

## 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 we **postulated** “ $z=zz+C$  implies *real*#0” (C constant so  $\delta C=0$  and  $z=zz+C$  eq1 defines the multiplicative properties of **0**) which then implies a rational Cauchy *sequence* with limit 0 that doubles as a *iteration* of eq1 in  $\delta C=0$  that gives the Mandelbrot set. Also plugging eq1 into  $\delta C=0$  gives the Dirac equation and, with that Mandelbrot set, *generally* covariant Dirac *real* eigenvalues of a Newpde, clearly a big advancement over prior knowledge (See fig2 also.).

**David Maker**

**Summary**  $z=zz+C$  implies *real*0 [postulate0] ( $\equiv z_0$ , C constant so  $\delta C=0$  and  $z=zz+C$  is eq1)

We need that  $z=zz$  to define the multiplicative properties of **0** in (eg., Plugging  $1 \equiv 1+0$  into  $1=1X1$  thereby gives required relations  $0X1=0$ ,  $0X0=0$ . See appendix M3 for the (*list number-defining-symbol*) replacement method of the ring-field axioms:

itself implying  $z=1+\delta z$  into eq1 results in  $\delta z+\delta z\delta z=C$  (3) so  $\frac{-1 \pm \sqrt{1^2+4C}}{2} = \delta z = dr + i dt$  (4) for  $C < -1/4$ . So C is complex. But the definition of *real*0 implies that Cauchy sequence “iteration” so requires

I **plugging** the **eq1 iteration** ( $z_{N+1}-z_N z_N = C$ ) into  $\delta C=0$ . Given *real*0,  $1 \equiv 1+0$  then creates these other rational number eq4 *Real*<sub>1</sub> and *Real*<sub>2</sub>(times*i*) components of C that then requires two Cauchy sequences or a single (*Real*<sub>1</sub>,*Real*<sub>2</sub>*i*) complex iteration (recall  $z_0=0$ ) implying  $\delta C = \delta(z_{N+1}-z_N z_N) = \delta(\infty-\infty) \neq 0$  for some  $C=(\text{Real}_1, \text{Real}_2 i)$ . The Cs that result instead in finite complex  $z_\infty$ s (so  $\delta C=0$ ) define the **Mandelbrot set** fig1 lemniscate with fractal scale  $10^{40} X C_M$   $\delta C=0$  extreme jumps at  $C_M=-1.75$ . So for huge Nth scale  $|\delta z| \gg 1/4$ . Note to define these derivatives in  $\delta C=0$  we require continuity so we *must* pull only the lemniscates of fig1 out of the zoom. Next

II **plug  $z=zz+C$  into  $\delta C=0$**  So using eqs 3,4:  $\delta C = \delta(\delta z + \delta z \delta z) = \delta \delta z (1) + 2(\delta \delta z) \delta z \approx \delta(\delta z \delta z) = \delta((dr + i dt)^2) = \delta[(dr^2 - dt^2) + i(dr dt + dt dr)] = 0 = (5) \text{Minkowski metric} + \text{Clifford algebra} \equiv \text{Dirac equation}$  (See eq7a  $\gamma^\mu$  derivation from eq5.). But (N=0, 2D)  $\delta \delta z 1$  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  $2D+2D=4D$  Dirac Newpde eq.204D Dirac **Newpde**  $\equiv \gamma^\mu (\sqrt{\kappa_{\mu\mu}}) \partial \psi / \partial x_\mu = (\omega/c) \psi$  for  $\nu, e$ ;  $\kappa_{00} = e^{i(2\Delta\epsilon/(1-2\epsilon))} - r_H/r$ ,  $\kappa_{rr} = 1/(1+2\Delta\epsilon - r_H/r)$ ;  $r_H = C_M/\xi = e^2 X 10^{40} N/m$  (fractal jumps  $N = -1, 0, 1, \dots$ )  $\Delta\epsilon \equiv m_e$ ,  $\epsilon = \mu$  are zero if no object B (appendix B). Note both plugins are required,

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 $1S_{1/2}, 1S_{1/2}, 2S_{1/2}$ leptons (Koide)	
4 SM Bosons from 4 axis extreme rotations of $e, \nu$	
N=-1 (i.e., $e^2 X 10^{-40} \equiv G_N$ ). $\kappa_{ij}$ is then by inspection the Schwarzschild metric $g_{ij}$ (For $N=-1, \Delta\epsilon \ll 1$ ). 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 $\kappa_{ij}$ gives the anomalous gyromagnetic ratio and Lamb shift <i>without</i> the renormalization and infinities.	
So $\kappa_{ij}$ provides the general covariance of the Newpde.	
So we got all this physics by mere inspection of this Newpde with no gauges!	

