

This Theory Is Zero

Abstract: All QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues. All mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So here we simply **postulate0** “ $z=zz+C$ eq1 implies *real#0*” (C constant so $\delta C=0$, $z=zz$ needed for the multiplicative properties of 0. See math* appendix M3) implying a rational Cauchy *sequence* with limit 0 thereby doubling as an *iteration* of eq1 in $\delta C=0$ that gives the (fractal)Mandelbrot set. Also plugging eq1 directly into $\delta C=0$ gives the Dirac eq. and so fractal(scales $10^{40N} \times C_{M=N=0}$, fig1) *real* eigenvalues of a *generally* covariant generalization of the Dirac equation(Newpde) that does not require gauges, clearly a major discovery as shown in fig2

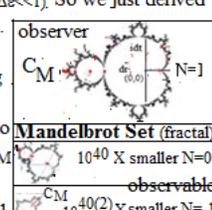
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* Plugging $1=1+0$ consecutively into $1=1X1$ thereby *defines* ring relation $1X0=0$ and $0X0=0$ so list $1=1X1$ -**define** symbol $z=zz$ gives the *multiplicative properties of 0* such as $1X0=0$ +C is needed for the *addition* of constants (so $\delta C=0$) in the ring-field such as $1=1+0$ in $z=zz+C$ eq1. The rest of “list number-*define* symbol” replacement of ring-field axioms with single simple axiom postulateo is in appendix M3.

Summary: So **postulate0** (ie “ $z=zz+C$ eq1 implies *real#0*”) also derives math including δC . So can plug $z=1+\delta z$ into eq1 and get $\delta z+\delta z\delta z=C$ (3) so that $\frac{-1\pm\sqrt{1^2+4C}}{2}=\delta z\equiv dr+i dt$ (4) for $C<-1/4$. So C is complex. But the definition of *real0* $\equiv z_0$ implies that Cauchy sequence “iteration” so requires

I **Plugging the eq1** rel *iteration* ($z_{N+1}-z_N z_N=C$) into $\delta C=0$ implies $\delta C=\delta(z_{N+1}-z_N z_N)=\delta(\infty-\infty)\neq 0$ for some C. The Cs that result instead in finite $z_{\infty S}$ (so $\delta C=0$) define the **Mandelbrot set** in fig1 whose lemniscate continuity (11) along $dr\approx dR$ is required by the derivative in $\delta C\equiv (\partial C/\partial R)dR=0$ with its max extremum jump at $C_M=-1.75$ (at <http://www.youtube.com/watch?v=0jGaio87u3A>) where there is the (new Mandelbrot set lemniscate fractal scale fig1 shapes $C=C_M 10^{xN}$ with C_M that postulated constant) $0=(\partial C/\partial r)(dr)=dC_M 10^{40N}$ largest x given that elsewhere $x<40$ (M5). Eg for huge Nth fractal scale $|\delta z| \gg 1/4$. So extreme $-1/4, -1.75$ solve $\delta C=0$. Thus our rational Cauchy sequence is iteration $z_{N+1}-z_N z_N=C=-1/4, -3/16, -55/256, \dots 0$. So **0** is a *real* number QED.

II **Plugging eq1** directly into $\delta C=0$ is also required. So given eq1 and thus equations 3,4 $\delta C=\delta(\delta z+\delta z\delta z)=\delta\delta z(1)+2(\delta\delta z)\delta z\approx\delta(\delta z\delta z)=\delta((dr+idt)^2)=\delta[(dr^2-dt^2)+i(dr dt+dtdr)]=0$ = (5) **Minkowski metric** +**Clifford algebra** \equiv **Dirac equation** (See eq7a γ^μ derivation from eq5.). But (N=0, 2D) $\delta\delta z1$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1 2D) independent Dirac dr implying 2D Dirac+2D Mandelbrot=4D Dirac **Newpde** $\equiv\gamma^\mu(\sqrt{\kappa_{\mu\nu}})\partial\Psi/\partial x_\mu=(\omega/c)\Psi$ for ν, e ; $\kappa_{00}=e^{(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$; $r_H=C_M/\xi=e^2 X 10^{40N}/m$ (fractal jumps N= . -1,0,1..) $\Delta\varepsilon\equiv m_e c$, $\varepsilon=\mu$ are zero if no object B (appendix B, C).

Spherical Harmonic Solutions to Newpde: $2P_{3/2}, 1S_{1/2}, 2S_{1/2}$ at $r=r_H$ since Stable $2P_{3/2}$ at $r=r_H$	
<p>N=0 at $r=r_H$ $2P_{3/2}$ $3e$ baryons (QCD not required) Hund's rule $1S_{1/2}, 2S_{1/2}$ leptons (Koide) 4 SM Bosons from 4 axis extreme rotations of e, ν N=-1 (i.e., $e^2 X 10^{-40} \equiv G m_e^2$). κ_{ij} is then by inspection the Schwarzschild metric g_i (For $N=-1, \Delta\varepsilon \ll 1$). So we just derived General Relativity(GR) and the gravity constant G from Quantum Mechanics(QM) in one line. N=1 Newpde zitterwegung expansion stage is the cosmological expansion. N=1 Zitterbewegung harmonic coordinates and Minkowski metric submanifold (after long time expansion) gets the DeSitter ambient metric we observe. N=0 The third order Taylor expansion(terms) in $\sqrt{\kappa_{ij}}$ gives the anomalous gyromagnetic ratio and Lamb shift <i>without</i> the renormalization and infinities. So $\kappa_{\nu\nu}$ provides the general covariance of the Newpde. So we got all this physics by mere inspection of this Newpde with no gauges!</p>	
fig1	

Conclusion: So by merely *postulating 0*, out pops the whole universe, no more, no less, BOOM! easily the most important discovery ever made or that will ever be made again.

Factor real eq5

$$\delta ds = 0$$

Next factor real eq.5: $\delta(dr^2-dt^2)=\delta[(dr+dt)(dr-dt)]=0=[[\delta(dr+dt)](dr-dt)]+[(dr+dt)[\delta(dr-dt)]]=0$ (6)
 so $-dr+dt=ds, -dr-dt=ds \Rightarrow ds_1 (\rightarrow \pm e)$. Squaring & eq.5 gives circle in e, v (dr, dt) 2nd, 3rd quadrants (7)
 & $dr+dt=ds, dr-dt=ds, dr \pm dt=0$, light cone ($\rightarrow v, \bar{v}$) in same (dr, dt) plane fig3 1st, 4th quadrants (8)
 & $dr+dt=0, dr-dt=0$ so $dr=dt=0$ (in eq.11) defines vacuum (while eq.4 derives space-time) (9)
 Those quadrants give *positive* scalar $drdt$ in eq.7 (if *not* vacuum) since also, given the Mandelbrot set C_M (Here at $-1.75=C_M$). C_M iteration definition, implies $\delta z \neq 0$. This then implies the eq.5 *non* infinite 0 extremum for **imaginary** $\equiv drdt + dt dr = 0 \Rightarrow \gamma^i dr^j dt + \gamma^j dt^i dr = (\gamma^i \gamma^j + \gamma^j \gamma^i) drdt$ so $(\gamma^i \gamma^j + \gamma^j \gamma^i) = 0, i \neq j$ (from real eq5 $\gamma^i \gamma^i = 1$) Thus from eqs5: $ds^2 = dr^2 - dt^2 = (\gamma^r dr + i \gamma^t dt)^2$ (7a)

QM Operators

We square eqs.7 or 8 $ds_1^2 = (dr+dt)(dr+dt) = (-dr-dt)(-dr-dt) = [dr^2 + dt^2] + (drdt + dt dr)$
 $\equiv ds^2 + ds_3 = \text{Circle} + \text{invariant}$ (10). **Circle** $= \delta z = dse^{i\theta} = dse^{i(\Delta\theta + \theta_0)} = dse^{i((\cos\theta dr + \sin\theta dt)/(ds) + \theta_0)}$, $\theta_0 = 45^\circ$
 min of $\delta ds^2 = 0$ given eq.7 constraint $dr+dt=ds$. We define circle (ds radius) normalized dimensions $k \equiv dr/ds, \omega \equiv dt/ds, \cos\theta \equiv r, \sin\theta \equiv t. dse^{i45^\circ} = ds'$ (eg., normalized with ds and so unitless $r \propto$ real r as in meters, feet). Take the ordinary derivative with respect to this unitless real dr (since flat space) of this 'Circle'.

$$\frac{\partial \left(dse^{i\left(\frac{rdr}{ds} + \frac{tdt}{ds}\right)} \right)}{\partial r} = i \frac{dr}{ds} \delta z \text{ so } \frac{\partial (dse^{i(rk+wt)})}{\partial r} = ik\delta z, k\delta z = -i \frac{\partial \delta z}{\partial r} \quad (11)$$

$\delta z \equiv \psi$. Actual upper real limit to set C (eq3) is a tiny negative 'dr' value added to $-1/4$, so not exactly $-1/4$. (ie., $-1/4 > C$ not $-1/4 \geq C$ for eq4). Thus in eq4 Newton quotient $\lim_{dr \rightarrow 0} dr/ds = 1$ so dr is real as a limit only. So we proved that *dr is a real number*. So **$k = dr/ds$ is an operator in eq.11 with real eigenvalues** dr/ds since eq.11 implies k is an observable defining p/\hbar . Also since $\delta z = \cos kr$ then k has to be $2\pi/\lambda$ thereby deriving the DeBroglie wavelength λ . Also eq.11 with integration by parts implies $\langle p_r \rangle^* = \int (p_r \psi)^* \psi d\tau = \int \psi^* p_r \psi d\tau = \langle p_r \rangle$ and $\int \psi_a p \psi_b d\tau \equiv \langle a|p|b \rangle$ in Dirac bra-ket notation. Therefore $p_r = \hbar k$ is Hermitian given dr is *real* which it is.

IIa) Eq5 Minkowski Metric implies Lorentz transformations(9)

Recall eq.5 with its Minkowski metric ($ds^2 = dr^2 - dt^2 = dr^2 - 1^2 dt^2 = dr^2 - c^2 dt^2$). eq8 v is the light cone making natural unit $1 = c = dr/dt$ is always a coefficient **1** of dt and so invariant with respect to changes in dt and dr given ds invariance in eq.5 for flat space (See sect C4 for Mandelbrot set $\delta z \approx C$ curved space perturbation eq.16) **further implying reference frame Fitzgerald contractions $1/\gamma$** (Lorentz contraction) $\delta z' = \delta z/\gamma$ boosted frame of reference for **$N=0$ observables**. Note for **observables $N=0$** (so small) equation 3 extremum $\delta z \approx C$. So

$$C \approx \delta z/\gamma \equiv C_M/\xi = \delta z' \quad (12)$$

given γ having the same Lorentz γ transformations as mass ξ does.

So C_M defines charge e^2 . ξ defines mass $= mc^2$. From eqs.3,12 for $N=0$ small $C \approx \delta z = \delta z/\gamma = dr/\gamma = pds/\gamma$. If $p = mdr/ds = mv$ then $C = \delta z/\gamma = dr/\gamma = pds/\gamma = pds/m = (mdr/ds)(ds/m) = dr'$ the Lorentz contracted dr and so we have shown that for eq12 k mass $\hbar k = p = mv$. Recall $z = 1 + \delta z$. So for no noise $C=0$ (IIC). So $z = zz$ for $z=1,0$ electron ($\psi \equiv \delta z = -1$) or no electron ($\delta z = 0$). Thus:

$\delta z = -1, z=0$: So $\delta C_M = \delta(\xi \delta z') = \delta \xi \delta z' + \xi \delta \delta z' = 0$ so if **$\delta z' \approx -1$** , $\delta \xi$ is **tiny** so stable, electron
 $\delta z = 0, z=1$: So $\delta \xi \delta z' + \xi \delta \delta z' = 0$. So $|\xi|$ is big and $\delta \xi$ is big so unstable $6e$ (eg., that $D = \xi = \tau + \mu$) (13).
 Note $N=0$ (micro, subatomic) we need **small** $C \approx \delta z$ for free particle observables $N=0$ in fig1 so eq.12 $C \approx C_M/\xi$ so this large ξ $6e$ (eg., that $D = \xi = \tau + \mu$) is in $C \approx \delta z/\gamma \equiv C_M/\xi = \tau_H$ (14)

thereby making free electrons point like particles since r_H is thereby so small. We extend eq14 to apply to new complex extreme constraints (eg slits) in section IIIC that instead requires big C to be the particles. For $2P_{3/2}$ at $r=r_H$ the ground state Newpde particle is just e so small $\xi=m_e$ as an internal unobservable so not requiring small C. But from the outside it looks like (is observable as) big ξ anyway (since $\gamma=917$). From the frame of reference of the only possible observer(s) the +e, the central electron has a (big Δp) $\gamma=917$ so its Δr uncertainty in $\Delta r \Delta p \approx \hbar/2$ is very small See PartII (Assumed $\delta\delta z$ is small here: see eq15 for large $\delta\delta z$ implications.).

$\delta\delta z = \delta_t \delta z$ implies Hamiltonian in eq.11

Also in $\delta C = \delta(\delta z + \delta z \delta z) = \delta\delta z + \delta(\delta z \delta z)$ so that if (from eq.11)

$$\delta(\delta z)/dt \equiv \delta_t(\delta z)/dt = (\partial(\delta z)/\partial t) dt/dt = H \delta z = \text{energy} X \delta z \quad (15)$$

implying large $\delta ds^2 = 0$ axis extreme rotations (high energy COM collisions) as well in eq16 (appendix C) below. Also recall that observer fractal scale $N=1$ (where $\delta z \gg 1$) is not normalizable but as we saw observable (fig1) $N=0$ is normalizable (eg., $\delta z = -1$ electron) implying Bohr's $-1 * -1 = \delta z * \delta z = \psi * \psi = 1$ probability density for electron (so it's not a postulate anymore).

Eq.7 $dr+dt=ds$ $N=0,-1$ fractal scale δz perturbation also gives the general covariance of κ_{ij}

That Leap Frog effect (here $N=-1 \rightarrow N=1$, B5,IIIId) means $N=-1$, given it is summed to get $N=1$, is actually a large perturbation. So we must also use the eq7 fractal scale perturbation $N=-1$ in eq16. Large curvature with $N=-1$ (in fig 1) then from eq3 $\delta z \delta z \ll \delta z \approx C$ so requires an additional 2D δz variation around the light cone of eq.7 but now constrained by those $\delta C=0$ circle ds extreme at 45° of course(eq10). But ($N=0, 2D$) $\delta\delta z$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the ($N=1$ 2D)_independent Dirac dr and so $2D+2D=4$ dimensions. Recall the required $N=-1$ tiny $C \approx \delta z$ must be a perturbation (giving large curvature general covariance of eq.17-19.) of the $N=1$ eq.7 $= \delta z' + \delta z = (dx_1 + idx_2) + (dx_3 + idx_4) \equiv dr + idt$. But given $\delta z \approx dr \approx dt$ at 45° we must add and subtract $\delta z'$ in eq7:

$$(dr - \delta z') + (dt + \delta z') \equiv dr' + dt' = ds \quad (16)$$

with $\delta z' = C_M/\xi \equiv (2e^2/m_e c^2) 10^{40N} = r_H 10^{40N}$ with (Small scale seen from larger scale as 'dr' is big on that smaller scale 'r') $dr \approx r$ on $N=0$ for $N=1$ ($10^{40}X$ larger) observer. Define from eq.16 dr, dt' :

$$\kappa_{rr} \equiv (dr/dr')^2 = (dr/(dr - \delta z'))^2 = 1/(1 - r_H/r)^2 = A_1/(1 - r_H/r) + A_2/(1 - r_H/r)^2 \quad (RN) \quad (17)$$

The partial fractions A_i can be split off from RN and so $\kappa_{rr} \approx 1/[1 - r_H/r]$ in $ds^2 = \kappa_{rr} dr'^2 + \kappa_{oo} dt'^2$ (18)

Given eq5 $\delta(dr dt + dt dr) = \delta(2 dt dr) = 0$ therefore $dr' dt' = dr dt = \sqrt{\kappa_{rr}} dr' \sqrt{\kappa_{oo}} dt'$ so $\kappa_{rr} = 1/\kappa_{oo}$ (19)

Note here $N=-1$ gravity thereby creates 4D curved space time $\delta z'$ and so the equivalence principle: we really did derive GR, all of it.

$2D+2D=4D$ (due to $\delta\delta z$ term in (from eq3) $\delta C = \delta(\delta z + \delta z \delta z) = \delta\delta z + \delta(\delta z \delta z)$)

But ($N=0, 2D$) $\delta\delta z$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the ($N=1$ 2D)_independent Dirac dr implying a $2D+2D=4D$. Thus in $\delta z' + \delta z = (dx_1 + idx_2) + (dx_3 + idx_4) \equiv dr + idt$ so with $x_1, x_2, x_3, x_4 \rightarrow (dr, dt) \rightarrow x, y, z, t$. So (eq 7a) $dr^2 - dt^2 = (\gamma^x dr + i\gamma^y dt)^2$ applies so dr can point in the direction of any dx_i (eg., $dx^2 - dt^2 = (\gamma^x dx + i\gamma^y dt)^2$). Note also that all dx's are squared and add to $-dt^2$ and making these conditions exactly equivalent to $dr^2 \equiv dx^2 + dy^2 + dz^2$ *with* $\gamma^i dr = \gamma^x dx + \gamma^y dy + \gamma^z dz$ with $\gamma^i \gamma^j + \gamma^j \gamma^i = 0, i \neq j, (\gamma^i)^2 = 1$ in $(\gamma^x dr + i\gamma^y dt)^2 = (\gamma^x dx + \gamma^y dy + \gamma^z dz + \gamma^t idt)^2 = dx^2 + dy^2 + dz^2 - dt^2 = ds^2 = dr^2 - dt^2$. Thus we have derived the well known 4D Clifford algebra Dirac γ matrices. So the Dirac equation is what gives us our 4D space-time degrees of freedom imbedded in merely that Mandelbrot set 2D complex plane with the r changes in eq17 and time providing the two (holographic, eq.D2) 'phase' exponent changes in

the Hamiltonian H in $\psi=e^{iHt/\hbar}$ mimicking higher dimensionality effects for a Dirac lepton observer! Us! But we must still incorporate those $N=-1$ fractal scale δz perturbation equations 17-19 in $\kappa_{\mu\nu}$ we get $(\gamma^x \sqrt{\kappa_{xx}} dx + \gamma^y \sqrt{\kappa_{yy}} dy + \gamma^z \sqrt{\kappa_{zz}} dz + \gamma^t \sqrt{\kappa_{tt}} dt)^2 = \kappa_{xx} dx^2 + \kappa_{yy} dy^2 + \kappa_{zz} dz^2 - \kappa_{tt} dt^2 = ds^2$. Multiply both sides by \hbar^2/ds^2 and $\delta z^2 \equiv \psi^2$ (since lemniscate extremum $C=-2$ is harmonic) use eq.11 inside brackets () and use object A and B perturbation appendix eqs A10 and B3 and get the 4D QM **Newpde** $\equiv \gamma^\mu (\sqrt{\kappa_{\mu\mu}}) \partial \psi / \partial x_\mu = (\omega/c) \psi$ for $e, \nu, \kappa_{00} = e^{i(2\Delta\varepsilon/(1-2\varepsilon))} - r_H/r, \kappa_{rr} = 1/(1+2\Delta\varepsilon - r_H/r),$ (20) $r_H = C_M/\xi = e^2 \times 10^{40N}/m$ ($N = -1, 0, 1, \dots$), $\Delta\varepsilon = 0$ for neutrino ν and $N=-1$ or no object B (eq.24, B2).

