \frac{\hbar c}{\sqrt{N} k_B L_P} \sim \frac{6 \times 10^{-8}}{\left(\frac{M}{M_{Sun}}\right)} {}^o K \quad (1.8)$$
$$t_{lifetime} \sim 10^{71} \left(\frac{M}{M_{Sun}}\right)^3 \sec$$

However, the surface gravity of a charged rotating Kerr-Newman black hole is more complicated than the above rough estimate:[4]

[3] math.ucr.edu/home/baez/physics/Relativity/BlackHoles/**hawking**.html
[4] en.wikipedia.org/wiki/**Surface_gravity**

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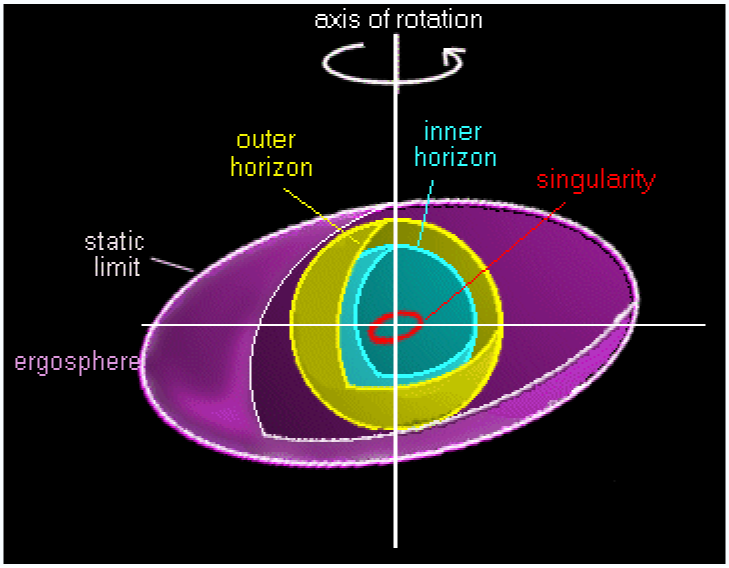
The Kerr-Newman solution



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Picture above is only for Q = 0, i.e., Kerr solution.

The surface gravity for the Kerr-Newman solution is for outer horizon r_+ and inner horizon r_- with the inner ring singularity of infinite 4th rank tensor Weyl curvature

$$\kappa = \frac{r_+ - r_-}{2(r_+^2 + a^2)} = \frac{\sqrt{M^2 - Q^2 - J^2/M^2}}{2M^2 - Q^2 + 2M\sqrt{M^2 - Q^2 - J^2/M^2}},$$

where *Q* is the electric charge, *J* is the angular velocity, we define

$$r_\pm := M \pm \sqrt{M^2 - Q^2 - J^2/M^2}$$

to be the locations of the two horizons and *a* = *J* / *M*.

Therefore, my model for the universal "gravity" slope of the Regge trajectories of the hadronic resonances, is

$$-d^2 \equiv M^2 - Q^2 - J^2/M^2$$
$$\to$$
$$J^2 = M^4 + M^2\left(d^2 - Q^2\right) \tag{1.9}$$
$$\to$$
$$J = M^2\sqrt{1+\frac{\left(d^2 - Q^2\right)}{M^2}} \sim M^2 + \frac{1}{2}\left(d^2 - Q^2\right)$$

Is essentially what I proposed in 1973 "Collective Phenomena" edited by H. Frohlich and F.W. Cummings, which prompted Abdus Salam to invite me to ICTP Trieste (1973-4)

Therefore stable zero temperature and zero entropy[5] ground states of the micro black hole Bohm hidden variables without Hawking radiation obey $d \to 0$ in the convention $\hbar, c, G \equiv 1$

$$J^2 = M^4 - M^2Q^2$$
$$J = M^2\sqrt{1-\left(\frac{Q}{M}\right)^2} \sim M^2\left(1-\frac{1}{2}\left(\frac{Q}{M}\right)^2\right) = M^2 - \frac{1}{2}Q^2 \tag{1.10}$$
$$\frac{Q}{M} \ll 1$$