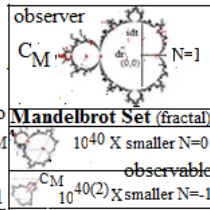


fig2

**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.

**Introduction**  $z=zz+C$  implies **real0** [postulate0] ( $\equiv z_0$ ,  $C$  constant so  $\delta C=0$  and  $z=zz+C$  is eq1)  
 We need that  $z=zz$  to define the multiplicative properties of **0** in (eg., Plugging  $1\equiv 1+0$  into  $1=1X1$  thereby gives required relations  $0X1=0$ ,  $0X0=0$ . See appendix M3 for the (list number-defining-symbol) replacement method of the ring-field axioms:

itself implying  $z=1+\delta z$  into eq1 results in  $\delta z+\delta z\delta z=C$  (3) so  $\frac{-1\pm\sqrt{1^2+4C}}{2}=\delta z=dr\pm i dt$  (4) for  $C<-1/4$ .

Note  $C$  generally *complex* in this complex plane. But the definition of **real0** implies that Cauchy sequence “iteration” so requires **plugging** the **eq1 iteration** ( $z_{N+1}-z_N z_N=C$ ) into  $\delta C=0$ . Given **real0**,  $1\equiv 1+0$  then creates these other rational number eq4  $Real_1$  and  $Real_2(\text{times}i)$  components of  $C$  that then requires two Cauchy sequences or a single  $(Real_1, Real_2i)$  complex iteration (recall  $z_0=0$ ) implying  $\delta C=\delta(z_{N+1}-z_N z_N)=\delta(\infty-\infty)\neq 0$  for some  $C=(Real_1, Real_2i)$ . The  $C$ s that result instead in finite complex  $z_\infty$ s (so  $\delta C=0$ ) define **Mandelbrot set** fig1 lemniscate with fractal scale jumps.

### Lemniscates required in dr,dt zoom

The fig1 Lemniscate (as a function of adding continuous circles(11)) is continuous along  $dr$ . So these  $\delta z$  fields of real numbers allow us to define the general case of  $\epsilon$ ,  $\delta$  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 with that lemniscate boundary and the maximum jump fractal scale being our two extreme since they are just two ways of writing the same boundary, one as 1.75 on the  $N$ th fractal scale and the other as  $1.75 \times 10^{40}$  on the  $N-1$  th fractal scale, making them two separate extreme giving one boundary. To get this boundary reverse engineer the lemniscates down to the second circle iteration where the first Circle  $C_0$  is not 0 making this the fundamental lemniscate quadratic equation (as our equation 3 is and not a cubic or quartic,..) so putting  $(-1/4, i1.225)$  on the (1<sup>st</sup> extremum) boundary of our set. This quadratic equation is then just as fundamental as equation 3 and its iteration also produces the Mandelbrot set. We could have postulated this circle equation instead of equation1 and worked backwards to find eq1 then and repeated everything: so this boundary indeed is fundamental. Therefore:

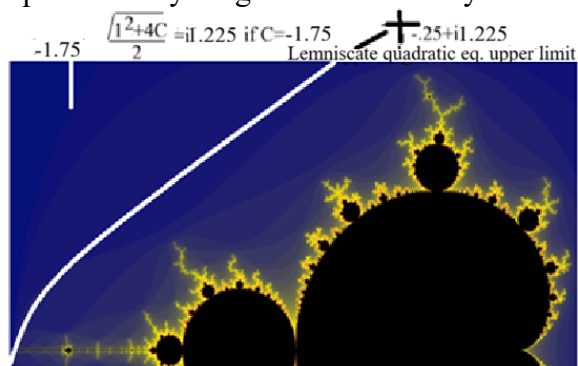


fig3 So  **$(-1.75, -1/4)$**  solves  $real\delta C=0$

↓ $C_M$  tiny limaçon So  $C=-1.75$  and  $C=-1/4$  are those 1<sup>st</sup> extreme solutions of  $real\delta C=0$ . So we can zoom at those two points to find a 2<sup>nd</sup> extreme  $\partial C/\partial R=0$  along some lemniscate  $R$  direction filament radiating at -1.75, The zoom gets nothing but continuum at -.25.