So **Postulate(0)** \rightarrow **Newpde**

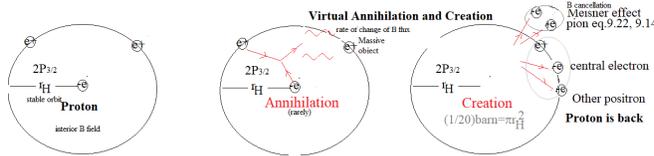
III) Solutions To The Newpde

z=0 Newpde N=0 stable state $2P_{3/2}$ at $r=r_H$ (baryons) implying also $2S_{1/2}, \tau; 1S_{1/2}, \mu$ and associated Schrodinger equation $\tau + \mu + e$ proper mass limit (Kiode)

The only nonzero proper mass particle solution to the Newpde is the electron m_e ground state. At $r=r_H$ the only multiparticle *stable* state is the $2P_{3/2}$ **3e** state = reduced mass = $p = Kiode/2$

IIIa Stability (bound state) of $2P_{3/2}$ at $r=r_H$

At $r=r_H$, we have *stability* ($dt'^2 = \kappa_{00} dt^2 = (1 - r_H/r) dt^2 = 0$) since the dt' clocks stop at $r=r_H$. After a possible positron (central) electron annihilation that 2γ ray scattering can be only off the 3^{rd} large mass (in $2P_{3/2}$) the diagonal metric (eq.17) E&M time reversal invariance is a reverse of the γ ray pair annihilation with the subsequent e^\pm pair creation inside the r_H volume given $\sigma = \pi r_H^2 \approx (1/20)$ barn making it merely a virtual creation-annihilation event (Sect.9.10). So our $2P_{3/2}$ composite **3e** (proton = $P = D/2$) at $r=r_H$ is the *only* stable multi e composite. Also see PartII.



IIIa) For $2P_{3/2}$ ground state $3m_e$ representation

the interior curved space ultrarelativistic nature of $2P_{3/2}$ at $r=r_H$ allows for *only* a 2 positron $2m_e$ and one central electron bound state allowing for a reduced mass representation of the 2 positron bound state eq.7.1. $D/2 = m_p$ with very high γ ($=917$) due to B field flux (BA)

quantization = $mh/e = 3h/e$ for SP^2 (PartII). The 2^{nd} pair creation (top one in the above diagram) gives the zpe emf of eq.9.22 partII as a Faraday's law result of these resulting rapid B field changes and so required zpe Meissner effect (the pion cloud origin of the Yukawa nuclear force).

Also in the frame of reference of these two positron (*only*) observers the central electron is also ultrarelativistic, so heavy, and so with a tiny Δx uncertainty and so it easily fits inside r_H .

Comparison with QCD

The Newpde $2P_{3/2}$ **trifolium** 3 lobed, **3e**, state at $r=r_H$ the electron **spends 1/3 of its time in each lobe** (fractional $(1/3)e$ charge), the **spherical harmonic lobes can't leave** (just as with Schrodinger eq (asymptotic freedom), we have **P wave scattering (jets)** and there are **6 P states (udsctb)**. The two e positrons must be ultrarelativistic (due to interior B flux quantization, so $\gamma=917$) at $r=r_H$ so the **field line separation** is Lorentz contracted, **narrowed** at the central electron **explaining the strong force** (otherwise **postulated by qcd**). Thus the quarks are merely these individual $2P_{3/2}$ probability density **stationary lobes** explaining also why **quarks appear nonrelativistic**.

But note these purely mathematical lobes don't leave but the electron physical objects *can* leave so QCD must fail at very high energies ($>> 1 \text{ GeV}$ ~ bound state), which it does (see LHC Totem data). Thus these detailed calculations of QCD work as long as this connection to the

above Newpde $2P_{3/2}$ state holds, thus when the Gev level $2P_{3/2}$ at $r=r_H$ bound state electrons stay in these lobes.

So the bottom line is that protons are just 2 Newpde positrons and an electron in $^2P_{3/2}$ at $r=r_H$ states. We simply must throw away QCD as quickly as possible, adding all these unnecessary (qcd) postulates to physics is nonsense.

IIIb) $10^{40}X$ scale jump between $N=1, N=0$ with 10^{80} electrons in between

The Mandelbrot set fig1 (“snow man shape”) lemniscate (appendix M5) continuity along $dr \approx dR$ is required by the derivative in $\delta C = (\partial C / \partial R) dR = 0$. The $\partial C / \partial R = 0$ extremum solution is at $C = C_M = -1.75$ given that is where the maximum fractal scale(13) jump $10^{40N} X C_M$ is as we see in the zoom: <http://www.youtube.com/watch?v=0jGaio87u3A> which explores the Mandelbrot set interior near the tiny limaçon near that -1.75 point (see app M5). Since this much smaller object is exactly selfsimilar to the first at this point inside the Lemniscate we can simply reset the zoom start at such extremum $S_N C_M = 10^{40N} C_M$ in appendix D3 and eq.20. In any case the splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So $3^{2.7 \times 62} = 10^N$ so $172 \log 3 = N = 80$. So there are 10^{80} splits. So there are about 10^{80} splits per initial split. But each of these Mandelbrot set -1.75 points is a $C_M / \xi \approx r_H$ in electron (eq.10 above). So for each larger electron there are **10^{80} constituent electrons**. Note there is a 75% chance of us being inside of one of these $N=1$ fractal 10^{80} electrons which itself is inside that stable composite $3m_e$ $2P_{3/2}$ at $r=r_H$ objects (proton). See appendix B and partII. Also the scale difference between Mandelbrot sets as seen in that -1.75 zoom is about 10^{40} , **the scale change** between the classical electron radius $r_H = 10^{-15}m$ and cosmological horizon $r_H = 10^{11}ly$

Single field but observed from different frames of reference

These fields on the different fractal scales **are really all the same** field but seen from the different frames of reference created by the different fractal $10^{40N}X$ jump mass contributions to the zitterbewegung frequency oscillation frames of reference of the Newpde. Thus the fields from consecutive fractal scales have to be the same at the weak asymptotes (eg., $g_{00} = \kappa_{00}$ locally in the halo (partIII) and homogenous Mercuron (B5) which then connects, “bridges”, $N=0$ to $N=1$, see partIII or bottom of appendix B). This is certainly then a true “unified field”.

The $10^{40}X$ scale jump and 10^{80} number jump imply Leapfrog effect for fractal scale masses

A second implication of this 10^{80} jump $= M_1$ in mass $M_1 m_e$ is that $N_1 = 10^{-40} X 10^{80} = 10^{40} X$ scale jump $= (N_1) r_e = 2G(M_1 m_e) / c^2$ which is also consistent with the $N=0$ fractal scale charges contributing nothing to re (through the coupling G) by canceling out to one (or 0) left over so implying a “leap frog” effect where the $N=1$ scale M is composed of the $N=-1$ scale M ($N+1$ mass composed of $N-1$ mass). For us ($N=0$) this means masses M always attract (given eq.17-19) and charges e might cancel out and so their e^2 sources might or might not cancel and so implying possible repulsion (and attraction). Note $N=0$ thereby also leapfrogs to the $N=2$ fractal scale, etc.,

N countable 10^{80} electron masses (QM observables) in the Mercuron (appendixA) frame of reference is the “quantization of the field” Each of these zoomed 10^{80} objects is $-1.75 = C_M$, -1/4 equation 5 extremum is on the lemniscate so is a Newpde $N=0$, $z=0$ e, ν eigenstate $\delta z \approx \psi$. Note from appendix C the (SU(2)) rotation from 4th ν to 1st $\tilde{\nu}$ quadrant (AppendixC4) is the (Maxwell eq γ) and of course the (U(1)) is the Dirac eq. electron e (so a SU(2)XU(1) exponent rotation (in C1A) in eq.16) with both having the same ds in fig4. Recall from sect 1 at 45° $dr = dt$ and $dr + dt = ds$ for both e

and v so for (observables) operator $\left(\frac{dr+dt}{ds}\right) \delta z = \left(\frac{ds}{ds}\right) \delta z = (1)\delta z$. And so we counted to 1 real eigenvalue for each δz . But recall $\frac{dt}{ds} = \omega$ in eq. 11 so $\frac{dt}{ds} \delta z = H\delta z = E\delta z = \hbar\omega\delta z$. Note 1 $\hbar\omega$ per one δz solution state in the Newpde. So the number of ways W of filling g_i single Newpde spin $1/2$ states with n_i particles is $W=g_i!/(n_k!(g_i-n_i)!)$. ($1/2+1/2=1$, $1/2-1/2=0$ states have no such above restrictions so BE statistics). You take a Log of both sides and use Stirling's approximation and you get the Fermi Dirac distribution for example thereby giving us $klnW \equiv S$ and so the thermodynamics of Fermi level states let's say. Note also that the Mercuron (appendix A) frame of reference $N=10^{80}$ count and $E=Nhf$ are one to one suggesting a more fundamental Mandelbrot set E&M field quantization.

Mandelbrot set one-to-one Counter of N of $N\hbar\omega=E$, $N=10^{80}$ quantizes our unified field in the Mercuron

But in the very hot (billions of degrees) Mercuron frame of reference(appendix A) there is one photon for what was two electrons so our $10^{80}/2$ count gives us the quantization ($N=integer$) of the electromagnetic field(analogous to being in the special COM frame of reference of the oscillator with speed v in the usual SHM field quantization). This explains why all energy is split into these $E=hf$ quanta, that being the most profound of all our results. Counting these 10^{80} fractal splits is the real method of E&M field quantization, not the nominal SHM method. See appendix M3 also. for (observables) operator $\left(\frac{dr+dt}{ds}\right) \delta z = \left(\frac{ds}{ds}\right) \delta z = (1)\delta z$. And so we counted to 1 real eigenvalue For each δz . But recall $\frac{dt}{ds} = \omega$ in eq. 11 so $\frac{dt}{ds} \delta z = H\delta z = E\delta z = \hbar\omega\delta z$. Note 1 $\hbar\omega$ per one δz solution state in the Newpde. So the number of ways W of filling g_i single Newpde spin $1/2$ states with n_i particles is $W=g_i!/(n_k!(g_i-n_i)!)$. ($1/2+1/2=1$, $1/2-1/2=0$ states have no such above restrictions so BE statistics). You take a Log of both sides and use Stirling's approximation and you get the Fermi Dirac distribution for example thereby giving us $klnW \equiv S$ and so the thermodynamics of Fermi level states let's say.

Fractal Scales N in eq.20 Newpde

N=1 observer (eq.17,18,19 gives our **Newpde metric $\kappa_{\mu\nu}$** at $r<r_H, r>r_H$)

Found General Relativity (GR) GR from eq.17- eq.19 so Schwarzschild metric and so can do a dyadic coordinate transformation on it to get the Kerr metric and all these free space metrics to get all the solutions to $R_{ij}=0$ so (reverse engineer to) generate the Ricci tensor (25)

N=-1, $e^2 10^{40(-1)}=e^2/10^{40}=Gm_e^2$, solve for G, get GR. So we can now write the Ricci tensor $R_{\mu\nu}$ (and fractally selfsimilar perturbation Kerr metric since frame dragging decreased by external object B, sect.B2). Also for fractal scale $N=0$, $r_H=2e^2/m_e c^2$, and for $N=-1$ $r'_H=2Gm_e/c^2=10^{-40}r_H$.

IIIc) Alternatively C can be white noise (Useful for $N=1$ macro 45° extreme applications.)

postulate $z=zz$ (Note $0=0X0$. So we still postulated 0.) with added white noise C (So $z=zz+C$ eq1)

Constant C so $\delta C=0$. Plug eq1 (and its iteration) into $\delta C=0$ (but without motivation for the iteration).

Get Dirac eq and Mandelbrot set respectively. Same result as before.

But here C=0 is on the 0,1 real axis, 0° , so these extreme particles now at 45° in this noise C formulation

IIIc) Single Slit experiment

Wave particle duality comes from that 45° angle of the electron particle on that e,v graph (sect.IIIC) where C noise position uncertainty is largest (so wide slit, photoelectric effect) with ds^2 circle always wave (eq C1) then C=0 (narrow slit, Airy pattern) gives only the wave.

IIIId) Fractal leap frog dimensions

$N=r^D$. So the **fractal dimension**= $D=\log N/\log r=\log(\text{splits})/\log(\#r_H \text{ in scale jump})=(\text{leap frog})$
 $=\log 10^{80}/\log 10^{40}=\log(10^{40})^2/\log(10^{40})=2$ (See appendix D for Hausdorff dimension & measure)
 which is the same as the 2D of our eq.4 Mandelbrot set. The next smaller (subatomic) fractal
 scale $r_1=r_H=2e^2/m_e c^2$, $N=0^{\text{th}}$, $r_2=r_H=2GM/c^2$ is defined as the $N=1$ th where $M=10^{80}m_e$ with
 $r_2=10^{40}r_1$ So the -1.75 pt. gave us a lot of physics:

eg. **#of electrons in the universe, the universe size,...** With 10^{80} electrons between any two
 fractal scales we are also *certainly allowed objects B&C*(fig4) in the Newpde ${}^2P_{3/2}$ state at $r=r_H$
 the subject of their respective appendices A,B and C.

Summary

The Concept

The concept is simple because it is "simplicity" itself:

"Ultimate Occam's razor postulate(0) implies mathematics&Newpde"

given "0 is the simplest idea imaginable" (Hold that thought: 0, a blank; 1, a complex object).
 So this is "first principles", thus we have actually figured it out! We completely understand!!!

And so it must work(fig2) and makes sense because all QM physicists know about *Lorentz*
 covariant(9) Dirac equation *real* eigenvalues and all mathematicians know that the limit of a
 Cauchy sequence of rational numbers is a Cauchy *real* number. So by **postulating**

" $z=zz+C$ implies *real*#0"

(C constant so $\delta C=0$ and $z=zz+C$ eq1 gets us the multiplicative properties of **0**. See M3) there
 then must be a rational Cauchy *sequence* with limit 0 that then doubles as a *iteration* of eq1 in
 $\delta C=0$ that thereby gives the (fractal) Mandelbrot set. Also plugging eq1 into $\delta C=0$ gives the
 Dirac equation and so fractal (scales $10^{40N}XCM_{N=0}$, fig1) *real* eigenvalues of a *generally*
 covariant Dirac Newpde; clearly a big advancement as shown in fig2.

Newpde $\equiv \gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for v, e ; $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$;

$r_H=C_M/\xi=e^2X10^{40N}/m$ (fractal jumps $N=.$ -1,0,1..) $\Delta\varepsilon\equiv m_e c$, $\varepsilon=\mu$ are zero if no object B(appendix B

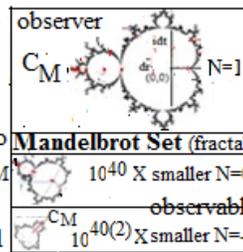
Spherical Harmonic Solutions to Newpde: $2P_{3/2}, 1S_{1/2}, 2S_{1/2}$ at $r=r_H$ since Stable $2P_{3/2}$ at $r=r_H$	
$N=0$ at $r=r_H$ $2P_{3/2}$ $3e$ baryons (QCD not required) Hund's rule $1S_{1/2}, 2S_{1/2}$ leptons (Koide)	
4 SM Bosons from 4 axis extreme rotations of e, v	
$N=-1$ (i.e., $e^2X10^{-40}\equiv Gm^2$). κ_{ij} is then by inspection the Schwarzschild metric g_{ij} (For $N=-1, \Delta\varepsilon\ll 1$). So we just derived	
General Relativity(GR) and the gravity constant G from Quantum Mechanics(QM) in one line.	
$N=1$ Newpde zitterwegung expansion stage is the cosmological expansion.	
$N=1$ Zitterbewegung harmonic coordinates and Minkowski metric submanifold (after long	
time expansion) gets the DeSitter ambient metric we observe.	
$N=0$ The third order Taylor expansion(terms) in $\sqrt{\kappa_{ij}}$ gives the anomalous gyromagnetic ratio	
and Lamb shift <i>without</i> the renormalization and infinities.	
So κ_{ij} provides the general covariance of the Newpde.	
So we got all this physics by <i>mere inspection</i> of this Newpde with no gauges!	
	
	fig1

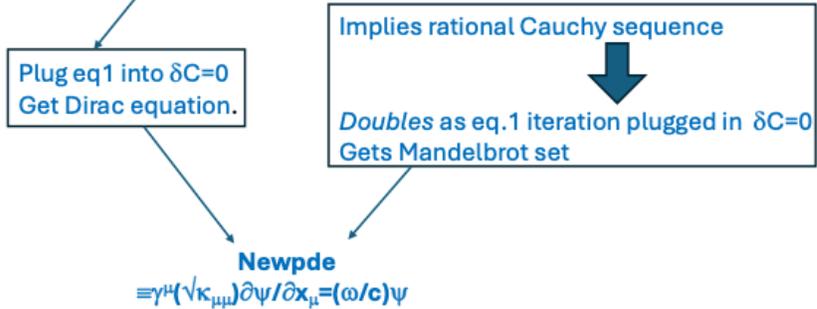
fig2

There is a 75% chance of being in a fractal scale $N=1$ cosmological proton since it is 3 electrons
 with 1 orbiting as in hydrogen. So we are merely in object A, that along with object C orbit
 object B (figure4 below) $2P_{3/2}$ at $r=r_H$, with all these objects being electron e solutions to the
 Newpde. Object B drop in A's Kerr inertial frame dragging generates $\Delta\varepsilon, \varepsilon, \tau$ in object A. Thus
 we have as our appendix designations A,B and C.