Violation of this constraint give excited hadronic resonances whose Hawking evaporation temperature determines their finite lifetimes via the blackbody radiation law in this Bohmian toy model.

$$T_{Hawking} \sim k \sim r_+ - r_-$$
$$S_{Bekenstein} \sim r_+^2 - r_-^2 = \left(r_+ - r_-\right)\left(r_+ + r_-\right) \tag{1.11}$$

The connection of tetrads to Einstein's 1916 General R

[5] 3rd Law of Thermodynamics, the 2nd Law of Thermodynamics is enforced by advanced signal retro-causality from the future dark energy de Sitter horizon of our accelerating universe back to the moment of inflation that developed into the hot Big Bang in a cosmic-scale Novikov globally self-consistent loop in time. This also solves misunderstandings about the relationship of Darwinian natural selection to "intelligent design" and "irreducible complexity" that is considered heretical by the politically correct de-facto State Church of Atheism. Jonathan Wells writes about this in his "Politically Incorrect Guide to Darwinism and Intelligent Design", which earned him the prize of "most hated man in America" and no doubt a high crackpot rating by The PC Guardians of Orthodoxy. ☺

$$ds^2 = g_{mn} dx^m dx^n = e^a e_a = h_{ab} e^a e^b$$
$$h_{ab} = \begin{matrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{matrix} \quad (1.12)$$

The Einstein-Hilbert geometrodynamic action for the pure gravity-torsion *exotic dark energy/matter vacuum field* is

$$S_G \sim \frac{c^4}{G_{Newton}} \int_{V^4} * \left(R^{ab} \wedge e^c \wedge e^d + \Lambda_{zpf} e^a \wedge e^b \wedge e^c \wedge e^d \right) \quad (1.13)$$

The Hodge star dual transformation from a p-form to a n-p form is *. The curvature 2-form is

$$R^{ab} = dS^{ab} + S^a{}_c \wedge S^{cb} \quad (1.14)$$

Where the six antisymmetric spin connection 1-forms $S^{ab} = -S^{ba}$, that can include the torsion gap dislocation fields from localizing the Lorentz group obey

$$S^{ab} = w^{ab}{}_c e^c \quad (1.15)$$

Therefore, they are also quantum renormalizable spin 1-vector fields of the Yang-Mills type. Note also that

$$dw^{ab}{}_c I^c + w^a{}_{dc} I^d \wedge w^{cb}{}_e I^e = 0 \quad (1.16)$$

Therefore the disclination defect curvature 2-form field is

$$\begin{aligned} R^{ab} &= dw^{ab}{}_c \left(I^c + N^{-1/3} A^c \right) + w^a{}_{dc} \left(I^d + N^{-1/3} A^d \right) \wedge w^{cb}{}_e \left(I^e + N^{-1/3} A^e \right) \\ &= dw^{ab}{}_c N^{-1/3} A^c + w^a{}_{dc} I^d \wedge w^{cb}{}_e N^{-1/3} A^e + w^a{}_{dc} N^{-1/3} A^d \wedge w^{cb}{}_e I^e \\ &+ w^a{}_{dc} N^{-1/3} A^d \wedge w^{cb}{}_e N^{-1/3} A^e \end{aligned} \quad (1.17)$$

The curvature field has spin 0, spin 1 and spin 2 quantum zero point vacuum fluctuations from virtual scalars, vectors and antisymmetric 2nd rank tensor quanta respectively.