Max scale change (so  $\partial C/\partial R=0$ )  
 $\Delta C = 10^{40}X$  along R



$-1.75 = C_M$

Note tiny limaçon at  $C_M$  point. <http://www.youtube.com/watch?v=0jGaio87u3A>  
 then zooms up its lemniscate R line filament to the second extremum (fractal  
 maximum lemniscate scale jump change) at  $X = -1.75 = C_M$ .

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

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$-1.75 = C_M$  yields lemniscates with  $10^{40}N X C_M$  scaling. So for *observer* huge Nth scale  $|\delta z| \gg 1/4$

$-1/4$  rational Cauchy sequence  $(z_{N+1} - z_N) z_N = C = -1/4, -3/16, -55/256, \dots, 0$ . So  $0$  is a **real** #. QED

$-1/4$  is in the continuum but zooming at  $C_M = -1.75$ ..we **observe** rotated and fractal  $10^{40}X$  scale jumps with rotation (back to that  $N=1$  orientation) and scaling being mere frame of reference changes not effecting that continuity of the lemniscate structure. One  $10^{40}X$  zoom is enough.

## II Plug $z = zz + C$ into $\delta C = 0$

Note for  $N=2$  (Appendix A1) huge fractal scale observers  $|\delta z| \gg 1/4$  relative to  $N=0$  tiny rotated  $\delta z' \approx 1$  scale. So using eqs 3,4:  $\delta C = \delta(\delta z + \delta z \delta z) = \delta \delta z (1) + 2(\delta \delta z) \delta z \approx \delta(\delta z \delta z) = \delta((dr + idt)^2) = \delta[(dr^2 - dt^2) + i(dr dt + dt dr)] = 0$  (5)

**Minkowski metric** + **Clifford algebra** = **Dirac equation** (See eq7a  $\gamma^\mu$  derivation from eq5.).

But ( $N=0, 2D$ )  $\delta \delta z 1$  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  $2D + 2D = 4D$  Dirac Newpde eq.20  
 $4D$  Dirac **Newpde**  $\equiv \gamma^\mu (\sqrt{\kappa_{\mu\mu}}) \partial \psi / \partial x_\mu = (\omega/c) \psi$  for  $v, e$ ;  $\kappa_{00} = e^{i(2\Delta\epsilon/(1-2\epsilon))} r_H/r$ ,  $\kappa_r = 1/(1+2\Delta\epsilon r_H/r)$ ;  
 $r_H = C_M/\xi = e^2 X 10^{40}N/m$  (fractal jumps  $N = -1, 0, 1, \dots$ )  $\Delta\epsilon \equiv m_e$ ,  $\epsilon = \mu$  are zero if no object B (appendix B

## Applications

of  $\delta(ds) = 0$

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  $-dr + dt = ds, -dr - dt = ds \equiv ds_1 (\rightarrow \pm e)$ . Squaring & eq.5 gives circle in  $e, v$  ( $dr, dt$ ) 2<sup>nd</sup>, 3<sup>rd</sup> quadrants (7)

&  $dr + dt = ds, dr - dt = ds, dr \pm dt = 0$ , light cone ( $\rightarrow v, \bar{v}$ ) in **same** ( $dr, dt$ ) plane fig3 1<sup>st</sup>, 4<sup>th</sup> 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  $-1.4 \dots = C_M$ ).  $C_M$  iteration definition, implies  $\delta z \neq \infty$ . This then implies