Concept: Ultimate Occam's Razor(postulate0) → math&Newpde

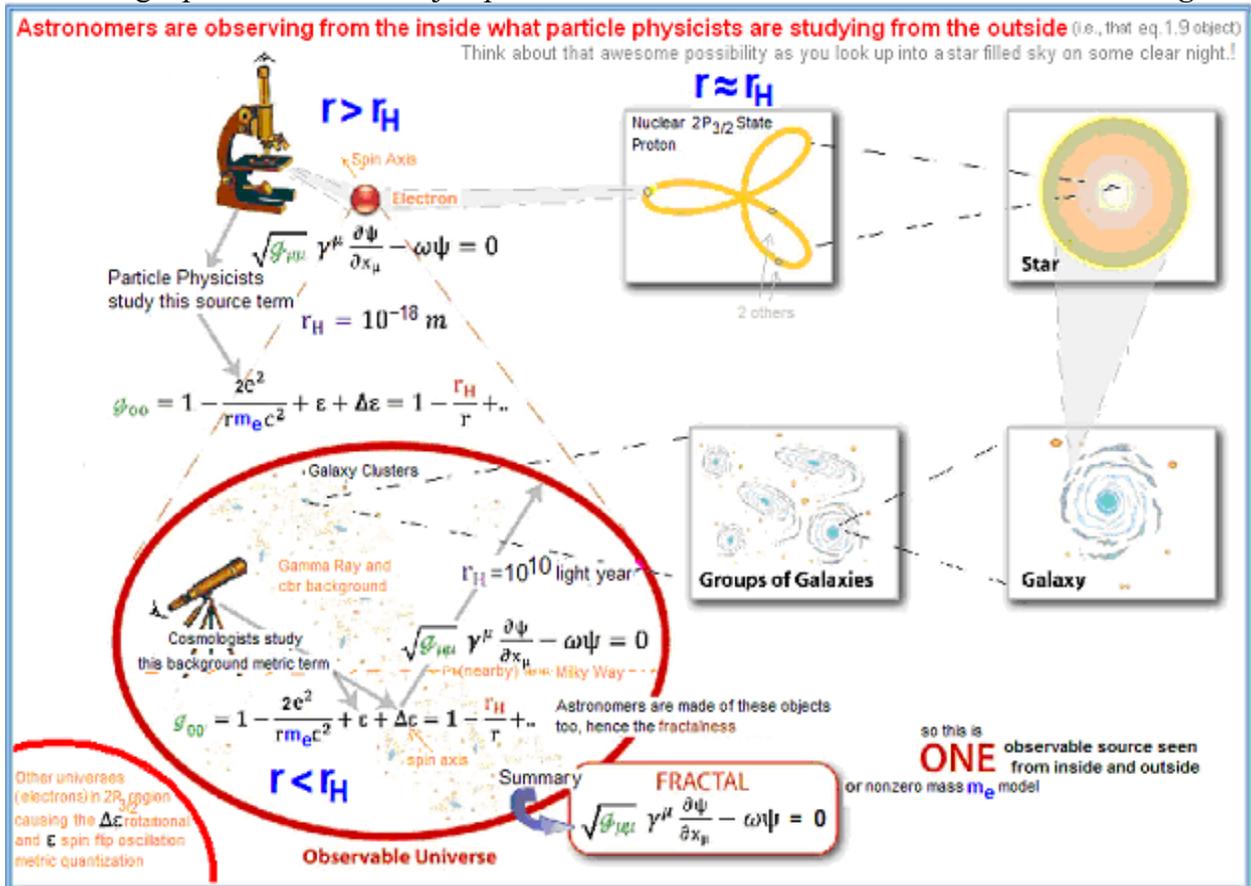
Origin of mathematics:

List#s-define symbols and (single simple axiom) postulate0: $z=zz+C$ implies real0
 eq1 (C constant so $\delta C=0$)



Origin of physics:

The Mandelbrot set fractal scale jumps ($10^{40N} X C_M$, N integer) of fig1 implies “astronomers are observing from the inside of what particle physicists are studying from the outside”, the Newpde electron. Think about that as you look up into a clear night sky! With a single power of 10^{40} scale jump we are back to where we started! **Fig4**



Object B Object A Nearby object C $r_H = C_M/m = e^2 10^{40N}/m$ (C_M in fig1).

References

- (6) Penrose in a utube video implied that the Mandelbrot set might contain physics. Here we merely showed how to find it. I once heard Murray Gell Mann say the same thing in a lecture I attended. For example the lower *extremum* point C_M $C_M=1.76.X10^{40N}$ (fig1) merely contributes to the successive onion shell horizons in $r_H=C_M/\xi$ in $\kappa_{00}=1-r_H/r$ in the $\sqrt{\kappa_{ij}}$ in the Newpde. The Mandelbrot set merely contributes these extreme numbers in the $r_H=C_M/\xi$ in κ_{00} in the Newpde.
- (7) Cantor: Ueber die Ausdehnung eines Satzes aus der Theorie der trigonometrischen Reihen, "Ueber eine elementare Frage der Mannigfaltigkeitslehre" Jahresbericht der Deutschen Mathematiker-Vereinigung.". Cantor proved the real#s were dense with a binary # (1,0) argument. But our $z=zz$ list (appendixM) is also for # $(1,0)$ thereby allowing Cantor to use his binary argument at this fundamental level.
- (8)Tensor Analysis, Sokolnikoff, John Wiley $\kappa_{\mu\nu}$ here is covariant given it's Schwarzschild limit
- (9)The Principle of Relativity, A Einstein, Dover.The Minkowski metric gives Lorentz transform
- (10)Quantum Mechanics, Merzbacher, John Wiley
- (11) lemniscate circle sequence (Wolfram, Weisstein, Eric). Implies C^2 continuity for fig1 r axis
- (12) Quantum Mechanics, Merzbacher 2nd edition pp.605-607 Dirac equation derivation
- (13)Mandelbrot set fig1 generated by <http://www.youtube.com/watch?v=0jGai087u3A> at $r=-1/75$

Appendix

Summary of Appendices A, B, C (and M)

In this fractal model we have a 75% chance of being in a (cosmological, N=1) proton (as opposed to a free electron) given hydrogen is by far the most common element. The proton in my ${}^2P_{3/2}$ at $r=r_H$ stable state solution to the Newpde is composed of 3 objects, two orbiting positrons and a central electron which we call objects A, B and C (bottom of fig4) on the cosmological N=1 fractal scale. We are in one of the two positrons, object A with object B being the central electron also giving us our appendix labels (A,B,C,M). M=ring Math but with one axiom postulate0. M5 is on the lemniscate extreme.

Table Of Contents (of appendix) Get κ_{00} from object A and κ_{rr} from central object B

Appendix A) **Object A** (fig4) given the structure(A10) in the Newpde gets κ_{00} . κ_{rr} unaffected.

Appendix B) **Object B** (fig4) and the fractal rotation Kerr metric puts mass in κ_{rr} . κ_{00} unaffected

And gets the 3 massive Bosons of the SM

Appendix C) **Object C** (eg C2) gives us the Fermi G factor thereby completing the SM.

Appendix M) Ring Math *definitions* (not axioms. Single axiom \equiv postulate0) required by $z=zz+C$

Appendix A

Object A Fractal mass and N=1 (is) cosmology

From Newpde (eg., eq.1.13 Bjorken and Drell special case) $i\hbar \frac{\partial \psi}{\partial t} = \frac{\hbar c}{i} \left(\alpha_1 \frac{\partial \psi}{\partial x^1} + \alpha_2 \frac{\partial \psi}{\partial x^2} + \alpha_3 \frac{\partial \psi}{\partial x^3} \right) + \beta mc^2 \psi = H\psi$. For electron at rest: $i\hbar \frac{\partial \psi}{\partial t} = \beta mc^2 \psi$ so: $\delta z = \psi_r = w^r(0)e^{-i\varepsilon_r \frac{mc^2}{\hbar} t}$
 $\varepsilon_r=+1, r=1,2; \varepsilon_r=-1, r=3,4.$): This implies an oscillation frequency of $\omega=mc^2/\hbar$. which is fractal here ($\omega=\omega_0 10^{-40N}$). So the eq.16 the 45° line has this ω oscillation as a (that eq.7-9 δz variation) rotation at radius ds. On our own fractal cosmological scale N=1 we are in the expansion stage of one such oscillation. Thus the fractalness of the Newpde explains cosmology. The next higher cosmological scale is independent (but still connected by relativistic superposition of speeds)

implying a inverse separation of variables result. As an example my zitterbewegung $r=e^{i\omega t}=\cos\omega t+i\sin\omega t$ can be modeled $r=\cos\omega t$: clocks reset for $t=0$ at $r=0$ using $r=r_0(1+\cos(\omega t-\pi))$. Take the first time derivative and get $v=\dot{r}=-r_0\omega\sin(\omega t-\pi)$. Take another time derivative and get $a=\ddot{r}=-r_0\omega^2\cos(\omega t-\pi)$. Now take a third derivative and we get $\text{jerk}=\ddot{\dot{r}}=r_0\omega^3\sin(\omega t-\pi)$. Note the sine of $\omega t-\pi+\pi/2=-\text{small}-\pi+\pi/2$ (just before $\cos(\omega t-\pi)$ *middle of expansion*) is negative so the third derivative is negative. But the cosine of $-\text{small}-\pi+\pi/2$ is negative so 'a' is still positive. Thus the third derivative is indeed negative but yet the acceleration at that time is still positive. **Thus the acceleration is getting smaller even though the acceleration itself is still positive.** It is cool that you can model all of this recently discovered DESI-DES-CBR data cosmology with a simple (fractal Dirac eq solution) cosine model and so drop the dark energy altogether.

Mid expansion dt and also selfsimilar spin

But note that at *mid expansion* we are also close to the cosmological horizon $r_H=2GM/c^2$ so GR severely distorts the time t (in $\cos\omega t$) with $dt^2=g_{00}dt'^2=(1-r_H/r)dt'^2$ resulting in the distant comoving observers dt' being a lot longer (so older) than dt explaining the high metallicity mature looking spiral galaxies and supermassive black holes seen at even high z and even thermalized CBR (without inflation theory). The Dirac spin (internally a weak Kerr metric) even explains the net individual galaxy rotation direction seen by Webb. The Kerr metric internal t violation (eg has a $dtd\theta$ cross term), because of CPT, then gives a *ambient CP violation*

Eq1.13 zitterbewegung source term for Laplace-Beltrami and its Ricci tensor

Note the Hund rule $2S_{1/2}$ τ and $1S_{1/2}$ μ ($=\epsilon$) states(fig2) turning equation 1.13 automatically into $r=r_0e^{i(\tau+\epsilon)t}$ Given newpde principle quantum number degeneracy $E(2S_{1/2})\tau = E(2P_{3/2})\mu$ with $2P_{3/2}$ completely stable (at $r=r_H$) with this complete stability and energy equality thereby allowing e^{it} to be normalized to 1 so our eq1.13 result is automatically: $\psi=e^{i(\tau+\epsilon+\Delta\epsilon)t}\approx e^{i(\epsilon+\Delta\epsilon)t}$. Also the small ϵ match with $R_{22}=e^{-\nu}[1+1/2 r(\mu'-\nu')]-1\approx-\nu\approx-\epsilon\approx-\sin\epsilon$ near $r=r_H$ makes it $R_{22}=-\sin\epsilon$ and so the right side is the metric source $-\sin\epsilon$ thereby explaining the negative sign, Thus sine is largest at first since (inside r_H) $r\approx r_0e^{-\epsilon}\approx r_0(1-\epsilon+..)$. Also to get a metric coefficient dr^2 we must square eq 1.13 $dr^2=dr_0^2e^{i(2\epsilon+2\Delta\epsilon)t}=\kappa_{ij} dr'^2$ so that $e^{i(2\epsilon+2\Delta\epsilon)t}=\kappa_{rr}$. (And we can further normalize out ϵ for *even more local* space time $\Delta\epsilon$ step wise metric quantization QM perturbations by $e^{2\Delta\epsilon/(1-2\epsilon)}=\kappa_{00}$ (A1)

So near the time the Mercuron(A3C) exists. $R_{ij}=0 \rightarrow R_{ij}=-\Delta(g_{ij})$ (A2)

(where Δ is the Laplace-Beltrami second derivative operator) is not =zero since it is a mass source in the Mercuron (next section). Thus the above Laplace Beltrami source eq. A2 $-\sin\omega t=-\sin\epsilon$ here comes out of the **Newpde zitterbewegung** eq1.13 for the $N=2$ observer.

A1 Huge $N=2$ scale, as the observer of $N=1$ cosmology scale, sees Newpde zitterbewegung source negative square root in B10 ($\epsilon \propto 1/\sqrt{(1-r_H/r)}$) in $R_{22}=-\sin\epsilon \rightarrow -\sinh\epsilon$ inside the $N=1$ r_H . So by artificially changing $i \rightarrow 1$, $N=2$ sees what we ($N=1$) see $\sin\epsilon \rightarrow \sinh\epsilon$ thereby making cosmology an observable(recall fig1). Serendipitously for $r < r_H$ then $R_{22}=-\sinh\epsilon$ is also integrable, has a closed form solution(see below A3A). So we require $\sin\epsilon \rightarrow \sinh$ $R_{22}=-\sinh\mu$ (A2A)

$=R_{22}=e^{-\nu}[1+1/2 r(\mu'-\nu')]-1=-\sinh\nu=(-(e^\nu - e^{-\nu})/2)$, $\nu'=-\mu'$ so $(e^\mu-1)=-\sinh\mu$ for positive μ in $\sinh\mu$ then the $\mu=\epsilon$ in the e^μ on the left is negative (A2B)

$e^{-\mu}[-r(\mu')]=- \sinh\mu - e^{-\mu} + 1 = -(e^{-\mu} + e^\mu)/2 - e^{-\mu} + 1 = -(e^{-\mu} + e^\mu)/2 + 1 = -\cosh\mu + 1$. So given $\nu'=-\mu'$ $e^{-\nu}[-r(\mu')]=1-\cosh\mu$. Thus

$e^{-\mu}r(d\mu/dr)=1-\cosh\mu$

This can be rewritten as:

$$e^\mu d\mu/(1-\cosh\mu)=dr/r$$

Recall we started at the top of the sine wave so the *integration* of this equation is from $\xi_1 = \mu = \varepsilon = 1$ to the present day mass of the $\mu = \text{muon} = .05946$ (X tauon mass) giving us:

$$\ln(r_{M+1}/r_{bb}) + 2 = [1/(e^\mu - 1) - \ln[e^\mu - 1]]^2 \quad (\text{A3C})$$

So $r_{bb} \approx 30$ million miles (\approx Mercuron radius), $r_M \approx 10^{11}$ Ly, $\mu = \text{muon mass} = .06$. Also note that the g factor $= g = e/2m$ and $w = gB = 2\pi f$ with f the Larmor frequency which is what you use to measure the g factor (like in MRI). The anomalous gyromagnetic ratio $g_y = g - 2$. Note if the mass is decreasing then g_y (and the g factor) goes up as well. The difference in g_y between 2023 (FermiLab) and 1974 (CERN) is $116592059[22] - 11659100[10] = 1$ part in 10^5 increase which translates to 1 part in 10^8 increase in g since g is about 2000X larger than g_y . Note g is increasing corresponding to a decreasing mass m in $g = e/2m$, by about 1 part in 10^8 over 50 years so about **1 part in 10^{10} over 1 year** in eq.A3C. Note 10^{10} years is the approximate time from (the big uptick) in eq.A3C, also coincidentally being the mainstream nominal age of the universe.

Thus we have the particle masses

Thus we generate from the evolution of the universe the ratio of the mass of the tauon τ to mass of the muon $\mu = \varepsilon$ as a function of time. Given the reduced mass connection to the mass of the proton $(m_\tau + m_\mu)/2 = m_p$ and the fact that $2X917m_e = m_p$ (from part II eq.7.1) we have the mass of the electron, which in fact is the fundamental new pde mass here. These masses are the basis for constructing the heavier particle masses eg., m_p is fundamental in baryonic, mesonic multiplets from Newpde ch.8-9. The muon and eq.9.22 pion is fundamental to the heavy CMS particles in appendix C5 to determining the heavy CMS detector particle masses and other properties).

Metric quantization effect Inside the Mercuron

The Newpde zitterbewegung oscillatory sine wave $\sin\mu$ source for R_{22} should be used for exact answers in which r is close to $r_{bb} \approx 30$ million miles radius (Approximate Mercury radius, hence the „Mercuron“). But Metric quantization (see appendix B5, partIII) also exists there so the rebound explosion will be ~ 100 antinodes $= D$ across the Mercuron r_{bb} , 10 across a supernova explosion neutron star object: see partIII, implying a Rayleigh Taylor instability so web like explosion remnants in both such as in M1 and Mercuron circumferencial $320 (= \pi D)$ giving the initial radius (now at ~ 400 MLY) of those ‘BAO’ cbr structures at reionization. On average single galaxy dominate a 4MyLY wide region 100X smaller, the next metric quantization down. Globulars next(100X smaller) and stellar neighborhoods next(100X smaller) and planets.

A2 local interior in general homogenous contribution of object A.

The manifold carries the curvature so $R_{ij} = 0$ throughout the Mercuron and outside locally.