The “Yang-Mills” dislocation torsion gap 2-form field is

$$T^a = de^a + w^a{}_{dc} e^c \wedge e^c \quad (1.18)$$

There are two kinds of spin connection 0-form tetrad rotation coefficients $w^{ab}{}_{c}$ one kind $w^{ab}{}_{c4}$ are redundant non-dynamical objects from localizing 4-parameter T_4. They only give the zero torsion disclination curvature defects in the quantum foam lattice of Einstein's 1916 first historical approximation to the final unified theory. The bubbles $\sim N^{1/6}L_P$ [6] of the scale-dependent "wavelet" surround the point geometrodynamic monopole nodes of the three real Higgs fields where their two relative Goldstone phases are undetermined analogous to the vortex strings when there are only two real Higgs fields with one relative Goldstone phase as in superfluid helium and Type II electrical superconductors. These point nodes are the lattice points of Hagen Kleinert's "world crystal lattice" that is Minkowski spacetime in the IR limit when perfect with no defects. The second class for the true dynamical torsion field $w^{ab}{}_{c1,3}$ come from localizing the 6-parameter Lorentz group of 4D spacetime rotations and they form the Calabi-Yau spaces of superstring theory. It gives both disclination curvature and dislocation torsion gaps.

$$d\left(I^a + N^{-1/3}A^a\right) + w^a{}_{bc4}\left(I^b + N^{-1/3}A^b\right)\wedge\left(I^c + N^{-1/3}A^c\right) = 0 \qquad (1.19)$$

Therefore, the dynamically independent torsion field is only from the localized Lorentz group part

$$T^a = w^a{}_{bc1,3}\left(I^b + N^{-1/3}A^b\right)\wedge\left(I^c + N^{-1/3}A^c\right) \neq 0 \qquad (1.20)$$

The torsion field like the curvature field has spin 0, spin1 and spin 2 quanta. The part involving only the Minkowski tetrads is purely due to the non-geodesic motions of the detectors. Since the contorsion field added to the Levi-Civita connection is a GCT 3rd rank tensor, like the curvature tensor it does not vanish for geodesic detectors the way the purely center-of-mass (COM) non-inertial frame g-forces on the detectors vanish. The Maxwell-Yang-Mills torsion field equations are

$$\begin{aligned} &DT^a = dT^a + w^a{}_{bc}e^b \wedge T^c = 0 \\ &D{*}T^a = {*}J^a \\ &D{*}J = 0 \\ &S_{Torsion} \sim \int_{V^4} {*}(T^a \wedge {*}T_a) \end{aligned} \qquad (1.21)$$

The dominating term in the strong field limit quartic in A^a with coefficient $\sim 1/GN^{4/3}$. Therefore, my strong field limit of the MB equations is

[6] There are exactly N quantum foam bubbles surrounded by a closed surface of N quanta of Planck area ~ 10-66 cm2. The closed surface has no boundary, but is itself not a boundary because of the interior monopoles that are like the poles of a complex function in the complex plane whose contour integrals are given by the residue theorem. This homology/cohomology of quantized Bohr-Sommerfeld deRham integrals of nonexact closed forms over non-cycles generalized complex analysis to n-dim manifolds over any algebraic field.

$$\vec{\nabla}\cdot\vec{g}\approx -4\pi G N^{4/3} m\left|\Psi_{sc}\right|^2-\Lambda_{zpf}V_g \quad \text{MB (20)}$$

"Gauss's law" where $\vec{g}$ is the analog to the electric field. It is the g-force measured by a off-geodesic LNIF detector. It transforms to zero in a geodesic LIF because of the equivalence principle. The superconductor macroquantum ground state ODLRO Landau-Ginzburg local order parameter is Ψ_{sc}. The exponent 1/3 is the world hologram effect of "Volume without volume", i.e. 3D space is a holographic image from a 2D horizon that has Bekenstein entropy and Hawking temperature and which lies in our future for the large-scale structure of our pocket universe. V_g is Newton's gravity potential energy per unit test particle mass that in 1916 General Relativity in the weak field slow-speed Galilean relativity limit obeys the Poisson equation

$$\begin{aligned}&\nabla^2 V_g = 4\pi G\rho\left(1+3w\right)\rightarrow 8\pi c^2\Lambda_{zpf}\\&w = p/\rho c^2 \rightarrow -1\left(zpf\right)\end{aligned} \qquad (1.22)$$