the eq.5 *non* infinite 0 extremum for **imaginary**  $\equiv drdt + dt dr = 0 \equiv \gamma^i dr \gamma^j dt + \gamma^j dt \gamma^i dr = (\gamma^i \gamma^j + \gamma^j \gamma^i) dr dt$  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 or 9  $ds_1^2 = (dr + dt)(dr + dt) = (-dr - dt)(-dr - dt) = [dr^2 + dt^2] + (drdt + dt dr) \equiv ds^2 + ds_3 = \text{Circle} + \text{invariant}$ . (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 for  $N=0$   $\delta z'$  perturbation of eq5 flat space implying a further  $\delta C = 0 = (\partial C/\partial r)_r dr + i(\partial C/\partial t)_t dt = 0$  where  $dt=0$  and  $45^\circ$  allowed (so where also  $dr \approx 0$  on  $1/4R$  circle)  
 is the  $(\partial C/\partial r) dr = 0$  Feigenbaum lower extremum zoom dense point(2), thus where the last of the derivatives  $\partial C/\partial r$  exist. We define circle ( $ds$  radius) normalized dimensions  $k \equiv dr/ds$ ,  $\omega \equiv dt/ds$ ,  $\cos\theta = r$ ,  $\sin\theta = t$ .  $dse^{i45^\circ} = ds'$  (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'.

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

$\delta z \equiv \psi$ . Recall from above that we proved that  $dr$  is a real number. So  $k = dr/ds$  is an operator in eq.11 with *real* eigenvalues since eq.11 implies  $k$  is an observable. Also since  $\delta z = \cos kr$  then  $k$  has to be  $= 2\pi/\lambda$  thereby deriving the DeBroglie wavelength  $\lambda$ . Note the derivation of eq11 from that circle. 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 given that the actual upper real limit to set  $C$  (eq3) is a negative ‘ $dr$ ’ value added to  $-1/4$ , so not exactly  $-1/4$ .

### Eq5 Minkowski Metric implies Lorentz transformations(9)

Recall eq.5 with its Minkowski metric ( $ds^2 = dr^2 - dt^2 = dr^2 - 1^2 dt^2 = dr^2 - c^2 dt^2$ ). 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) **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 **observable  $N=0$**  (so small) equation 3 extremum  $\delta z \approx C$ . So  $C \approx \delta z/\gamma = C_M/\xi = \delta z'$  (12) with  $\gamma$  having the same Lorentz  $\gamma$  transformations as mass  $\xi$  does.

So  $C_M$  defines charge  $e^2$ .  $\xi$  defines mass  $= mc^2$ . But in general (from fig1)  
 $C_M = C_{M(N=0)} \times 10^{40N} \equiv e^2 10^{40N}$ . Recall  $z = 1 + \delta z, z = 1, 0$

So  $C = -1/4 \approx 0$ ,  $|C| = |C_M| = -1.7.. \approx 1$  in eq1 imply **small stable mass  $\xi = e, \nu$**  with large  $\gamma$  making **6e large unstable mass  $\xi$**  (=stable large mass  $P$  if  $2P_{3/2}$  at  $r=r_H$ , partII). Thus:

$z = -1/4 \approx 0$ : 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 (13)

$z = -1.7.. \approx -1$ : So  $\delta \xi \delta z' + \xi \delta \delta z' = 0$ . So  $|\xi|$  is **big** and  $\delta \xi$  is big so unstable **6e**(eg., that  $D = \xi = \tau + \mu$ ) (14) =  $K_{\text{iode}}$ . See appendix M3. B flux  $3h/e$  quantization implies 1 ultrarelativistic stable **3e** (large  $\gamma$ ) at  $r=r_H$ . 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

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)

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

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 eq.13 Bohr’s  $\delta z * \delta z = \psi * \psi = 1$  probability density for electron (not a postulate anymore).

### Eq.7 $dr + dt = ds$ for $N=1$ scale has to be perturbed by some $\delta z$ from $N=0$ , $N=-1$ fractal scales

That Leap Frog effect (here  $N=-1 \rightarrow N=1$ , B5) 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  $\delta z$  variation around the light cone of eq.7 but now constrained by those  $\delta C=0$  circle  $ds$  extreme at  $45^\circ$  of course(eq10). 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  $= \delta z' + \delta z = (dx_1 + i dx_2) + (dx_3 + i dx_4) \equiv dr + i dt$ . But given  $\delta z \approx dr \approx dt$  at  $45^\circ$  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 seen from larger scale as ‘ $dr$ ’ is big on that smaller scale ‘ $r$ ’)  $dr \approx r$  on  $N=0$  for  $N=1$  ( $10^{40} \times$  larger) observer. Define from eq.16  $dr, dt'$ :