From eqs 17-19 but with ambient metric ansatz: $ds^2 = -e^\lambda (dr)^2 - r^2 d\theta^2 - r^2 \sin^2\theta d\phi^2 + e^\mu dt^2$ (A3)

so that $g_{00} = e^\mu$, $g_{rr} = e^\lambda$. From eq. $R_{ij} = 0$ for spherical symmetry in free space and $N = 0$

$$R_{11} = \frac{1}{2}\mu'' - \frac{1}{4}\lambda'\mu' + \frac{1}{4}(\mu')^2 - \lambda'/r = 0 \quad (\text{A4})$$

$$R_{22} = e^{-\lambda} [1 + \frac{1}{2} r(\mu' - \lambda')] - 1 = 0 \quad (\text{A5})$$

$$R_{33} = \sin^2\theta \{ e^{-\lambda} [1 + \frac{1}{2} r(\mu' - \lambda')] - 1 \} = 0 \quad (\text{A6})$$

$$R_{00} = e^{\mu-\lambda} [-\frac{1}{2}\mu'' + \frac{1}{4}\lambda'\mu' - \frac{1}{4}(\mu')^2 - \mu'/r] = 0 \quad (\text{A7})$$

$$R_{ij} = 0 \text{ if } i \neq j$$

(eq. A4-A7 from pp.303 Sokolnikof(8)): Equation A4 is a mere repetition of equation A6. We thus have only three equations on λ and μ to consider. From equations A4, A7 we deduce that $\lambda' = -\mu'$ so that radial $\lambda = -\mu + \text{constant} = -\mu + C$ where C represents a possible \sim constant ambient metric contribution which (allowing us to set $\sinh\mu = 0$) could be imaginary in the case of the slowly oscillating ambient metric of nearby object B from B2. So $e^{-\mu+C} = e^\lambda$. Then A3-A7 can be written as:

$$e^{-C} e^\mu (1 + r\mu') = 1. \quad (\text{A9})$$

Set $e^\mu = \gamma$. So $e^{-\lambda} = \gamma e^{-C}$ ε and $\Delta\varepsilon$ are time dependent. So integrating this first order equation (equation A9) we get: $\gamma = -2m/r + e^C \equiv e^\mu = g_{00}$ and $e^{-\lambda} = (-2m/r + e^C)e^{-C} = 1/g_{rr}$ or $e^{-\lambda} = 1/\kappa_{rr} = 1/(1-2m/r)$, $2m/r + e^C = \kappa_{00}$. With (reduced mass ground state rotator ($\Delta\varepsilon$) for charged if $-\varepsilon$) dr zitterbewegung from B1 $\kappa_{rr} dr^2 = e^C \kappa_{00} dr'^2 = e^{i(-\varepsilon + \Delta\varepsilon)^2} \kappa_{00} dr^2$ from A2. We found

$$\kappa_{00} = e^C - 2m/r = e^{i(-\varepsilon + \Delta\varepsilon)^2} - 2m/r \quad (A10)$$

$\Delta\varepsilon$ here is reduced ground state mass $\Delta\varepsilon$ as in Schrodinger eq $E = \Delta\varepsilon = 1/\sqrt{\kappa_{00}}$. (A10a)

does not add anything to r_H/r in κ_{rr} since e^C is not added to r_H/r there. Here the Kiode $\Delta\varepsilon$, ε , τ ratio (so ε in AC3) is normalized so that $\tau=1$ which then ignores the mass effect of object B, discussed in the appendix B below.

Appendix B Object B Fig4

Our new (Dirac) pde has spin $S=1/2$ and so the self similar fractal ambient metric on the $N=0$ th fractal scale is the $N=1$ scale Kerr metric we are inside of which contains those ambient metric **perturbation rotations** ($d\theta/dt$ T violation so (given CPT) thereby **CP violation**) due to cosmological object B caused drop in inertial frame dragging observed inside object A. We are in a rotating Schwarzschild metric (aka a Kerr metric) and so being close to the r_H horizon we notice (mostly) only the Schwarzschild metric. But near $\mu=1$ (near the tiny Mercuron radius), far away from the big horizon (eg., the r_H horizon), the frame is not dragged as much due to the nearness of object B as the Webb space telescope discovered (eg., 2/3 galaxies spin clockwise and they formed far away from r_H). We can write the Kerr metric as:

$$ds^2 = \rho^2 \left(\frac{dr^2}{\Delta} + d\theta^2 \right) + (r^2 + a^2) \sin^2 \theta d\phi^2 - c^2 dt^2 + \frac{2mr}{\rho^2} (a \sin^2 \theta d\theta - c dt)^2, \quad (B1)$$

where $\rho^2(r, \theta) \equiv r^2 + a^2 \cos^2 \theta$; $\Delta(r) \equiv r^2 - 2mr + a^2$, In our 2D $d\phi=0$, $d\theta=0$ Define:

$$\left(\frac{r^2 + a^2 \cos^2 \theta}{r^2 - 2mr + a^2} \right) dr^2 + \left(1 - \frac{2m}{r^2 + a^2 \cos^2 \theta} \right) dt^2 \quad \theta \neq 0$$

$\rho^2(r, \theta) \equiv r^2 + a^2 \cos^2 \theta$; $\Delta(r) \equiv r^2 - 2mr + a^2$, $r^2 \equiv r^2 + a^2 \cos^2 \theta$, $r'^2 \equiv r^2 + a^2$. Slightly inside r_H still

$$a \ll r, \quad \left(\frac{(r')^2}{(r)^2 - 2mr} \right) dr^2 + \left(1 - \frac{2mr}{(r')^2} \right) dt^2 + \dots = \left(\frac{1}{\frac{(r')^2}{(r')^2} - \frac{2mr}{(r')^2}} \right) dr^2 + \left(1 - \frac{2mr}{(r')^2} \right) dt^2.$$

$$\text{So } 1/(g_{rr} + 2m/r) \approx \frac{(r')^2}{(r')^2} = \frac{r^2 + a^2}{r^2 + a^2 \cos^2 \theta} = \frac{1 + \frac{a^2}{r^2}}{1 + \frac{a^2}{r^2} \cos^2 \theta} \approx \left(1 + \frac{a^2}{r^2} \right) \left(1 - \frac{a^2}{r^2} \cos^2 \theta \right) + \dots = 1 -$$

$$\frac{a^4}{r^4} \cos^2 \theta - \frac{a^2}{r^2} \cos^2 \theta + \frac{a^2}{r^2} + \dots \approx 1 + \frac{a^2}{r^2} (1 - \cos^2 \theta) + \dots = 1 + \frac{a^2}{r^2} \sin^2 \theta + \dots \equiv 1 + \left(\frac{a}{r} \right)^2 u^2 =$$

$$\left(\text{from eq12a our } N=1 \text{ mass} = \frac{C_M}{\delta z \delta z} \right) = 1 + 2(\varepsilon + \Delta\varepsilon) + \dots \quad (B2)$$

where we then add that $-2m/r$ to this $1+2(\varepsilon+\Delta\varepsilon)$ at the end. $\Delta\varepsilon$ is *total* mass as in eq.12a $N=1$ $\xi \approx C_M/(\delta z \delta z) = (a/r)^2$ caused by this inertial frame dragging drop of object B

In summary inertial frame dragging reduction due to object B adds to κ_{rr} (B2) and only oblates $2m/r$ in κ_{00} for eq.7 possibly nondiagonal metric.

Summary: Our Newpde metric including the drop in inertial frame dragging off diagonal metric effect of object B makes the Kiode ${}^2S_{1/2}$ and ${}^1S_{1/2}$ sum $\tau+\mu$ and also m_e *nonzero* (v and γ are stuck on the diagonal because they are $|dr|=|dt|$ light cone solutions.).

$$\tau+\mu \text{ in free space } r_H = e^2 10^{40(0)}/2m_{pc}^2, \quad \kappa_{00} = e^{i(2\Delta\varepsilon/(1-2\varepsilon))} - r_H/r, \quad \kappa_{rr} = 1 + 2\Delta\varepsilon/(1+\varepsilon) - r_H/r \text{ Leptons} \quad (B3)$$

$\tau+\mu$ on $2P_{3/2}$ sphere at $r_H=r$, $r_H=e^2 10^{40(0)}/2m_e c^2$, comoving with $\gamma=m_p/m_e$. Baryons, part2 (B4)
Imaginary $i\Delta\varepsilon$ in this cosmological background metric $\kappa_{00}=e^{i\Delta\varepsilon}$ B13 makes no contribution to the
Lamb shift but is the core of partIII cosmological application $g_{00}=\kappa_{00}$ of eq B13 of this paper.
Note B3 is still covariant because it comes out of the fractal (covariant) Kerr metric eq B1.

B1 N=0 eq.B3 Application example: anomalous gyromagnetic ratio Separation Of Variables On New Pde.

After separation of variables the “r” component of Newpde can be written as:

$$\left[\left(\frac{dt}{ds} \sqrt{\kappa_{00}} m_p \right) + m_p \right] F - \hbar c \left(\sqrt{\kappa_{rr}} \frac{d}{dr} + \frac{j+3/2}{r} \right) f = 0 \quad B5$$

$$\left[\left(\frac{dt}{ds} \sqrt{\kappa_{00}} m_p \right) - m_p \right] f + \hbar c \left(\sqrt{\kappa_{rr}} \frac{d}{dr} - \frac{j-1/2}{r} \right) F = 0. \quad B6$$

Using the above Dirac equation component we find the anomalous gyromagnetic ratio Δgy for the spin polarized $F=0$ case. Recall the usual calculation of rate of the change of spin S gives $dS/dt \propto m \propto gyJ$ from the Heisenberg equations of motion. We note that $1/\sqrt{\kappa_{rr}}$ rescales dr in $\left(\sqrt{\kappa_{rr}} \frac{d}{dr} + \frac{j+3/2}{r} \right) f$ in equation B5 with κ_{rr} from B3. Thus to have the same rescaling of r in the second term we must multiply the second term denominator (i.e., r) and numerator (i.e., $J+3/2$) each by $1/\sqrt{\kappa_{rr}}$ and set the numerator ansatz equal to $(j+3/2)/\sqrt{\kappa_{rr}} \equiv 3/2+J(gy)$, where gy is now the gyromagnetic ratio. This makes our equation B5, B6 compatible with the standard Dirac equation allowing us to substitute the gy into the Heisenberg equations of motion for spin S : $dS/dt \propto m \propto gyJ$ to find the correction to dS/dt . Thus again:

$$\begin{aligned} [1/\sqrt{\kappa_{rr}}](3/2+J) &= 3/2+Jgy, \text{ Therefore for } J=1/2 \text{ we have:} \\ [1/\sqrt{\kappa_{rr}}](3/2+1/2) &= 3/2+1/2gy = 3/2+1/2(1+\Delta gy) \end{aligned} \quad B7$$

Then we solve for Δgy and substitute it into the above dS/dt equation.

Thus solve eq. B7 with Eq.A1 values in $\sqrt{\kappa_{rr}} = 1/\sqrt{(1+2\Delta\varepsilon/(1+\varepsilon))} = 1/\sqrt{(1+2\Delta\varepsilon/(1+0))} = 1/\sqrt{(1+2 \times 0.0002826/1)}$. Thus from equation B1:

$[\sqrt{(1+2 \times 0.0002826)}](3/2 + 1/2) = 3/2 + 1/2(1+\Delta gy)$. Solving for Δgy gives anomalous **gyromagnetic ratio correction of the electron** $\Delta gy = .00116$.

If we set $\varepsilon \neq 0$ (so $\Delta\varepsilon/(1+\varepsilon)$) instead of $\Delta\varepsilon$ in the same κ_{00} in Newpde we get the anomalous **gyromagnetic ratio correction of the muon** in the same way.

Composite 3e: Meisner effect For B just outside r_H . (where the zero point energy particle eq. 9.22 is $.08 = \pi^\pm$) See A4

Composite 3e CASE 1: Plus $+r_H$, therefore is the proton + charge component. Eq.A4: $1/\kappa_{rr} = 1+r_H/r_H + \varepsilon'' = 2 + \varepsilon''$. $\varepsilon'' = .08$ (eq.9.22). Thus from eq.B17 $\sqrt{2 + \varepsilon''}(1.5+.5) = 1.5+.5(gy)$, $gy = 2.8$

The gyromagnetic ratio of the proton

Composite 3e CASE 2: negative r_H , thus charge cancels, zero charge:

$$\begin{aligned} 1/\kappa_{rr} = 1-r_H/r_H + \varepsilon'' = \varepsilon'' \quad \text{Therefore from equation B7 and case 1 eq.A3 } 1/\kappa_{rr} &= 1-r_H/r_H + \varepsilon'' \\ \sqrt{\varepsilon''}(1.5+.5) &= 1.5+.5(gy), \quad gy = -1.9. \end{aligned}$$

the **gyromagnetic ratio of the neutron** with the other charged and those ortho neutral hyperon magnetic moments scaled using their masses by these values respectively.

B4 eq.B3 κ_{00} application example: Lamb shift

After separation of variables the “r” component of Newpde can be written as

$$\left[\left(\frac{dt}{ds} \sqrt{\kappa_{00}} m_p \right) + m_p \right] F - \hbar c \left(\sqrt{\kappa_{rr}} \frac{d}{dr} + \frac{j+3/2}{r} \right) f = \quad B8$$

$$\left[\left(\frac{dt}{ds} \sqrt{\kappa_{00}} m_p \right) - m_p \right] f + \hbar c \left(\sqrt{\kappa_{rr}} \frac{d}{dr} - \frac{j-1/2}{r} \right) F = 0. \quad \text{B9}$$

Comparing the flat space-time Dirac equation to the left side terms of equations B8 and B9:

$$(dt/ds)\sqrt{\kappa_{00}}=(1/\kappa_{00})\sqrt{\kappa_{00}}=(1/\sqrt{\kappa_{00}})=\text{Energy}=E \quad \text{B10}$$

We have normalized out the e^C in equation B10 to get the pure measured r_H/r coupling relative to a laboratory flat background given thereby in that case by κ_{00} under the square root in equation B10.

Note for electron motion around hydrogen proton $mv^2/r=ke^2/r^2$ so $KE=1/2mv^2=(1/2)ke^2/r=PE$ potential energy in $PE+KE=E$. So for the electron (but not the tauon or muon that are not in this orbit) $PE_e=1/2e^2/r$. Write the hydrogen energy and pull out the electron contribution B10a. So in eq.B2 and B8 for free electron equation 14 $r_H=(1+1+.5)e^2/(m_\tau+m_\mu+m_e)/2=2.5e^2/(2m_p c^2)$. B11

Variation $\delta(\psi^*\psi)=0$ At $r=n^2a_0$

Next note for the variation in $\psi^*\psi$ is equal to zero at maximum $\psi^*\psi$ probability density where for the hydrogen atom is at $r=n^2a_0=4a_0$ for $n=2$ and the $\psi_{2,0,0}$ eigenfunction. Also recall eqA1, A4 eq.11a $\xi_1=m_L c^2=(m_\tau+m_\mu+m_e)c^2=2m_p c^2$ normalizes $1/2ke^2$ (Thus divide $\tau+\mu$ by 2 and then multiply the whole line by 2 to normalize the $m_e/2$.result. $\varepsilon=0$ since no muon ε here.): Recall in eq.11a ξ_0 has to be pulled in a Taylor expansion as an operator since it a separate observable. So substituting eqs.B1 for κ_{00} , values in eq.B10:

$$\begin{aligned} E_e &= \frac{(tauon+muon)(\frac{1}{2})}{\sqrt{1-\frac{r_H}{r}}} - (tauon + muon + PE_\tau + PE_\mu - m_e c^2) \frac{1}{2} \\ &= 2(m_\tau c^2 + m_\mu c^2) \frac{1}{2} + 2 \frac{m_e c^2}{2} + 2 \frac{2.5e^2}{2r(m_L c^2)} m_L c^2 - 2 \frac{2e^2}{2r(m_L c^2)} m_L c^2 - 2 \frac{3}{8} \left(\frac{2.5e^2}{r m_L c^2} \right)^2 m_L c^2 \\ &\quad - 2(m_\tau c^2 + m_\mu c^2) \frac{1}{2} \\ &= \frac{2m_e c^2}{2} + 2 \frac{e^2}{4r} - 2 \frac{3}{8} \left(\frac{2.5}{r m_L c^2} \right)^2 m_L c^2 = m_e c^2 + \frac{e^2}{2r} - 2 \frac{3}{8} \left(\frac{2.5e^2}{r m_L c^2} \right)^2 m_L c^2 \\ \text{So: } \Delta E_e &= 2 \frac{3}{8} \left(\frac{2.5}{r m_L c^2} \right)^2 m_L c^2 = (\text{Third order } \sqrt{\kappa_{\mu\mu}} \text{ Taylor expansion term})= \\ \Delta E &= 2 \frac{3}{8} \left[\frac{2.5(8.89 \times 10^9)(1.602 \times 10^{-19})^2}{(4(.53 \times 10^{-10}))^2((1.67 \times 10^{-27})(3 \times 10^8))^2} \right]^2 (2(1.67 \times 10^{-27})(3 \times 10^8))^2 \\ &= hf = 6.626 \times 10^{-34} \cdot 27,360,000 \text{ so that } f = 27 \text{ MHz Lamb shift.} \end{aligned} \quad \text{(B12)}$$

The other 1050Mhz comes from the zitterbewegung cloud.

Note: Need infinities if **flat space Dirac 1928 equation**. For flat space $\partial g_{ik}/\partial x^j=0$ as a limit. Then must take field $g^{km}=1/0=\infty$ to get finite Christoffel symbol $\Gamma^{m}_{ij} \equiv (g^{km}/2)(\partial g_{ik}/\partial x^j + \partial g_{jk}/\partial x^i - \partial g_{ij}/\partial x^k) = (1/0)(0) = \text{undefined}$ but still implying *nonzero* acceleration on the left side of the

geodesic equation: $\frac{d^2 x^\mu}{ds^2} = -\Gamma^{\mu}_{\nu\lambda} \frac{dx^\nu}{ds} \frac{dx^\lambda}{ds}$. Christoffel symbol $\equiv \Gamma^{\mu}_{\nu\lambda}$. So we need infinite

fields for flat space. Thus QED requires (many such) infinities. But we have in general curved space $g_{ij}=\kappa_{ij}$ in the New pde so do not require that anything be infinite and yet we still obtain for the third order Taylor expansion term of $\sqrt{\kappa_{\mu\nu}}$ the Lamb shift and anomalous gyromagnetic ratio correction (see above sections B3,B4).