$$\vec{\nabla}\cdot\vec{B}_g \sim \rho_{g-monopole} \quad \text{(MB21)}$$

My theory has gravity monopoles where the three vacuum Higgs fields all vanish so that their two relative Goldstone phases in the vacuum manifold are undefined at these point nodes in ordinary space. There are N gravity monopoles in the interior of a closed surface that has N area bits $L_P^2 \sim 10^{-66}cm^2$. Each monopole node is in center of a quantum gravity foam bubble $N^{1/6}L_P$ across.[7] This is ~ 1 fermi in our universe ~ 10^{28} cm across, $N \sim 10^{122} BITS$ as *super-determined retro-causally from the future* de Sitter horizon of our dark energy dominated accelerating pocket universe on the cosmic landscape of the multiverse[8] populated by eternal chaotic inflation. However, retrocausality is how advanced consciousness metric engineers its own congenial pocket universes in a Novikov globally self-consistent loop in time. This over-rides Darwinian natural selection, which is still there of course as background creative noise.

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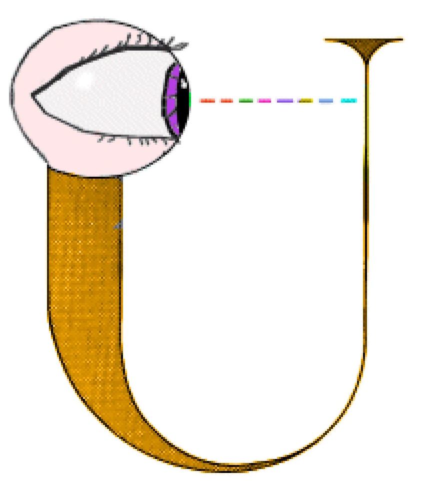
[7] Y. J. Ng & H. van Dam, gr-qc/0209021v1

[8] B.J. Carr "Universe or Multiverse?" (Cambridge, 2007) http://www.fourmilab.ch/fourmilog/archives/2007-08/000879.html (J. Walker)



$$\vec{\nabla}\times\vec{g} = -\frac{\partial \vec{B}_g}{\partial t} \quad \text{MB (22)}$$

"Faraday's law" of gravi-electric induction (motor/generator)

$$\vec{\nabla}\times\vec{B}_g \approx -\frac{4p\,GN^{4/3}}{c^2} m\left|\Psi_{sc}\right|^2 \vec{v}_{sc} + \frac{1}{c^2}\frac{\partial \vec{g}}{\partial t} - \Lambda_{zpf}\vec{A}_g \quad \text{MB (23)}$$

"Ampere's law" with "radiation" Maxwell displacement current. The physical dimensions of the gravimagnetic "vorticity" field $\vec{B}_g$ are 1/time same as rotational frequency.

$$B_g \approx B_g(0)e^{-\sqrt{\Lambda_{zpf}x^2}} + 3w\frac{4p\,GN^{4/3}m\left|\Psi_{sc}\right|^2}{c^2\Lambda_{zpf}} \quad \text{MB (25)}$$

Using Abdus Salam's f-gravity that gives correct universal Regge slope of hadronic resonances, that I showed way back in 1973, for rotating Kerr black holes as Bohm hidden variables, requires

$$\Lambda_{zpf}(f) \sim \left(\frac{1}{10^{-13}cm}\right)^2 = 10^{26}cm^{-2} \qquad (1.23)$$

$$\left(N_f\right)^{4/3} \sim \left(10^{66}10^{-26}\right)^{4/3} \sim 10^{62} \qquad (1.24)$$

$$\frac{Gm}{c^2} \sim 10^{-52}cm \qquad (1.25)$$

$$3w\frac{4p\,GN^{4/3}m\left|\Psi_{sc}\right|^{2}}{c^{2}\Lambda_{zpf}}\sim 3w\frac{4p\,10^{-52}10^{62}\left|\Psi_{sc}\right|^{2}}{\left(10^{-13}\right)^{-2}}\sim 12wp10^{-16}\left|\Psi_{sc}\right|^{2} \qquad (1.26)$$