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

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

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

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. This implies then that N=0 2D Mandelbrot set  $\delta z'$  must then have a dimensionality that is independent of the N=1 2D Dirac  $dr$  thereby creating the 4D *eigenfunction*  $\psi \equiv \delta z'$  (So our **real** #s really are eq11 eigenvalues in the Newpde). Thus in  $\delta z' + \delta z = (dx_1 + i dx_2) + (dx_3 + i dx_4) \equiv dr + i dt$  so with  $x_1, x_2, x_3, x_4 \rightarrow (dr, dt) \rightarrow x, y, z, t$ . So (eq 7a)  $dr^2 - dt^2 = (\gamma^r dr + i \gamma^t dt)^2$  applies so  $dr$  can point in the direction of any  $dx_i$  (eg.,  $dx^2 - dt^2 = (\gamma^x dx + i \gamma^t dt)^2$ ). 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**  $\gamma^r dr \equiv \gamma^x dx + \gamma^y dy + \gamma^z dz$  with  $\gamma^i \gamma^j + \gamma^j \gamma^i = 0$ ,  $i \neq j, (\gamma^i)^2 = 1$  in  $(\gamma^r dr + i \gamma^t dt)^2 = (\gamma^x dx + \gamma^y dy + \gamma^z dz + i \gamma^t dt)^2 = dx^2 + dy^2 + dz^2 - dt^2 = ds^2 = dr^2 - dt^2$ . Thus we have derived the well known 4D Clifford algebra Dirac  $\gamma$  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  $\delta z$  perturbation equations 17-19 in  $\kappa_{\mu\nu}$  we get  $(\gamma^x \sqrt{\kappa_{xx}} dx + \gamma^y \sqrt{\kappa_{yy}} dy + \gamma^z \sqrt{\kappa_{zz}} dz + \gamma^t \sqrt{\kappa_{tt}} i dt)^2 = \kappa_{xx} dx^2 + \kappa_{yy} dy^2 + \kappa_{zz} dz^2 - \kappa_{tt} dt^2 = ds^2$ . 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  $e, \nu$ ,  $\kappa_{00} = e^{i(2\Delta\epsilon/(1-2\epsilon))} - r_H/r$ ,  $\kappa_{rr} = 1/(1+2\Delta\epsilon - r_H/r)$ , (20)  $r_H = C_M/\xi = e^2 \times 10^{40N}/m$  (N=-, -1, 0, 1, ..),  $\Delta\epsilon = 0$  for neutrino  $\nu$  and N=-1 or no object B (eq.24, B2).

### Postulate(0) $\rightarrow$ Newpde

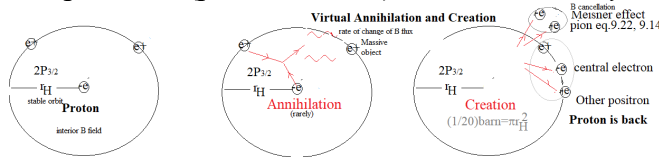
## III) Solutions To The Newpde

**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  $p = K_{iode}/2$

**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 2  $\gamma$  ray scattering can be only off the 3<sup>rd</sup> large mass (in  $2P_{3/2}$ ) the diagonal metric (eq.17) E&M time reversal invariance is a reverse of the  $\gamma$  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.



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.  $D/2 = m_p$  with very high  $\gamma$  ( $=917$ ) due to B flux (BA) quantization  $= \hbar m / e = 3\hbar / e$  for  $SP^2$ . (PartII) Also in the frame of reference of these two positron (only) *observers* the central electron is also ultrarelativistic and so with a tiny  $\Delta x$  uncertainty and so also can easily fit 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 (udscbt)**. 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 CERN 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 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.

## IIIa) $1S_{1/2}$ $2S_{1/2}$ at $r \leq r_H$ Hund rule States

Recall from just above:

$$(\gamma^x \sqrt{\kappa_{xx}} dx + \gamma^y \sqrt{\kappa_{yy}} dy + \gamma^z \sqrt{\kappa_{zz}} dz + \gamma^t \sqrt{\kappa_{tt}} dt)^2 = \kappa_{xx} dx^2 + \kappa_{yy} dy^2 + \kappa_{zz} dz^2 - \kappa_{tt} dt^2 = ds^2. \quad (21)$$

**z=1 eq13 Schrodinger equation for Newpde for these  $1S_{1/2}$   $\mu$ ,  $2S_{1/2}$   $\tau$ , at  $r \leq r_H$  States.**

1) Recall associated 2 body *energy eigenvalues of Newpde Schrodinger equation* hydrogen atom  $r \gg r_H$  Rydberg formula

$$E = R_b / N^2 \quad N = \text{principle quantum number}$$

2) The resulting  $2S_{1/2}$ ,  $1S_{1/2}$ , *energy eigenvalues of the Newpde Schrodinger eq.* at  $r=r_H$  in contrast is given by the Koide formula:  $\frac{m_\tau + m_\mu}{(\sqrt{m_\tau} + \sqrt{m_\mu})^2} = \frac{2}{3}$ .