B5 Single field but observed from different frames of reference

For metric quantization we require a grand canonical ensemble with nonzero chemical potential. These fields on the different fractal scales **are really all the same** field but seen from the different frames of reference motion created by the different fractal 10^{40N} X jump mass contributions of the zitterbewegung frequency oscillation frames of reference of the Newpde. **Bridging these fractal N scales in fig1 is possible for a unified field** if both observers are in the same frame of reference at least along some coordinate direction such as a central force azimuth angle ϕ . Thus we can state N=1 fractal scale $g_{00}=\kappa_{00}$ N=0 fractal scale along a galaxy (or other local source) central force azimuth ϕ (So circular motion $mv^2/r=GMm/r^2$) in the halo which then at least connects, “bridges”, N=0 to N=1 thereby showing this is a true “unified field”. N=1 $g_{00}=1-2GM/(c^2r)$ has to transition into the asymptotic component of N=0 $\kappa_{00}=1-(2\Delta\varepsilon/(1-2\varepsilon))^2/2$ since these fields in the same frame of reference “coordinate system“ are the same where the **transition between the two fractal scales occurs**, thus where

$$g_{00}=\kappa_{00}.$$

Mixed state $\varepsilon\Delta\varepsilon$ (Again $GM/r=v^2$ so $2GM/(c^2r)=2(v/c)^2$.)

$$g_{00}=1-2GM/(c^2r)=\text{Re}\kappa_{00}=\cos[2\Delta\varepsilon+\varepsilon]=1-[\Delta\varepsilon+\varepsilon]^2/2=1-[(2\Delta\varepsilon+\varepsilon)^2/(\Delta\varepsilon+\varepsilon)]^2/2=1-[(2\Delta\varepsilon^2+\varepsilon^2+2\varepsilon\Delta\varepsilon)/(2\Delta\varepsilon+\varepsilon)]^2$$

The $2\Delta\varepsilon^2$ is just the above first case (Case 1) so just take the mixed state cross term $[\varepsilon 2\Delta\varepsilon/(\varepsilon+2\Delta\varepsilon)]=c[2\Delta\varepsilon/(1+\Delta\varepsilon/\varepsilon)]/2=c[2\Delta\varepsilon+\Delta\varepsilon^2/\varepsilon+\dots 2\Delta\varepsilon^{N+1}/\varepsilon^{N+1}]/2=\Sigma v_N$. Note each term in this expansion is itself a (mixed state) operator. $\Delta\varepsilon$ So there can't be a single v in the large gradient 2nd case so in the equation just above we can take $v_N=[2\Delta\varepsilon^{N+1}/(2\varepsilon^N)]c$. (B13)

$(\Delta\varepsilon)^m$ is the operator in $\Delta\varepsilon^m\psi = -\frac{i^m\partial^m}{\partial t^m}\psi_{N=1} = H^m\psi_{N=1}$ so each term in this B13 expansion is an independent QM operator so with independent speed= v eigenvalues relative to COM. From eq. B13 for example $v=m100^N\text{km/sec}$. $m=2, N=1$ here (Local arm). In part III we list hundreds of examples of B13 metric quantization: (sun: 1, 2km/sec, galaxy halos $m100\text{km/sec}$ without dark matter.). Given enough energy 100 across Mercuron, 10 across a supernova.

Appendix C Object C with spinor ansatz for eq.16(gives ordinary field theory SM) Review of eq16

For the N=0 tiny observer $C=\delta z \gg \delta z \delta z$ from eq.3. Recall from section 1 that the required N=0 tiny $C \approx \delta z$ must automatically be a perturbation of the N=1 eq.7 $=\delta z' + \delta z = (dx_1 + idx_2) + (dx_3 + idx_4) \equiv dr + idt$. But given $\delta z \approx dr \approx dt$ at 45° we must add and subtract $\delta z'$

$$(dr - \delta z') + (dt + \delta z') \equiv dr' + dt' = ds \quad (16)$$

The $\delta ds^2=0$, 45° small extreme gave the e and v . But we have not yet accounted for the 4 axis large $\delta ds^2=0$ extreme $\delta\delta z$ (1) rotations (allowed by the $\delta_t \delta z$ eq.13 Hamiltonian H eg., in high energy $H\psi = E\psi$ COM accelerator collisions) as well in eq.16.

So large rotation angle $\delta\delta z/ds$ in eq.5 can then be those large axis' ds extreme thus rotation through the $\pm 45^\circ$ min ds and so two possible 45° rotations so through a total of two quadrants for $\pm\delta z'$ in eq.16 (a single δz just gives e, v eq.7-9 back). Typical rotation from axis to axis (SM) is through two diagonals thus constituting a *derivative of a derivative* giving us Bosonic field theory (eg C7). Object C is a much smaller perturbation (C7) of object A than is object B but its higher ranked tensor QM Hamiltonian operator (object B's uniform field acts like a scalar operator.) still makes 3 of these Bosons (W^-, W^+, Z_0) make nontrivial physical contributions to the Fermi G . So there are the object B leptonic components of the Hamiltonian that give e, v and $2v=\gamma$ and these new object C Bosonic components of the Hamiltonian that give the W and Z .

These rotations are

I→II, II→III, III→IV, IV→I required extremum to eq.16 extremum rotations in eq.7-9 plane Give SM Bosons at high interaction COM energies(when $\delta\delta z$ gets big). $N=0$

Note in fig.3 dr, dt is also a rotation and so has an eq.11 rotation operator observable θ . Thus from equation 11 for (θ) angle rotations $\theta\delta z \equiv (dr/ds)\delta z = -i\partial(\delta z)/\partial r$ for the first 45° rotation. So we got through one Newpde derivative for each 45° rotation. For the next 45° rotation in fig.4 it is then a second derivative $\theta\theta\delta z' = e^{i\theta}pe^{i\theta'}\delta z = e^{i(\theta+\theta')}\delta z = (dr/ds)((dr/ds)dr') = -i\partial(-i\partial(dr'))/\partial r = -\partial^2(dr')/\partial r^2$ large angle rotation in figure 3. In contrast for $z=1$, $\delta z'$ small so $45^\circ-45^\circ$ small angle rotation in figure 3 (so then $N=-1$). Do the same with the time t and get for $z=0$ rotation of $45^\circ+45^\circ$ (fig.4) then $\theta\theta\delta z' = (d^2/dr^2)z' + (d^2/dt^2)\delta z'$ (C1)

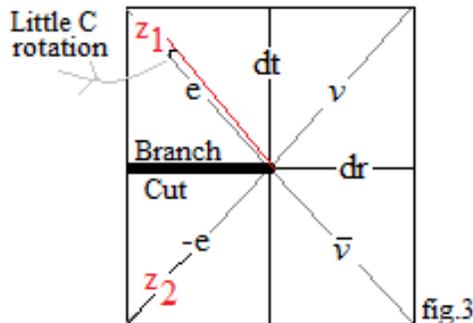


fig.3. for $45^\circ-45^\circ$ So two body (e, v) singlet $\Delta S = 1/2 - 1/2 = 0$ component so pairing interaction (sect.4.5). Also ortho $\Delta S = 1/2 + 1/2 = 1$ making 2 body (at $r=r_H$) $S=1$ Bosons and so a field theory. Note we also get these Laplacians characteristic of the Boson field equations by those $45^\circ+45^\circ$ rotations so eq.16 implies Bosons accompany our leptons (given the $\delta z'$), **so these leptons exhibit “force”**.

Newpde $r=r_H, z=0, 45^\circ+45^\circ$ rotation of composites e, v implied by Equation 16

The Mandelbrot set perturbations in eq16 are the same as rotations on that e, v plane given by eqs7-8. The 4 axis' are max extreme of $\delta(dr+dt)=0, \delta ds^2=0$ just as 45° is min (this time man made accelerator perturbations). So $z=0$ allows a large C z rotation application from the 4 different axis' max extremum (of eq.16) branch cuts gives the 4 results: $Z, +, -W$, photon bosons of the Standard Model. So we have derived the Standard Model of particle physics in this very elegant way (from the four axis'). You are physically at $r=r_H$ if you rotate through the electron quadrants (I, IV). of eq.7-9. So we have large C_M dichotomic 90° rotation to the next Reimann surface of eq.16, eq.A1 $(dr^2+dt^2)z''$ from some initial extremum angle(s) θ . Eq.16 solutions imply complex 2D plane Stern Gerlach dichotomic rotations using eq.A1 thereby using Pauli matrices σ_i algebra, which maps one-to-one to the quaternion algebra. Using eq.16 we start at some initial angle θ and rotate by 90° the noise rotations are: $C = \delta z'' = [e_L, v_L]^T \equiv \delta z'(\uparrow) + \delta z'(\downarrow) \equiv \psi(\uparrow) + \psi(\downarrow)$ has a eq.16 infinitesimal unitary generator $\delta z'' \equiv U = 1 - (i/2)\epsilon n^* \sigma$, $n \equiv \theta/\epsilon$ in $ds^2 = U^t U$. But in the limit $n \rightarrow \infty$ we find, using elementary calculus, the result $\exp(-(i/2)\theta^* \sigma) = \delta z''$. We can use any axis as a branch cut since all 4 are eq.20 large extremum so for the 2nd rotation we move the branch cut 90° and measure the angle off the next diagonal since Pauli matrix dichotomic rotations are actually axis rotations, leaving our e and v directions the same. In any case $(dr+dt)z''$ in eq.16 can then be replaced by eq.A1 $(dr^2+dt^2+..) \delta z'' = (dr^2+dt^2+..) e^{\text{quaternion}A}$ Bosons because of eq.C1.

C2 Then use eq. 12 and quaternions to rotate $\delta z'$ since the quaternion formulation is isomorphic to the Pauli matrices. $dr' = \delta z_r = \kappa_r dr$ for **Quaternion A** $\kappa_i = e^{iA_i}$ (C1A)

Possibly large $\delta\delta z$ in eq.3 $\delta(\delta z + \delta z \delta z) = 0$ so large rotations in eq.16 i.e., high energy, tiny $\sqrt{\kappa_{00}}$ since τ normalized to 1 allows formalism for object C

C1 for the eq.12: large $\theta = 45^\circ + 45^\circ$ rotation (for $N=0$ so large $\delta z' = \theta r_H$). Instead of the equation 13,15 formulation of κ_{ij} for small $\delta z'$ ($z=1$) and large $\theta = 45^\circ + 45^\circ$ we use A_r in dr direction with $dr^2 = dx^2 + dy^2 + dz^2$. So we can again use 2D (dr, dt) $E = 1/\sqrt{\kappa_{00}} = 1/\sqrt{e^{iA_i}} = e^{-iA/2}$. The 1 is mass energy and the first real component after that in the Taylor expansion is field energy A^2 . For 2 particles together the other particle ϵ negative means r_H is also negative. Since it is $e_1 * e_2 = r_H$. So $1/\kappa_r = 1 + (-\epsilon + r_H/r)$ is \pm and $1 - (-\epsilon + r_H/r)$ 0 charge. (C0)

For baryons with a 3 particle r_H/r may change sign without third particle ϵ changing sign so that at $r=r_H$. Can normalize out the background ϵ in the denominator of $E = (\tau + \epsilon) / \sqrt{(1 + \epsilon + \Delta\epsilon - r_H/r)}$ for Can normalize out the background ϵ in the denominator of $E = (\tau + \epsilon) / \sqrt{(1 + \epsilon + \Delta\epsilon - r_H/r)}$ for small conserved (constant) energies $1/\sqrt{(1 + \epsilon)}$ and (so $E = (1/\sqrt{(1+x)}) = 1-x/2+$) large r (so large λ so not on r_H) implies the normalization is:

$E = (\epsilon + \tau) / \sqrt{((1 - \epsilon/2 - \epsilon/2)/(1 \pm \epsilon/2))}$, $J=0$ para e, ν eq.9.23 π^\pm, π^0 . For large $1/\sqrt{\Delta\epsilon}$ energies given small $r=r_H$, Here $1 + \epsilon$ is locally constant so can be normalized out as in

$$E = (\epsilon + \tau) / \sqrt{(1 - (\Delta\epsilon/(1 \pm \epsilon)) - r_H/r)}, \text{ for charged if } -, \text{ ortho } e, \nu J=1, W^\pm, Z_0 \text{ (11d)}$$

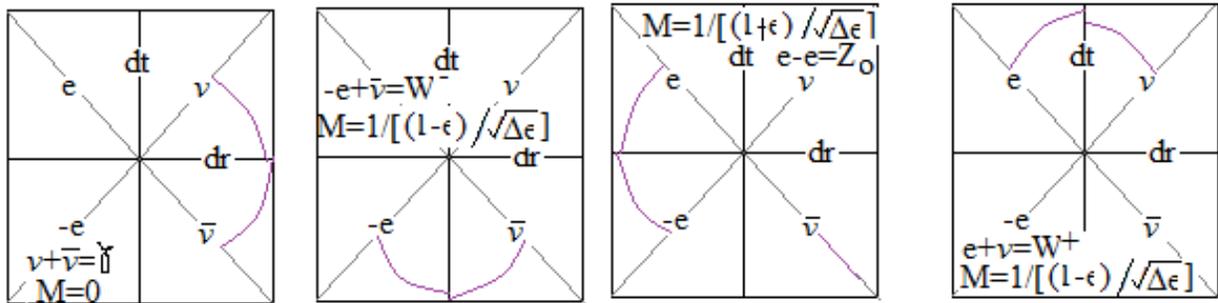


Fig5

Fig.4 applies to eq.9 $45^\circ + 45^\circ = 90^\circ$ case: **Bosons**.

C2 These quadrants were defined in eq.7-9 and used in eq.12. The Appendix C4 derivation applies to the far right side figure. Recall from eq.16 $z=0$ result $C_M = 45^\circ + 45^\circ = 90^\circ$, gets Bosons. $45^\circ - 45^\circ =$ leptons. The ν in quadrants II (eq.5) and III (eq.9). e in quadrants I (eq.7) and IV (eq.7). Locally normalize out $1 + \epsilon$ (appendix D). For the **composite e, ν** on those required large $z=0$ eq.9 rotations for $C \rightarrow 0$, and for stability $r=r_H$ (eg., for $2P_{1/2}$, I \rightarrow II, III \rightarrow IV, IV \rightarrow I) unless $r_H=0$ (II \rightarrow III) These two quadrant waves are also the $dr^2 + dt^2$ second derivative operator waves of the eq.11 observability circle which always exists for observables and so act like a ZPE for electron neutrino interactions: i.e., these waves are always there (eg. As with the ZPE of a spring).

For example:

C4 Quadrants IV \rightarrow I rotation eq.C2 $(dr^2 + dt^2 + \dots)e^{\text{quaternion A}}$ =rotated through C_M in eq.16.

example C_M in eq.C1 is a 90° CCW rotation from 45° through ν and anti ν

A is the 4 potential. From eq.17 we find after taking logs of both sides that $A_0 = 1/A_r$ (A2)

Pretending we have a only two i, j quaternions but still use the quaternion rules we first do the r

derivative: From eq. C1 $dr^2 \delta z = (\partial^2 / \partial r^2)(\exp(iA_r + jA_0)) = (\partial / \partial r)[(i\partial A_r / \partial r + \partial A_0 / \partial r)(\exp(iA_r + jA_0))] = \partial / \partial r[(\partial / \partial r)iA_r + (\partial / \partial r)jA_0](\exp(iA_r + jA_0)) + [i\partial A_r / \partial r + j\partial A_0 / \partial r]\partial / \partial r(iA_r + jA_0)(\exp(iA_r + jA_0)) +$

$$(i\partial^2 A_r/\partial r^2 + j\partial^2 A_o/\partial r^2)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r][i\partial A_r/\partial r+j\partial/\partial r(A_o)]) \exp(iA_r+jA_o) \quad (A3)$$

Then do the time derivative second derivative $\partial^2/\partial t^2(\exp(iA_r+jA_o)) = (\partial/\partial t)[(i\partial A_r/\partial t + \partial A_o/\partial t)$

$$\begin{aligned} &(\exp(iA_r+jA_o)) = \partial/\partial t[(\partial/\partial t)iA_r + (\partial/\partial t)jA_o](\exp(iA_r+jA_o)) + \\ &[i\partial A_r/\partial r + j\partial A_o/\partial r]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)) + (i\partial^2 A_r/\partial t^2 + j\partial^2 A_o/\partial t^2)(\exp(iA_r+jA_o)) \\ &+ [i\partial A_r/\partial t + j\partial A_o/\partial t][i\partial A_r/\partial t + j\partial/\partial t(A_o)]\exp(iA_r+jA_o) \end{aligned} \quad (C4)$$

Adding eq. C2 to eq. C4 to obtain the total D'Alambertian $C3+C4=$

$$\begin{aligned} &[i\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] + [j\partial^2 A_o/\partial r^2 + j\partial^2 A_o/\partial t^2] + ii(\partial A_r/\partial r)^2 + ij(\partial A_r/\partial r)(\partial A_o/\partial r) \\ &+ ji(\partial A_o/\partial r)(\partial A_r/\partial r) + jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 + ij(\partial A_r/\partial t)(\partial A_o/\partial t) + ji(\partial A_o/\partial t)(\partial A_r/\partial t) + jj(\partial A_o/\partial t)^2. \end{aligned}$$

Since $ii=-1, jj=-1, ij=-ji$ the middle terms cancel leaving $[i\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] +$

$$[j\partial^2 A_o/\partial r^2 + j\partial^2 A_o/\partial t^2] + ii(\partial A_r/\partial r)^2 + jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 + jj(\partial A_o/\partial t)^2$$

Plugging in C2 and C4 gives us cross terms $jj(\partial A_o/\partial r)^2 + ii(\partial A_r/\partial t)^2 = jj(\partial(-A_r)/\partial r)^2 + ii(\partial A_r/\partial t)^2 = 0$. So $jj(\partial A_r/\partial r)^2 = -jj(\partial A_o/\partial t)^2$ or taking the square root: $\partial A_r/\partial r + \partial A_o/\partial t = 0$ (C5)

$$i[\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] = 0, \quad j[\partial^2 A_o/\partial r^2 + i\partial^2 A_o/\partial t^2] = 0 \quad \text{or} \quad \partial^2 A_\mu/\partial r^2 + \partial^2 A_\mu/\partial t^2 + \dots = 1 \quad (C6)$$

A4 and A5 are **Maxwell's equations** (Lorentz gauge formulation) in free space, if $\mu=1,2,3,4$.

$$\square^2 A_\mu = 1, \quad \square \bullet A_\mu = 0 \quad (C7)$$

This looks like the Lorentz gauge formalism but it is actually a fundamental field equation (not interchangeable with some other as in gauge theories) hence it is *no gauge at all* and we have also avoided the Maxwell overdeterminism problem (8eq, 6 unknowns E_i, B_i). Must use Newpde 4D orthogonalization here. Amplitudes of physical processes in QED in the noncovariant Coulomb gauge coincide with those in the covariant Lorenz gauge. The Aharonov-Bohm effect depends on a line integral of \mathbf{A} around a closed loop, and this integral is not changed by $\mathbf{A} \rightarrow \mathbf{A} + \nabla\psi$ which doesn't change $\mathbf{B} = \nabla \times \mathbf{A}$ either. So formulation in the Lorentz gauge mathematics works (but again C7 is no longer a gauge). Here mass carries energy in the Dirac equation and so cancels out $E_{IV} - E_I = 0$. So the two v masses in a nonuniform G_{oo} in appendix C8 cancel out in this quadrant $IV \rightarrow I$ rotation.