### Nonrelativistic Schrodinger eq reduced COM $r=r_H$ observer model for $2P=D$

D must have net fictitious spin 0 (Or might be  $D^0$ ?) spin  $(2m_p) = S = 1/2 - 1/2 = 0$  to make the Schrodinger equation approach exact (eg., does not require a Pauli term) here thereby requiring a reduced mass  $D/2 = P$  so spins can cancel in a singlet black box state. So write

$$-i \frac{\partial}{\partial t} \psi = H \psi = -\frac{\hbar}{2m} \frac{\partial^2}{\partial r^2} \psi, P \psi = -\frac{\hbar}{2P} \frac{\partial^2}{\partial r^2} \psi = -\frac{\hbar}{D} \frac{\partial^2}{\partial r^2} \psi. \text{ Also using eq.11 } \hbar (dr/ds) \psi = -i \hbar d\psi/dr$$

$$\text{with } \hbar \text{ canceling out and eq.20 to get: } i^2 \frac{d^2 \psi}{D dr'^2} = \frac{1}{D} \left( \frac{dr'}{ds} \right)^2 \psi \rightarrow \left( \frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr}}{2^D}} \frac{dr}{ds} \right)^2 \psi \quad (22)$$

with  $dr'$  acting as that "black box" containing a ultrarelativistic  $\sqrt{\kappa_{rr}}$  mass (eq. B10) masquerading as a big *nonrelativistic proper mass* allowing us to start with the usual spherical symmetry Schrodinger equation nonrelativistic limit and its principle quantum number N degeneracies:

### Energy eigenvalue of $2S_{1/2} = 2P_{3/2}$ Energy eigenvalue

Must add (Faraday's law zero point energy eqs. 9.22, 9.14 Sect 9.10) observer  $\varepsilon = 1S_{1/2}$  to both sides:  $2S_{1/2} + 1S_{1/2} = 2P_{3/2} + 1S_{1/2}$  (23)

So left side Hamiltonian reduced mass  $(D_\mu + D_\tau)/2$  with  $(dr/ds)_\mu \rightarrow (dr/ds)_\tau + (dr/ds)_\mu$  in right side of eq.22 gives

$$\left(\frac{D_\tau + D_\mu}{2}\right)\psi_2 = \left(\frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr}}{2D_\tau}} \frac{dr}{ds} + \frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr}}{2D_\mu}} \frac{dr}{ds}\right)^2 \psi_2$$

Here all these  $\psi$  electron 'e' eigenstate orbitals are filled at  $r=r_H$  so for each of them  $|\psi^*\psi|=1$  and so can set each  $|\psi|=1$ . So we can literally write  $\psi$  by counting the electron contributions to total  $\psi$  here in a wave function by merely superposition (adding) of Newpde eigenfunction  $\psi$ s. Also the left hand side reduced mass is  $(D_\mu+D_\tau)/2$  gives  $3e+3e$  per  $2D$  so  $\psi_1=6\psi$ . Since right side is  $(dr/ds)^2\psi_2$  and  $2P+1S$  then it has to be a  $^1S+^2P=SP^2$  hybrid eigenstate operator of  $\psi_2=4\psi=4\phi_s$ :

$$SP^2 = \phi_0 = \frac{1}{\sqrt{3}}s - \frac{1}{\sqrt{6}}p_x + \frac{1}{\sqrt{2}}p_y$$

$$SP^2 = \phi_1 = \frac{1}{\sqrt{3}}s - \frac{1}{\sqrt{6}}p_x - \frac{1}{\sqrt{2}}p_y$$