Geodesics for eq. C7

Recall equation 17 eq C1: $g_{oo} = 1 - 2e^2/rm_e c^2 \equiv 1 - eA_o/mc^2 v^o$. We determined A_o , (and A_1, A_2, A_3) in above eq.C1A. We plug this eq.C1A A_i into the geodesics

$$\frac{d^2 x^\mu}{ds^2} = -\Gamma_{\nu\lambda}^\mu \frac{dx^\nu}{ds} \frac{dx^\lambda}{ds} \quad (5.9)$$

where Christoffel symbol $\Gamma_{ij}^m \equiv (g^{km}/2)(\partial g_{ik}/\partial x^j + \partial g_{jk}/\partial x^i - \partial g_{ij}/\partial x^k)$. So from the first order Taylor expansion of our

$$\text{above } g_{ij} \text{ quaternion ansatz } \quad g_{ii} \equiv \eta_{ii} + h_{ii} = 1 - \frac{eA_i(x,t)}{m_e c^2 v^i}, \quad i \neq 0, \quad (5.10)$$

$$A'_0 \equiv e\phi/m_e c^2, \quad g_{00} \equiv 1 - \frac{e\phi(x,t)}{m_e c^2} = 1 - A'_0, \quad \text{and define } g'_{\alpha\alpha} \equiv 1 - A'_\alpha/v_\alpha, \quad (\alpha \neq 0) \text{ and}$$

$g''_{\alpha\alpha} \equiv g'_{\alpha\alpha} / 2$ for large and near constant v , see eq. 14 also. In the weak field $g^{ii} \approx 1$. Note $e=0$ for the photon so it is not deflected by these geodesics whereas a gravity field does deflect them. The photon moves in a straight line through a electric or magnetic field. Also use the total

differential $\frac{\partial g_{11}}{\partial x^\alpha} dx^\alpha = dg_{11}$ so that using the chain rule gives us:

$$\frac{\partial g_{11}}{\partial x^\alpha} \frac{dx^\alpha}{dx^0} = \frac{\partial g_{11}}{\partial x^\alpha} v^\alpha = \frac{dg_{11}}{dx^0} \approx \frac{\partial g_{11}}{\partial x^0}.$$

gives a new $A(1/v^2)dv/dt$ force term added to the first order Lorentz force result in these geodesic equations (Sokolnikoff, pp.304). So plugging equation 4.24 into equation 4.23, the geodesic equations gives:

$$\begin{aligned} -\frac{d^2 x^1}{ds^2} &= \Gamma_{11}^1 v_1 v_1 + \Gamma_{12}^1 v_1 v_2 + \Gamma_{13}^1 v_1 v_3 + \Gamma_{10}^1 v_0 v_1 + \Gamma_{21}^1 v_2 v_1 + \Gamma_{22}^1 v_2 v_2 + \Gamma_{23}^1 v_2 v_3 + \Gamma_{20}^1 v_2 v_0 + \\ &\Gamma_{31}^1 v_3 v_1 + \Gamma_{32}^1 v_3 v_2 + \Gamma_{33}^1 v_3 v_3 + \Gamma_{30}^1 v_3 v_0 + \Gamma_{01}^1 v_0 v_1 + \Gamma_{02}^1 v_0 v_2 + \Gamma_{03}^1 v_0 v_3 + \Gamma_{00}^1 v_0 v_0 = \\ &\frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^1} \right) v_1 + \frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^2} \right) v_2 + \frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^3} \right) v_3 + \frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^0} \right) v_0 + \\ &\frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^2} \right) v_2 - \frac{g^{11}}{2} \left(\frac{\partial g'_{22}}{\partial x^1} \right) v_2 + 0 + 0 + \frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^3} \right) v_3 + 0 - \frac{g^{11}}{2} \left(\frac{\partial g'_{33}}{\partial x^1} \right) v_3 + 0 + \\ &\frac{g^{11}}{2} \left(\frac{\partial g'_{11}}{\partial x^0} \right) v_0 + 0 + 0 - \frac{g^{11}}{2} \left(\frac{\partial g'_{00}}{\partial x^1} \right) v_0 + O\left(\frac{A_i dv}{v^2 dt}\right) = v_2 \left(\frac{\partial g''_{11}}{\partial x^2} - \frac{\partial g''_{22}}{\partial x^1} \right) + v_3 \left(\frac{\partial g''_{11}}{\partial x^3} - \frac{\partial g''_{33}}{\partial x^1} \right) + \\ &\left(\frac{\partial g''_{11}}{\partial x^\alpha} v_\alpha + \frac{\partial g''_{11}}{\partial x^0} v_0 \right) - \left(\frac{\partial g''_{00}}{\partial x^1} \right) v_0 + O\left(\frac{A_i dv}{v^2 dx}\right) \approx - \left(\frac{\partial g''_{00}}{\partial x^1} \right) v_0 + v_2 \left(\frac{\partial g''_{11}}{\partial x^2} - \frac{\partial g''_{22}}{\partial x^1} \right) + \\ &v_3 \left(\frac{\partial g''_{11}}{\partial x^3} - \frac{\partial g''_{33}}{\partial x^1} \right) + O\left(\frac{A_i dv}{v^2 dt}\right) \approx \frac{e}{m_\tau c^2} \left(-\vec{\nabla} \phi + \vec{v} X(\vec{\nabla} X \vec{A}) \right)_x + O\left(\frac{A_i dv}{v^2 dr}\right). \end{aligned}$$

Lorentz force equation form $\left(-\left(\frac{e}{m_\tau c^2} \right) \left(\vec{\nabla} \phi + \vec{v} X(\vec{\nabla} X \vec{A}) \right) \right)_x$ plus the derivatives of $1/v$ which

are of the form: $\mathbf{A}_i(d\mathbf{v}/d\mathbf{r})_{av}/v^2$. **This new term $A(1/v^2)dv/dr$ is the SC pairing interaction.** So we discovered the origin of superconductivity eg if denominator $v=0$ asymmetric normal mode so nonidentical oscillators with equal mass($\text{Cu}=4\text{O}$, $64=4 \times 16$) and so big pairing interaction nonlocal force (sect.5.4, part I) Schrodinger eq operator added to the Hamiltonian.

C5 Other 45°+45° Rotations (Besides above quadrants IV→I) Proca eq.

In the 1st to 2nd, 3rd to 4th quadrants the A_u is already there as a single v in the rotation the mass is in both quadrants and in the end we multiply by the A_u so get the $m^2 A_u^2$ term in the Proca eq. for the W^+ , W^- . The mass still gets squared for the 2nd to 3rd quadrant rotation Z_0 .

For the **composite e,ν** on those required large $z=0$ eq.16 rotations for $C \approx 0$, and for stability $r=r_H$ for $2P_{3/2}$ (I→II, III→IV, II→III) unless $r_H=0$ (IV→I);

The $2P_{3/2}$ at $r=r_H$ two positron states are Ortho-para states are constrained by the Newpde $2P_{3/2}$ and $2P_{1/2}$ lobes at $r=r_H$. The $2P_{3/2}$ lobes are in the plane and $2P_{1/2}$ lobes are out of plane at a higher energy eigenvalue. So ortho states are side view and para states are top view. The para parallel internal μ , external π solutions radius is Fitzgerald contracted by $917=\gamma$ resulting in a small Compton wavelength and so large masses. From part II: At high enough positron energies the positron $\Delta\varepsilon$ becomes a single muon ε (see eq.25) moving inside r_H :

$$E = \mu_B B = \frac{\mu_B B A}{A} = \frac{e \hbar h}{2 m_\mu e \pi r_H^2} = \frac{9.27234 \times 10^{-24}}{206.65} \left(\frac{4(2.0678 \times 10^{-15})}{2.481 \times 10^{-29}} \right) = \frac{7.669 \times 10^{-38}}{5.126 \times 10^{-27}}$$

= $1.5 \times 10^{-11} \text{J} = 93.364 \text{MeV} \approx \text{muon}$. $\delta z = \psi \approx e^{i\varepsilon}$ is the fundamental Dirac state with the electron as usual the Newpde ground state even as in atomic physics. So the muon ε produces a second (magnetic) muon ε so the $2\mu\text{on } 2\varepsilon$ is also the **fundamental** $2\varepsilon \times 917$ para state *inside* r_H

Muon shrink: $917(\varepsilon/(1 \pm \varepsilon))$ weak interaction.

$917(\varepsilon/(1 + \varepsilon)) = Z_0$, 80 GeV Proca spin 1

$917(\varepsilon/(1 - \varepsilon)) = W^\pm$, 91 GeV; “ “

2 Muon shrink: $917(2\varepsilon/(1 \pm 2\varepsilon))$ the fundamental para state

$917(2\varepsilon/(1 + 2\varepsilon)) = t$, 173 GeV. Para state so Klein Gordon spin 0

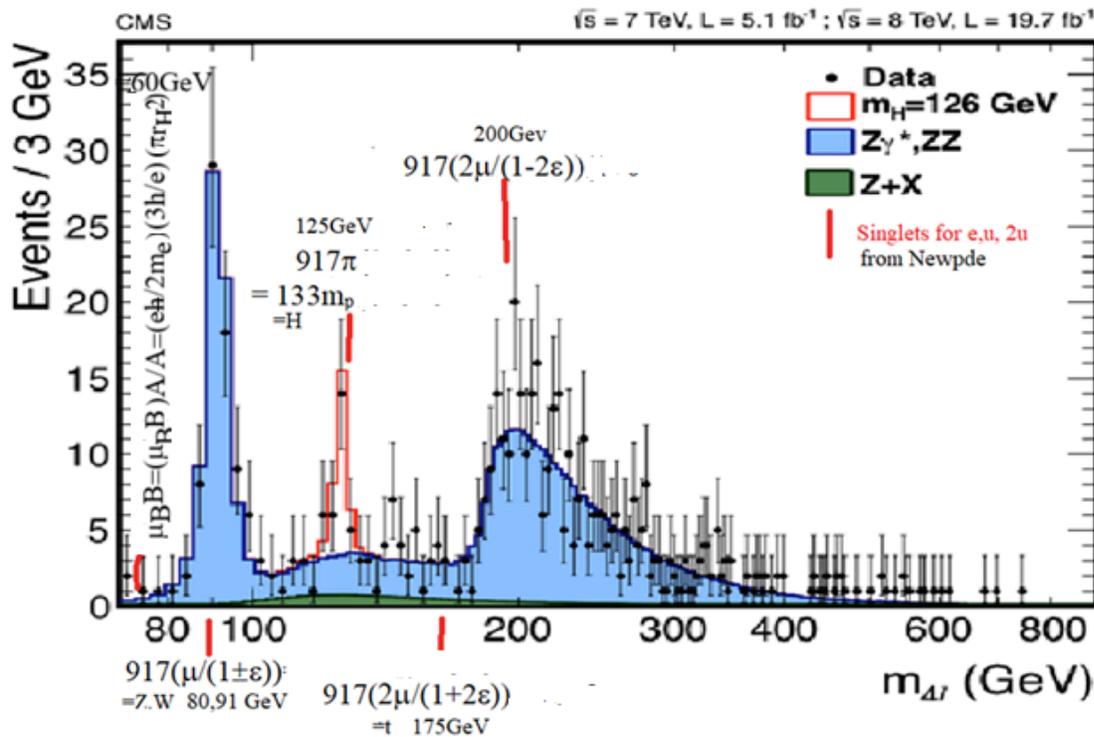
$917(2\varepsilon/(1 - 2\varepsilon)) = 207 \text{ GeV}$. I call this $J=0$ particle the James.

Outside r_H

Pion Shrink: 917π Klein Gordon spin 0

$917\pi = H$, 125 GeV. H is merely a para parallel π , outside zpe for the para solutions

Note these para $\gamma = 917 \times$ tiny λ , so huge mass $= m = h/c\lambda$, solve the hierarchy problem and also explain every part of the p-p collision data curve from the (huge) CMS detector at LHC!



For the **composite** e, ν on those required large $z=0$ eq.16 rotations for $C \approx 0$, and for stability $r=r_H$ for $2P_{1/2}$ (I \rightarrow II, III \rightarrow IV, II \rightarrow III) unless $r_H=0$ (IV \rightarrow I) are:

Ist \rightarrow II nd quadrant rotation is the W^+ at $r=r_H$. Do similar math to C2-C7 math and get instead a Proca equation The limit $\varepsilon \rightarrow 1 = \tau$ (D13) in ξ_1 at $r=r_H$ since Hund's rule implies $\mu = \varepsilon = 1S_{1/2} \leq 2S_{1/2} = \tau = 1$. So the ε is negative in $\Delta\varepsilon/(1-\varepsilon)$ as in case 1 charged as in appendix A1 case 2.

$$E = 1/\sqrt{(k_{00})} - 1 = [1/\sqrt{(1-\Delta\varepsilon/(1-\varepsilon)) - r_H/r}] - 1 = [1/\sqrt{(\Delta\varepsilon/(1-\varepsilon))}] - 1. E_r = E + E = 2/\sqrt{(\Delta\varepsilon/(1-\varepsilon))} = W^+ \text{ mass.}$$

$E_t=E-E$ gives E&M that also interacts weakly with weak force.

IIIrd → IV quadrant rotation is the W^- . Do the math and get a Proca equation again.

$E=1/\sqrt{(\kappa_{00})} -1=[1/\sqrt{(1-\Delta\varepsilon/(1-\varepsilon)-r_H/r)}]-1=[1/\sqrt{(\Delta\varepsilon/(1-\varepsilon))}]-1$. $E_t=E+E=2/\sqrt{(\Delta\varepsilon/(1-\varepsilon))}=W^-$ mass.

$E_t=E-E$ gives E&M that also interacts weakly with weak force.

II → III quadrant rotation is the Z_0 . Do the math and get a Proca equation. C_M charge cancelation. B14 gives $1/(1+\varepsilon)$ gives 0 charge since $\varepsilon \rightarrow 1$ to case 1 in appendix C2.

$E=1/\sqrt{(\kappa_{00})} -1=[1/\sqrt{(1-\Delta\varepsilon/(1+\varepsilon)-r_H/r)}]-1=[1/\sqrt{(\Delta\varepsilon/(1+\varepsilon))}]-1$. $E_t=E+E=2/\sqrt{(\Delta\varepsilon/(1+\varepsilon))}-1=Z_0$ mass.

$E_t=E-E$ gives E&M that also interacts weakly with weak force. Seen in small left handed

polarization rotation of light. Recall that $\Delta\varepsilon=.00058$. If contracted to $r=r_H$ by this singlet state

contraction then for the two \pm leptons ($10^{-18}m$). From eq.B10: $2\mu\gamma(1/(1\pm\varepsilon))=2\mu 917(1/(1\pm\varepsilon))=$

$$E = \frac{2m_p}{\sqrt{1-\Delta\varepsilon-\frac{r_H}{r}}}\left(\frac{1}{1\pm\varepsilon}\right) = \frac{2m_p}{\sqrt{1-\Delta\varepsilon-\frac{r_H}{r_H}}}\left(\frac{1}{1\pm\varepsilon}\right) = \frac{2m_p}{\sqrt{\Delta\varepsilon}}\left(\frac{1}{1\pm\varepsilon}\right) = 85\left(\frac{1}{1\pm\varepsilon}\right) = Z_0, W^\pm \text{ as our IV quadrant}$$

to Ist quadrant rotation Proca equation showed us. $Z_0 \text{ or } W = 85 \frac{1}{1\pm\varepsilon}$ negative ε means charged.

Positive ε is neutral.

IV → I quadrant rotation through those 2 neutrinos gives 2 objects. $r_H=0$

$E=1/\sqrt{\kappa_{00}} -1=[1/\sqrt{(1-\Delta\varepsilon/(1+\varepsilon))}]-1=\Delta\varepsilon/(1+\varepsilon)$. Because of the $+$ - square root $E=E+-E$ so E rest mass is 0 or $\Delta\varepsilon=(2\Delta\varepsilon)/2$ reduced mass.

Note we get SM particles out of composite e, ν using required eq.16 rotations.

In these eq.16 axis to axis 4 rotations (getting the 4 Bosons: W^+, W^-, Z_0, γ) we have a short cut way of deriving the Standard Model of particle physics (SM): **The ultimate reality check!!!**

C6 Object B Effect On Inertial Frame Dragging (from appendix B)

The fractal implications are that we are inside a cosmological positron inside a proton $2P_{3/2}$ at $r=r_H$ state. The cosmological object (electron) we are inside of is a positron and call it object A which orbits electron object B with a given distant 3rd object C. Object B is responsible for the mass of the electron since it's frame dragging creates that Kerr metric $(a/r)^2=m_e c^2$ (B9) result used in eq.D9. So Newpde ground state $m_e c^2 \equiv \langle H_e \rangle$ is the fundamental Hamiltonian eigenvalue

defining idea for composite e, ν , $r=r_H$ implying Fermi 4 point $E = \int \psi^\dagger H \psi dV = \int \psi^\dagger \psi H dV = \int \psi^\dagger \psi G$

Recall for composite e, ν all interactions occur inside r_H $(4\pi/3)\lambda^3 = V_{rH}$. $\frac{1}{v^{1/2}} = \psi_e = \psi_3 \frac{1}{v^{1/2}} =$

$$\psi_\nu = \psi_4 \text{ so } 4\text{pt} \iiint_0^{r_H} \psi_1 \psi_2 \psi_3 \psi_4 dV = 2G \iiint_0^{r_H} \psi_1 \psi_2 \frac{1}{v^{1/2}} \frac{1}{v^{1/2}} V$$

$$\equiv \iiint_0^{r_H} \psi_1 \psi_2 G \equiv \iiint_0^{r_H} \psi_1 \psi_2 (2m_e c^2) dV_{rH} = \iiint_0^{V_{rH}} \psi_1 (2m_e c^2) \psi_2 dV_{rH} \quad (A8)$$

Object C adds it's own spin (eg., as in 2nd derivative eq.A1) to the electron spin (I,IV quadrants) and the W associated with the $2P_{3/2}$ state at $r=r_H$ thereby adds a derivative in a neutrino quadrant (fig.4) thereby including neutrinos in the Fermi 4pt. So 2nd derivative

$$\Sigma((\gamma^\mu \sqrt{\kappa_{\mu\mu}} dx_\mu) - i\kappa)(\gamma^\nu \sqrt{\kappa_{\nu\nu}} dx_\nu + i\kappa)\chi = \Sigma((\gamma^\mu \sqrt{\kappa_{\mu\mu}} dx_\mu) - i\kappa)\psi \text{ so } \frac{1}{2}(1\pm\gamma^5)\psi = \chi. \quad (A9)$$

In that regard the expectation value of γ^5 is speed and varies with $e^{i3\phi/2}$ in the trifoldium. The spin $^{1/2}$ decay proton $S_{1/2} \propto e^{i\phi/2} \equiv \psi_1$, the original ortho $2P_{1/2}$ particle is chiral $\chi = \psi_2 \equiv \frac{1}{2}(1-\gamma^5)\psi = \frac{1}{2}(1-\gamma^5 e^{i3\phi/2})\psi$. Initial $2P_{1/2}$ electron ψ is constant. Start with initial ortho state χ . These γ^5 terms then

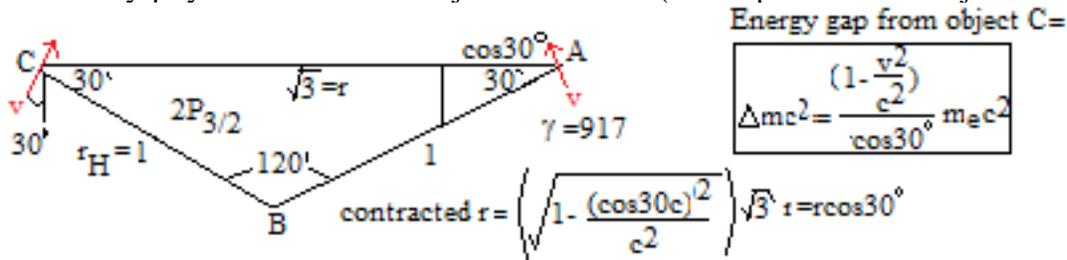
modify equation A8 to read $= \iiint_0^{V_{rH}} \psi_1 \psi_2 (2m_e c^2) dV_{rH} = \iint \psi_{S1/2}^* (2m_e c^2 V_{rH}) \chi dV_\phi =$

$$K \int \langle e^{i\frac{\phi}{2}} [\Delta\varepsilon V_{rH}] \left(1 - \gamma^5 e^{i\phi/2}\right) \psi \rangle d\phi = K G_F \int \langle e^{i\phi/2} - \gamma^5 e^{i(4/2)\phi} \rangle d\phi = K G_F \left(\frac{2e^{i\phi}}{i} \Big|_0^{2\pi+C} - \right.$$

$\frac{2\gamma^5 e^{i4\phi}}{i4} |0^{2\pi+c}) = k1(1/4+i\gamma^5) = k(.225+i\gamma^5 0.974) = k(\cos 13^\circ + i\gamma^5 \sin 13^\circ)$ **deriving the 13° Cabbibo angle.** With previously mentioned CP result(direct evidence of fractal universe) get CKM matrix

C7 Object C Effect on Inertial Frame Dragging and G_F found by using eq.C8 again (N=1 ambient cosmological metric)

Review of $2P_{3/2}$ Next higher fractal scale ($X10^{40}$), cosmological scale. Recall from B9 $m_e c^2 = \Delta \epsilon$ is the energy gap for object B vibrational stable eigenstates of composite $3e$ (vibrational perturbation r is the only variable in Frobenius solution, partII Ch.8,9,10) proton. Observer in object A. $\Delta m_e c^2$ gap=object C scissors eigenstates. is what we see at object A but $\Delta m_e c^2$ gets boosted by γ by rotation into the object B direction.(to compare with the object B $m_e c^2$ gap).



From fig 7 $r^2 = 1^2 + 1^2 + 2(1)(1)\cos 120^\circ = 3$, so $r = \sqrt{3}$. Recall for the positron motion $\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} = 917$.

So start with the distances we observe which are the Fitzgerald contracted $AC =$

$r_{CA} = 1 \sqrt{1 - \frac{\cos^2 30^\circ c^2}{c^2}} \sqrt{3} = .866 = \cos 30^\circ = CA$ and Fitzgerald contracted $AB = r_{BA} = x/\gamma = 1/\gamma$ so for Fitzgerald contracted $x=1$ for AB (fig7). We can start at $t=0$ with the usual Lorentz transformation for the time component.

$$t' = \gamma(ct - \beta x) = kmc^2.$$

since time components are Lorentz contracted proportionally also to $m_e c^2$, both with the γ multiplication.

In the object A frame of reference we see $\Delta m_e c^2$ which is the average of left and right object C motion effect. We go into the AB frame of reference to compare the object B $m_e c^2$ with this $\Delta m_e c^2$. Going into the AB frame automatically boosts $\Delta m_e c^2$ to $\gamma \Delta m_e c^2$. So start from a already Fitzgerald contracted x/γ . Next do the time contraction γ to that frame:

$$t'' = k\gamma \Delta m_e c^2 = \gamma \beta r_{AB} = \gamma \beta \left(\frac{x}{\gamma}\right) = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \beta \left(\sqrt{1 - \frac{v^2}{c^2}} \sqrt{1}\right) = \beta$$

with k defining the projection of tiny $\Delta m_e c^2$ "time" CA onto BA = $\cos \theta$ = projection of BA onto CA. But $m_e c^2$ is the result of object B of both of the motion and inertial frame dragging reduction (D9) so its γ is large. To make a comparison of ΔE to AB mass $m_e c^2$ CA is rotated and translated to the high speed AB direction and distance with its large γ so thereby *object C becomes mathematically object B* with the same k because of these projection properties of: CA onto BA. So we define projection k from projection of $m_e c^2$: So again

$$t' = \gamma(ct - \beta x) = kmc^2 = t'' = km_e c^2 = \gamma \beta r_{CA} = \left(\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}\right) \beta \left(\sqrt{1 - \frac{\cos^2 30^\circ c^2}{c^2}} \sqrt{3}\right) = \gamma \beta \cos 30^\circ$$

Take the ratio of $\frac{k\gamma\Delta m_e c^2}{km_e c^2}$ to eliminate k: thus

$$\frac{k\gamma\Delta m_e c^2}{km_e c^2} = \frac{\gamma\beta\left(\frac{x}{\gamma}\right)}{\gamma\beta r_{CA}} = \frac{1\beta 1}{\gamma\beta\cos 30^\circ} = \frac{1}{\gamma\cos 30^\circ} \quad \text{so}$$

$$\Delta m_e c^2 = \frac{\beta m_e c^2}{\beta\cos 30^\circ \gamma^2} = \frac{\left(1 - \frac{v^2}{c^2}\right)m_e c^2}{\cos 30^\circ} \quad (\text{A10})$$

allowing us to finally compare the energy gap caused by object C ($\Delta m_e c^2$) to the energy gap caused by object B ($m_e c^2$, C8). So to summarize $\Delta E = (m_e c^2 / ((\cos 30^\circ)^2 \gamma^2)) = m_e c^2 / 728000$. So the energy gap caused by object C is $\Delta E = (m_e c^2 / ((\cos 30^\circ)^2 \gamma^2)) = m_e c^2 / 728000$. The weak interaction thereby provides the ΔE perturbation ($\int \psi^* \Delta E \psi dV$) inside of r_H creating those Frobenius series (partII) $r \neq 0$ states, for example in the unstable equilibrium $2P_{1/2}$ electrons m_e . so in the context of those e, ν rotations giving W and Z_0 . The G can be written for E&M decay as $(2mc^2)XV_{r_H} = 2mc^2 [(4/3)\pi r_H^3]$. But Object Hamiltonian is a higher ranked tensor than (uniform scalar object Bs) so because this added object C rotational motion is eq.A9 Fermi 4 point it is entirely different than a mere 'weak' E&M. So for weak decay from equation A8 it is $G_F = (2m_e c^2 / 728,000) V_{r_H} = G_F = 1.4 \times 10^{-62} \text{ J}\cdot\text{m}^3 = 9 \times 10^{-4} \text{ MeV}\cdot\text{F}^3$ **the strength of the Fermi 4pt weak interaction constant** which is the coupling constant for the Fermi 4 point weak interaction integral. Note $2m_e c^2 / 729,000 = 1.19 \times 10^{-19} \text{ J}$. So $\Delta E = 1.19 \times 10^{-19} / 1.6 \times 10^{-19} = .7 \text{ eV}$ which \pm that r perturbation (instability) states in the Frobenius solution (partII) and so weak decay.

is our ΔE gap for the weak interaction (from operator H) inside the Fermi 4pt. integral for G_F .

The perturbation r in the Frobenius solution is caused by this ΔH in ($\int \psi^* \Delta H \psi dV$) with available phase space $\psi^* = \psi_p \psi_e \psi_\nu$ for $\psi = \psi_N$ decay where ψ_e and ψ_ν are from the factorization. The neutrino adds a $e^2(0)$ to the set of $e^2 10^{40N}$ electron solutions to Newpde r_H with electron charge $\pm e$ and intrinsic angular momentum conservation laws $S = 1/2$ holding for both e and ν .

The neutrino mass increases with nonisotopic homogenous space-time (sect.3.1 and our direction of motion here) whereas that Kerr metric $(a/r)^2$ term (B9) in general is isotropic and homogenous and so only effects the electron mass.

C8 NONhomogeneous and NONisotropic Space-Time

Recall 2D $N=1$ and that 2D $N=0$ (perturbation) orientations are not creatable so we have $2D+2D=4D$ degrees of freedom. But this is all still embedded in the same complex (2D) plane. So this theory is still complex 2D Z then. Recall the $\kappa_{\mu\nu} = g_{\mu\nu}$ metrics (and so R_{ij} and R) were generated in section 1.

In that regard for 2D for a homogenous and isotropic g_{ij} we have identically $R_{\mu\mu} - 1/2 g_{\mu\mu} R = 0 \equiv \text{source} = G_{00}$ since in 2D $R_{\mu\mu} = 1/2 g_{\mu\mu} R$ identically (Weinberg, pp.394) with $\mu=0, 1 \dots$ Note the 0 ($=E_{\text{total}}$ the energy density source) and we have thereby proven the existence of a net zero energy density vacuum. Thus our 2D **theory implies the vacuum is really a vacuum!** It is then the result of the fractal and 2D nature of space time!

A ultrarelativistic electron is essentially a transverse wave 2D object (eg., the $2P_{1/2}$ electron in the neutron). In a isotropic homogenous space time $G_{00}=0$. Also from sect.2 eqs. 7 and 8 (9) occupy the same complex 2D plane. So eqs. 7+8 is $G_{00} = E_e + \sigma \cdot \mathbf{p}_r = 0$ so $E_e = -\sigma \cdot \mathbf{p}_r$

So given the negative sign in the above relation the **neutrino chirality is left handed.**

But if the space time is not isotropic and homogenous then G_{00} is not zero and so the **neutrino gains mass** (These two ν masses cancel out in the $IV \rightarrow I$ rotation of C4 γ)

C9 Derivation of the Standard Electroweak Model from Newpde but with No Free parameters

Since we have now derived M_W , M_Z and their associated Proca equations, and Dirac equations for m_τ, m_μ, m_e etc., and G, G_F, ke^2 Maxwell's equations, etc. we can now write down the usual Lagrangian densities that implies these results. In the formulation $M_Z = M_W / \cos\theta_W$ you can find the Weinberg angle θ_W , $g \sin\theta_W = e$, $g' \cos\theta_W = e$; solve for g and g' , etc., We will have thereby derived the standard model from first principles (i.e., postulate 0). **It no longer contains free parameters.**

Note $C_M = -1.75$ pt really is the $U(1)$ charge and equation 16 rotation is on the complex plane so it really implies $SU(2)$ (C1) with the sect.1.2 2D eqs. $7+8+9 = G_{00} = E_e + \sigma \cdot p_r = 0$ gets the left handedness. Recall the genius of the SM is getting all those properties (of γ, Z_0, W^+, W^-) from $SU(2) \times U(1)_L$ so we really have completely derived the standard electroweak model from eq.16 which comes out of the Newpde given we even found the magnitude of its input parameters (eg., G_F (appendix C7), Cabbibo angle C6).

Appendix M (for underlying math)

M1) D=5 if using $N=-1$, and $N=0, N=1$ contributions in same $R_{ij}=0$

Note the $N=-1$ (GR) is yet another δz perturbation of $N=0$ $\delta z'$ perturbation of $N=1$ observer thereby adding, if these scales share the same time coordinate, at least 1 independent parameter tiny (wrapped up) dimension added to our $\delta z + (dx_1 + idx_2) + (dx_3 + idx_4)$ (4+1) *explaining why Kaluza Klein 5D $R_{ij}=0$ works so well*: GR is really 5D if $N=0$ E&M included with $N=-1$ as in Reissner Nordstrom.

M2) Alternative ways of adding 2D+2D→4D

Recall from section 1 that adding the $N=0$ fractal scale 2D δz perturbation to $N=1$ eq.7 2D gives curved space 4D. So $(dx_1 + idx_2) + (dx_3 + idx_4) \equiv dr + idt$ given (eqs 5, 7a) $dr^2 - dt^2 = (\gamma^r dr + i\gamma^t dt)^2$ if $dr^2 \equiv dx^2 + dy^2 + dz^2$ (3D orthogonality) so that $\gamma^r dr \equiv \gamma^x dx + \gamma^y dy + \gamma^z dz$, $\gamma^i \gamma^i + \gamma^j \gamma^j = 0$, $i \neq j$, $(\gamma^i)^2 = 1$, rewritten (with curved space $\kappa_{\mu\nu}$ eq.14-17)

$$(\gamma^x \sqrt{\kappa_{xx}} dx + \gamma^y \sqrt{\kappa_{yy}} dy + \gamma^z \sqrt{\kappa_{zz}} dz + \gamma^t \sqrt{\kappa_{tt}} idt)^2 = \kappa_{xx} dx^2 + \kappa_{yy} dy^2 + \kappa_{zz} dz^2 - \kappa_{tt} dt^2 = ds^2.$$

But there are alternatives to this 3D orthogonalization method. For example satisfying this 4D Clifford algebra and complex orthogonalization requirement is a special case of any 2 $x_i x_j$ in eq.3 (directly from postulate 1): Imposing orthogonality thereby creates 6 pairs of eqs.3&5. So each particle carries around it's own $dr + idt$ complex coordinates with them on their world lines. Alternatively this 2D $dr + idt$ is a 'hologram' 'illuminated' by a modulated $dr^2 + dt^2 = ds^2$ 'circle' wave (as 2nd derivative wave equation operators from eq.11 circle) since 4Degrees of freedom are imbedded on a 2D (dr, dt) surface here, with observed coherent superposition output as eq.16 solutions. A more direct way is to simply write the 4Degrees of freedom on the 2D surface as $dr + idt = (dr_1 + idt_1) + (dr_2 + idt_2) = (dr_1, \omega dt_2), (dr_2, idt_2) = (x, z, y, idt) = (x, y, z, idt)$, where $\omega dt \equiv dz$ is the z direction spin $1/2$ component ω (angular velocity) axial vector of the Newpde lepton (eqs.7-9); which we get anyway from lepton equation Newpde. Also see M5.

M3) One simple **Math axiom**, postulate(0), replaces the hundreds of math axioms:

All math is done in **One line instead of hundreds of lines**

simply by *defining* symbols as numbers, thereby making them the same thing. So instead of writing the "laws of mathematics" as a long list of ring and field axioms it is replaced with one

simple **axiom** postulateo. Note that here we postulated that “eq1 $z=zz+C$ implies some **real** $0=z$ ” which also implies *some* $z=zz$ case. So the **origin of mathematics** is eq.13 $z=0$ stable eq.11 **real** eigenvalue eq.5 e, ν and so $2\nu=\gamma$ (appendix C4) and so real **countability**(and thus the origin of **numbers**) since we can N count e, ν, γ (eg Mercuron section sect IIIb and appendix A1) with fractal scale one to one $E=Nhf$ countability) without them actually disintegrating even though the act of counting does change f as is well known. Note that even the proton is $3e$ (See partII). So you are still counting electrons even when you count everything else making eq13 the source of mathematics.

These numbers of e compose the numbers N in our list number-**define** symbol replacement of ring-field axioms with single simple axiom postulateo

M4 Define the two plug ins using parenthesis() and other math symbol definitions

Plus(+) and equals(=) just renames things(eg numbers). $1+1=2$ renames 1 and 1 as two. Plugging $1=1+0$ consecutively into $1=1X1$ thereby *defines* ring relation $0X1=0$ and $0X0=0$ so

list $1X1$ -**define** symbol $z=zz$ gives the *multiplicative properties of 0* such as $1X0=0$

$+C$ is needed for the *addition* of constants (so $\delta C=0$) in the ring-field such as $1=1+0$ in $z=zz+C$ eq1. on list number-**define** symbol replacement of ring-field axioms with single simple axiom postulateo. So we start with a

List all *numbers* such as $(1+0)X(1+0)=0X0 + 1X1+0X1+1X0$ defining *symbols* $(a+b)(c+d)=ac+ad+bc+bd$.

Distributive law

List all *numbers* such as $0X(1X0)=(0X1)X0$ and $1+(1+1)=(1+1)+1$ defining *symbols* $aX(bXc)=(aXb)Xc$ and $a+(b+c)=(a+b)+c$ multiplicative and additive **associativity** respectively. $0X1=0$ and $0X0=0$ come from the distributive law on plugging in $1=1+0$ into $1=1X1$.