$$SP^2 = \phi_2 = \frac{1}{\sqrt{3}}s + \frac{2}{\sqrt{6}}p_x$$

$$P = \phi_3 = p_z.$$

From the Newpde eq.21  $dr' = dr\gamma^r\sqrt{\kappa_{rr}}$ ,  $m=\sqrt{\kappa_{rr}}$  Also recall also for equation 7 electron diagonal  $ds=\sqrt{2}dr$  (sect1) and so:

$$\begin{aligned} \left(\frac{D_\tau+D_\mu}{2}\right)6\psi &= \left(\frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr}}{2D_\tau}} \frac{dr}{ds} + \frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr}}{2D_\mu}} \frac{dr}{ds}\right)^2 4\psi = \\ 3(m_\tau + m_\mu) &= 4\left(\frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr\tau}}{m_\tau}} \frac{dr}{\sqrt{2}dr} + \frac{\gamma^r}{1} \sqrt{\frac{\kappa_{rr\mu}}{m_\mu}} \frac{dr}{\sqrt{2}dr}\right)^2 \\ 3(m_\tau + m_\mu) &= 2(\sqrt{m_\tau} + \sqrt{m_\mu})^2 \quad \text{so} \\ \frac{Nm_\tau + Nm_\mu}{(\sqrt{Nm_\tau} + \sqrt{Nm_\mu})^2} &= \frac{2}{3} \quad (N \text{ is integer multiples of } ^2S_{1/2}, ^1S_{1/2}. m \text{ is derived in PartII.}) \quad (24) \end{aligned}$$

### Koide

Ratios of the real valued masses that solve

$$\text{Koide are } m_\tau/m_\mu = 1/.05946 = 1777\text{Mev}/105.6\text{Mev} \quad (A1)$$

good to at least 4 significant figures. A triple header with **all free space lepton masses**  $^1S_{1/2}$   $^2S_{1/2}$  at  $r \leq r_H$ . Since we are at  $r=r_H$  here alternatively  $\tau+\mu$ , instead of the two positrons, are in the  $^2P_{3/2}$  orbital at  $r=r_H$  in the context of the  $D (=2XP)$  deuteron the curved space proton as reduced

$$\text{mass}=(m_\tau+m_\mu)/2 = \text{Proton} = D/2 \quad (25)$$

the real eigenvalues. So we also have the ratio of muon to proton mass here.  $N$  is integer multiples of  $^2S_{1/2}$   $^1S_{1/2}$  Note we lost the eq8 and eq9 'v' here because we went *nonrelativistic* (ie Schrodinger eq.).

### IIIb) $\delta C=0$ 2 observable extremum (ie $C_M=-1.7..$ and $-1/4$ )

Upper real  $C$  extremum with finite imaginary idt is again  $\delta C=0$  extremum  $C=-1/4$ . But that extremum does not support the  $dr=dt$   $45^\circ$  of eq.7-9 and so eq.11 and observables. (But it does support showing the  $dr$  axis is real). But the lower limit is  $-1.40115..$  for observables (see zoom repeats).

Fiegenbaum pt. is one of those  $1/4X$ circles(fig1), so each circle allowing a  $45^\circ$   $dr=dt$ . In that regard recall zoom <http://www.youtube.com/watch?v=0jGaio87u3A> which explores the Mandelbrot set interior near the Fiegenbaum point because that is the small extremum point ( $-1/4$  is the big one).

Since this much smaller object is exactly selfsimilar to the first at this point inside the Lemniscate we can reset the zoom start at such extremum  $S_N C_M = 10^{40N} C_M$  in appendix 2 D3. 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  $10^{82}$  splits. So there are about  $10^{82}$  splits per initial split. But each of these Mandelbrot set Feigenbaum points is a  $C_M/\xi \equiv r_H$  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 part II.

Also the scale difference between Mandelbrot sets as seen in the zoom is about  **$10^{40}$ , the scale change** between the classical electron radius and  $10^{11} \text{ly}$ .

### 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 and homogenous Mercuron (B5) which then connects, “bridges”,  $N=0$  to  $N=1$ ). 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 in mass  $M$  given the horizon  $r_H$  goes as this  $10^{-40} X 10^{80} = 10^{40} X$  scale jump =  $M$  is that the  $N=0$  charges must cancel to one 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  $e$  cancel out.