Inverse and Bigger numbers z and so nonzero white noise symbol C in postulate

Define inverse $1-1=0$ also given these bigger numbers $1+1=2, C_i$ thereby *defining* symbol $C_1-C_2=\delta C=0$ as in the above inverse difference which applies even for a decimal because it can always be an integer in some unit system (for some scaling: eg decimal $1.1\text{km}=1100\text{m}$ integer). Thus we have the algebra to now do the two plugins(in sect1). So rings and fields are really **definitions**, not axioms, here required to define the terms(and apply it) in the one and only axiom: **postulate 0**: $z=zz+C$ implies **real0**

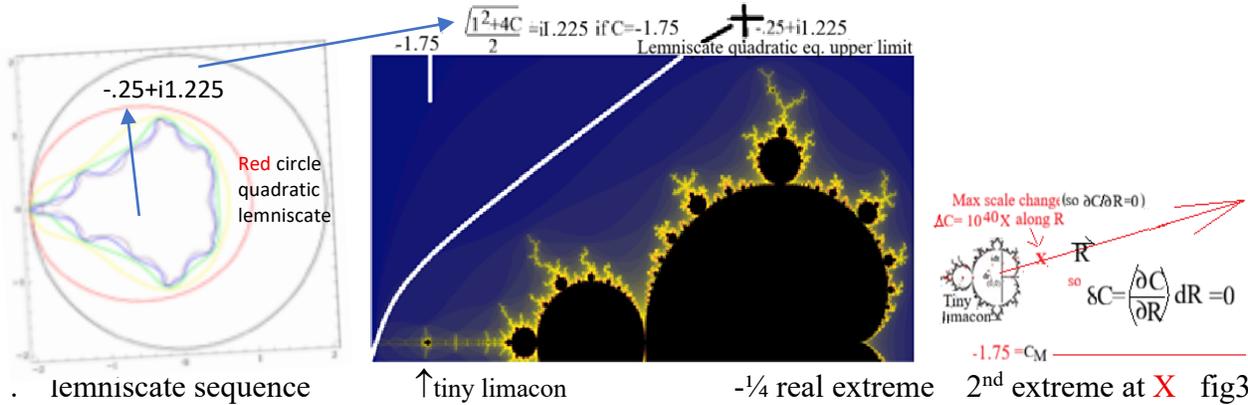
M5 Lemniscates required in dr, dt zoom: <http://www.youtube.com/watch?v=0jGai087u3A>

The fig1 Lemniscate (as a function of adding continuous circles fig3) is continuous(13) only along dr . So these δz fields of real numbers allow us to define the general case of ϵ, δ arbitrarily small(and not just snippets) in the limit definition of the Newton quotient

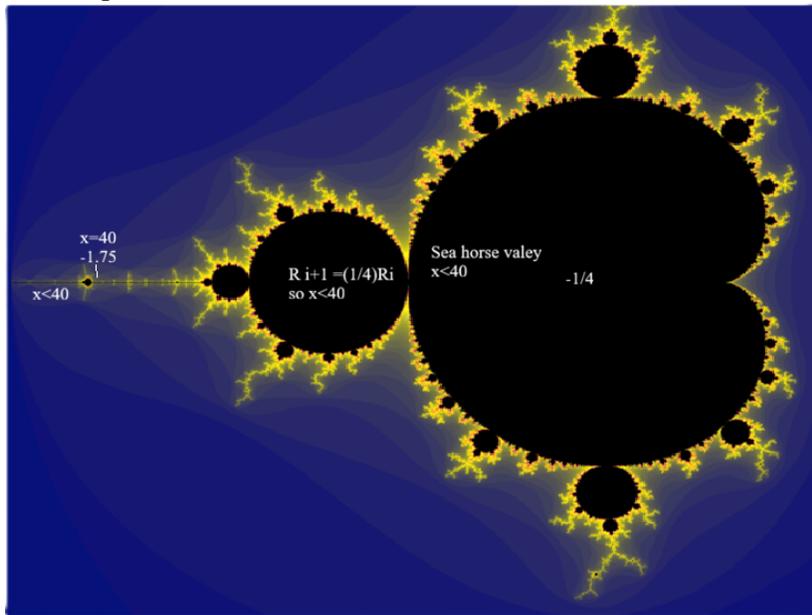
derivative= $\lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h} = \frac{df(x)}{dx}$ so we can write $\delta C \equiv \left(\frac{\partial C}{\partial r}\right) dr = 0$ thus **implying the**

requirement that C really is a constant (ie $\partial C/\partial R=0$) as the postulate demands. So to define $\delta C=0$ we *must* pull only the lemniscates of fig1 out of the zoom making this zoom process give us mathematically rigorous results. Also a lemniscate boundary and so the maximum jump fractal scale provide our two extreme since they are just two ways of writing the same boundary, one as 1.75 on the Nth fractal scale and the other as $1.75X10^{40}$ (maximum) on the **N-1 th fractal scale, making them two separate extreme giving one boundary**. To find this boundary (and thereby this number -1.75) reverse engineer the lemniscates down to the second circle iteration where the 2ndcircle C_n is not $0=C_0$ creating our fundamental lemniscate quadratic equation border containing point (-.25, i1.225) on that 1st extremum upper boundary. We must use that quadratic equation for that boundary because it is just as fundamental as eqs.1 & 3 and so also has its own

solutions like they do. We could have even postulated this circle equation instead of equation 1. Recall the lemniscate iteration sequence is $C_{N+1}=C_N C_N + C$. $C=C_1=dr^2+dt^2$, $C_0=0$. So that quadratic circle equation is $C_2=C_1 C_1 + C$ (Note similarity to eq.1.). To find the smallest boundaries we first write



lemniscate sequence ↑ tiny limaçon -1/4 real extreme 2nd extreme at X fig3
 So extreme (-1.75,-.25) solve $\text{real} \delta C=0$. So we can only zoom at those two points. For example for the 2nd extreme (for $\partial C/\partial R=0$) at $X=-1.75$ zoom along some lemniscate radial R direction near dr axis (tiny limaçon) filament <http://www.youtube.com/watch?v=0jGaio87u3A> (right fig3) to get the extreme maxima $10^{40N} X C_M$ scaling. In contrast the zoom at -.25 gets a continuum. Note from inspection of the real axis of the Mandelbrot set the extremum is really at -1.75. See below



$\delta C=(\partial C/\partial R)dR=0=d(C_M 10^{xN})$. $C=C_M$ is the postulated constant C. Along the real dr line $x < 40$ except at $R=-1.75$, $x=40$. So lower bound $R=-1.75$, upper bound $R=-1/4$

Summary: So extreme (-1.75, -1/4) solves $\text{real} \delta C=0$.

-1/4 upper extremum eq1 quadratic equation so rational Cauchy sequence $(z_{N+1}-z_N z_N=C)=-1/4$, -3/16,-55/256, ..0. So 0 is a real #. QED

-1.75= C_M lower extremum for lemniscate quadratic equation. By zooming at $C_M=-1.75$ we observe fractal $10^{40} X$ scale jumps with rotation (back to that $N=1$ orientation) and so not effecting that continuity of this lemniscate structure. So one $10^{40} X$ zoom is enough.

Concept "Ultimate Occam's razor postulate(0) implies mathematics&Newpde" given "0 is the simplest idea imaginable" (0 is no objects, a blank, 1 is some complex object). So this is "first principles", thus we have actually figured it out! We completely understand!!! And so it must work(fig2) and makes sense because all QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues and all mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So by **postulating**

$$z=zz+C \text{ implies } \text{real}\neq 0$$

(C constant so $\delta C=0$ and $z=zz+C$ eq1 gets us the multiplicative properties of 0) there then must be a rational Cauchy *sequence* with limit 0 that thereby doubles as an *iteration* of eq1 in $\delta C=0$ that thereby gives the (fractal) Mandelbrot set. Also plugging eq1 into $\delta C=0$ gives the Dirac equation and so fractal (scales $10^{40N} \times CM_{N=0}$, fig1) *real* eigenvalues of a *generally* covariant Dirac Newpde; clearly a big advancement as shown in fig2.

Newpde $\equiv \gamma^\mu (\sqrt{\kappa_{\mu\mu}}) \partial \psi / \partial x_\mu = (\omega/c) \psi$ for v, e ; $\kappa_{00} = e^{i(2\Delta\varepsilon/(1-2\varepsilon))} - r_H/r$, $\kappa_{rr} = 1/(1+2\Delta\varepsilon - r_H/r)$; $r_H = C_M/\xi = e^2 \times 10^{40N}/m$ (fractal jumps $N = -1, 0, 1, \dots$) $\Delta\varepsilon \equiv m_e$, $\varepsilon = \mu$ are zero if no object B(appendix B)

Questions answered:

Note the 'postulate(0) \rightarrow Newpde' idea answers the most important questions that the mainstream doesn't even ask!!!! (davidmaker.com for backup.) Like:

1) What is the origin of mathematics? (that physics requires)

Answer: **list numbers-define symbols and** (single simple *axiom*) **postulate0: $z=zz+C$ implies $\text{real} \neq 0$**

(C constant so $\delta C=0$. $z=zz+C$ eq1 needed for multiplicative properties of 0. See math Appendix M where list-numbers-define symbols replaces the many field-ring axioms with one simple axiom: postulate0.

2) Where does the Mandelbrot set come from?

Answer: That **real (0) implies a rational Cauchy sequence** doubling here as a (thereby required) iteration of eq.1 in $\delta C=0$ generating the Mandelbrot set.

3) Where does the Dirac equation and special relativity come from?

Answer: **equation 5** (resulting from plugging eq1 into $\delta C=0$, also required)

4) Where does the vacuum come from?

Answer: **eq.9**, One of the eq6 (ie $dr=dt$, $dt=-dt$, so: **$dt=dr=0$**) factors of real eq5.

5) What is the origin of the complex numbers and space-time?

Answer: eq1 is a quadratic equation resulting in eq.4 giving complex numbers (negative under the discriminant sqrt sign) **$dr+i1dt=ds$** which is also **the origin of space-time** dr, dt .

6) Why is the speed of light c constant?

Answer: In eq4 and eq5 the above natural unit **$1=c=dr/dt$** is always a coefficient 1

7) Where does charge come from?

Answer: Charge $e^2 = CM = -1.75$ (Fractal Mandelbrot set CM extremum comes from plugging *iteration* of eq1 into $\delta C=0$, Then plug eq.12 into eq16 getting $C_M/m=r_H=e^2/m$ charge-mass ratio

8) Where does the cosmological oscillation come from? (We are in the expansion stage.)

Answer: **Newpde zitterbewegung oscillation on the $N=1$ fractal scale explaining cosmology!!!**

9) Where does general relativity (GR) come from?

Answer: The Newpde κ_{ij} for $N=-1$ fractal scale(top of fig2).

10) Where does quantum mechanics (QM) come from?

Answer: Invariance of eq5 *circle* and so eq11 QM operator formalism. Also the 3rd order Taylor expansion term of $\sqrt{\kappa_{ij}}$ replaces renormalization(appendix B).

11) Where does the strong force come from?

Answer: Newpde half integer spherical harmonic $2P_{3/2}$ at $r=r_H$ with B **flux quantization** gives ultrarelativistic $+e$ s ($\gamma=917$ explaining large baryon mass) so extremely **narrowed E field lines at center** hence a huge force there (partIII, davidmaker.com. QCD and gluons are not required.)

12) Why does the (SM core of modern physics) idea ($SU(2)XU(1)_L$) feature complex numbers?

Answer: $SU(2)$ is rotation in the 2D complex plane, so from **eq.4**. $U(1)$ is **CM** (see C9). L left handedness from Newpde $e+\nu=G_{00}=0$ so in this same 2D uniform space-time (appendix C8).

13) Where does the weak force component of the SM come from?

Answer: We generate the Fermi G_F from **object C** field tensor(appendix C7)Newpde solution

14) Is there dark matter?

Answer: No. These quantized gravity Zwicky anomalies (they use for evidence) arise from the **fractal nature of space-time** instead. So, since there is quantization on the subatomic scale there is metric quantization on the cosmological scale. $g_{00}=\kappa_{00}$ is the fractal scale bridging (N and N-1 scales) condition giving the metric quantization math (See end of appendix B and partIII davidmaker.com).

15) How does the universe work?

Answer: **Postulate0**.

16) Where does gravity come from?

Answer: From **N=-1**. See figure 2. So $e^2 10^{40(-1)}=Gm_e^2$ solve for G. κ_{ij} for N=-1 with this G are the Schwarzschild metric. Thus we derived gravity from merely substituting **N=-1** into the Newpde.

17) Where does the neutrino come from?

Answer: It comes out of **eq.8** (in the context of the New pde resultant Dirac eq.20).

18) Where does the neutrino mass come from?

Answer: $E_e+\sigma^*p_\nu=G_{00}\neq 0$ **non uniform field**(C8) . Dirac $+m=G_{00}$ for matter neutrino, $-m$ for antineutrino. Note from appendix C8 this m depends on the size of the nonuniform G_{00} .

19) Why is there more matter than antimatter?

There isn't. Two positrons and one electron in the $2P_{3/2}$ at $r=r_H$ proton and one more distant orbiting e electron making up hydrogen the most common element. So they are in equal amounts

20) What is the pion field?

Answer: That virtual creation-annihilation process inside r_H (center -e infrequently annihilates one of the positrons $+e$) **changing the B field there causing a Faraday law emf outside** giving the eq. 9.22 **zpe pions nonzero motion energy**. This explains the Yukawa force pion cloud.

21) Why is the proton m_p heavy relative to the electron m_e ?

Answer: The $2P_{3/2}$ two positrons at $r=r_H$ move at ultrarelativistic speeds($\gamma=917$) **because of B**

field flux quantization. $\Phi = BA = \frac{\mu_0 i}{2r_H} (\pi r_H^2) = \frac{\mu_0}{2r_H} \left(\frac{e}{\left(\frac{2\pi r_H}{\gamma c}\right)} \right) (\pi r_H^2) = \Phi_0 N = 3\Phi_0 = \frac{h}{e} 3$

B inside equals $\sim 10^{12}T = \mu_0 i / 2r_H$ ($i=e/t$, $c=2\pi r_H/\gamma t$). partII. Solve for γ . Get 917. So $2X917m_e=m_p$. Meisner effect zpe (zpe pions,eq9.22) so small B *outside*. The two positron motion also implies ortho and par states (from the Clebch Gordon coefficients).

22) What are magneto stars?

Answer: The force of a supernova implosion **squishes out** these Meisner effect zpe (pions,eq.9.22) **so we see the bare $10^{12}T = B$** proton field. As the neutron star expands(in months) the zpe returns rapidly (so fast radio burst)

23) What is the deuteron?

Answer: **Two $2P_{3/2}$** (protons) **with an electron in between at r_H** . Can compute its binding energy = $2e^2/r_H$ The neutron is half a deuteron: So $2P_{3/2}$ with electron. It's extra mass is from $m_p c^2 + e^2/r_H + m_e c^2$.

24) Where do the 4 SM Bosons come from?

Answer: The Mandelbrot set perturbations in eq16 are the same as rotations on that e, ν plane given by eqs7-8. The 4 axis' are max extreme of $\delta(dr+dt)=0, \delta ds^2=0$ just as 45° is min (this time man made accelerator perturbations). One axis rotation is just what we have but **two axis' rotations** are new (appendix). There are **4 of them giving the 4 SM bosons** $-W, +W, Z, \gamma$ thereby deriving the Standard Model of Particle Physics

25 Why does the photon have no mass?

Answer: Uniform space-time neutrinos have no mass either (eq8 and $E_e + \sigma^* p_\nu = G_{00} = 0$) but obtain $-m, +m$ mass in a nonuniform gravity ($C8, G_{00} \neq 0$). In the **quadrant IV to I rotation (giving Maxwell's eqs.**, Lorentz force and so the γ) the $+m$ quadrant I and $-m$ quadrant IV neutrinos **cancel** out leaving the photon γ with no rest mass.

26) Why is the neutrino left handed?

Answer: In uniform space-time $E_e + \sigma^* p_\nu = 0$ so $E_e = -\sigma^* p_\nu$ with the negative sign meaning left handed given positive E_e . (see C8)

27 Why do W,Z,t,H have large masses m?

Answer: Recall $2P_{3/2}, 2P_{1/2}$ at $r=r_H$ constrains the two positron ortho-para states. In above orbit plane **Para state** on z axis ($2P_{1/2}$) the **Compton wavelength λ is shrunk** (Fitzgerald contraction) by $\gamma = 917X$, so huge $m = h/c\lambda$. Muon inside this r_H μ motion also creates another muon μ so 2μ (appendix C5 and partII)

Inside r_H Para states (from top, X917 eq4, partII)

Muon shrink: $917(\epsilon/(1 \pm \epsilon))$ weak interaction.

$917(\epsilon/(1+\epsilon)) = Z_0, J=1, 80$ Gev e-e rotation so 0 charge Appendix C5

$917(\epsilon/(1-\epsilon)) = W_{\pm}, J=1, 91$ Gev; e- ν rotation so charged with ν decay

2 Muon shrink: $917(2\epsilon/(1 \pm 2\epsilon))$ **the fundamental para state**

$917(2\epsilon/(1+2\epsilon)) = t, J=1/2, 173$ Gev. So the top is two para parallel μ , added e baryonic

$917(2\epsilon/(1-2\epsilon)) = 207$ GeV. Added e makes it baryonic

Outside Para state

$917\pi = H, 125$ Gev. H is merely a para parallel π , outside zpe for the para solutions

Ortho States (from side, X2, eq.7.1 partII)

These large (917X) masses solve the hierarchy problem.

The three ortho states are Ξ_s, Ξ_c, Ξ_b . with Frobenius series multiplet perturbations of these Newpde ortho states (PartII, Ch8-10). Proton is the ground state for the s Frobenius series solutions.

The three ortho states are Ξ_s, Ξ_c, Ξ_b . with Frobenius series multiplet perturbations of these ortho states (PartII, Chs8-10). Proton is the ground state for the s Frobenius series solutions.

This theory is falsifiable- testable. So here are a few of the predictions of (hopefully) future experiments and astronomical observations:

Predictions

1) In **50 years the new muon** gyromagnetic ratio will be $g_y=1165932249$ (1 part in 10^{-5} . (appendix B). The present one is 116592059) with the muon mass thereby going from $1.883531627 \times 10^{-28} \text{kg}$ to $1.883531608 \times 10^{-28} \text{kg}$ in that same time period. It is a thousand times more accurate to measure this mass change by measuring the g_y change instead since these g_y experiments are so accurate* (sect A3 of part1, davidmaker.com).

2) The electron has a radius (eq15) of about $r_H \sim 10^{-18} \text{ m}$ implying that the **proton-proton (3 electrons) scattering cross-section will peak at 21TeV** with a peak at 7TeV for single electron-electron scattering(partII). Need that new CERN accelerator to confirm this.

3) **cos ωt universe expansion and contraction** ($r=r_0(1+\cos(\omega t-\pi))$) with clocks dt' running fast for distant observers ($dt'^2=(1-r_H/r)dt^2$) implying a universe much older than the nominal 13by. (cos ωt from newpde zitterbewegung $e^{i\omega t}=\cos\omega t+i\sin\omega t$). The DES-DES-CBR measurements imply the possibility of a cos ωt oscillation already eg., "acceleration slowing" so big crunch? Much older universe implied by mature galaxies and black holes at 200MY. Selfsimilar Dirac spin from excess of galaxies spinning one way from Dirac eq spin selfsimilarity.

4) **F=(Adv/dt)/v² pairing interaction force** for superconductors (appendix C4), thereby explaining them (without using those adhoc Lagrangian densities,sect.5.4 PartI eg., BCS.).Copper oxides and Graphene SC 's already confirm this. Just show that in a future publication I guess.

5) The **neutrino mass** is not fixed, **varies with gravitational field gradients**. (In fact they have yet to determine its mass, appendix C8)

The 3 Neutrino's in the sun have a different mass than these neutrinos here. It is possible to experimentally confirm this too by observing the neutrino oscillations at different locations.

6) Wave particle duality comes from that 45° angle of the electron on that e,v graph (sect.IIIC) where C noise position uncertainty is largest (wide slit) with ds^2 circle always wave (eq C1) then C=0 (narrow slit) gives only the wave: so wide slit particle (photoelectric effect), narrow slit wave, airy diffraction pattern hence wave-particle duality. Has already been verified experimentally.

7) There is no dark matter. It is a metric quantization phenomena. Just set $g_{00}=\kappa_{00}$ to get the mathematics (a fractal scale bridging condition) deriving the whole shebang ($v \sim N100 \text{km/sec}$ halos, N integer). Can confirm this with *careful* asymptotic rotational velocity measurements of nearby galaxies. Actually, I already have this data (partIII davidmaker.com).