### Counting $10^{80}$ electron masses (QM observables)

Each of these zoomed  $10^{80}$  objects is  $-1.4..=CM$ ,  $-1/4$  equation 5 extremum is on the lemniscate so is a Newpde  $N=0$ ,  $z=0$   $e, \nu$  eigenstate  $\delta z \equiv \psi$ . Note from appendix C the (SU(2)) rotation from  $4^{\text{th}}$   $\nu$  to  $1^{\text{st}}$   $\tilde{\nu}$  quadrant (Appendix C4) is the (Maxwell eq  $\gamma$ ) and of course the (U(1)) is the Dirac eq. electron  $e$  (so a SU(2)XU(1) rotation in eq.16) with both having the same  $ds$  in fig4. Recall from sect 1 at  $45^\circ$   $dr=dt$  and  $dr+dt=ds$  for both  $e$  and  $\nu$  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  $\delta z$ . 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  $\delta z$  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  $W = g_i! / (n_i! (g_i - n_i)!)$ . ( $1/2 + 1/2 = 1$ ,  $1/2 - 1/2 = 0$  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  $\ln W \equiv S$  and so the thermodynamics of Fermi level states let's say. Since they share the same spherical harmonics the Newpde predicts electron and 2 neutrino BE energy degeneracy and so electron photon degeneracy since  $2\nu = 1/2 + 1/2 = \gamma$  in quadrants IV-I, appendix C4. For the cbr background  $T = 2.73 \text{K}$  and energy in  $1 \text{m}^3$  is  $E_{\text{cbr}} = (6/c) A \sigma T^4 = (6/c) 5.67 \times 10^{-8} (2.73)^4 = 6.3 \times 10^{-14} \text{J}$  about the same as the electron mass  $m_e c^2 = 8.2 \times 10^{-14} \text{J} = \hbar f_{\text{zitterbewegung}}$ , as predicted by this degeneracy. But  $f = 160.4 \times 10^9 \text{Hz}$  at cbr max so  $\hbar f = 10^{-22} \text{J}$  So  $E_{\text{cbr}} / 10^{-22} \text{J} = 6.3 \times 10^{-14} / 10^{-22}$  so there are millions of photons-neutrinos for every one of those  $10^{80}$  electrons. So by counting the electrons we also counted the photons because of that degeneracy. This explains why all energy is split into these  $E = \hbar f$  quanta, that being the most profound of all our results. See appendix M3 also.



### 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)

$N=-1$ ,  $e^2 10^{40(-1)} = e^2 / 10^{40} = G m_e^2$ , 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  $N=-1$   $r'_H = 2G m_e / c^2 = 10^{-40} r_H$ .

### IIIc) Alternatively C can be white noise (recall cover page)

Intuitively: **postulate**  $z=zz$  (Note  $0=0 \times 0$ . So we still postulated 0.)

with added white noise (So  $z=zz+C$  eq1)

Constant C so  $\delta C=0$ . Plug eq1 (and its iteration) into  $\delta C=0$

Get Dirac eq and Mandelbrot set respectively. Same result.

**IIIc) Single Slit experiment** where slit width D is noise uncertainty C (of where the object is) and the appendix C two quadrant rotation **wave equations** (given the quadratic terms on the eq.11 circle then acting as a ZPE) then apply *all the way around the circle*.

Example: But at  $45^\circ$  (it is large C so large D) it is a **particle** (eq11) (eg photoelectric effect), and  $\sim 0^\circ$  small D so small C, no particles there, just that ZPE **wave** again (with interference pattern  $(2J_1(r)/r)^2$ ). So we have explained Wave Particle Duality (WPD) from first principles. The mainstream hasn't a clue as to what causes WPD.

### IIId) Fractal Dimension

$N=r^D$ . So the **fractal dimension**  $= D = \log N / \log r = \log(\text{splits}) / \log(\#r_H \text{ in scale jump})$   
 $= \log 10^{80} / \log 10^{40} = \log(10^{40})^2 / \log(10^{40}) = 2$  (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  $r_1=r_H=2e^2/m_e c^2$ ,  $N=0$ th,  $r_2=r_H=2GM/c^2$  is defined as the  $N=1$  th where  $M=10^{82} m_e$  with  $r_2=10^{40} r_1$  So the Feigenbaum 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* in the Newpde  ${}^2P_{2/3}$  state at  $r=r_H$

### 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 to get the idea.).

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"**

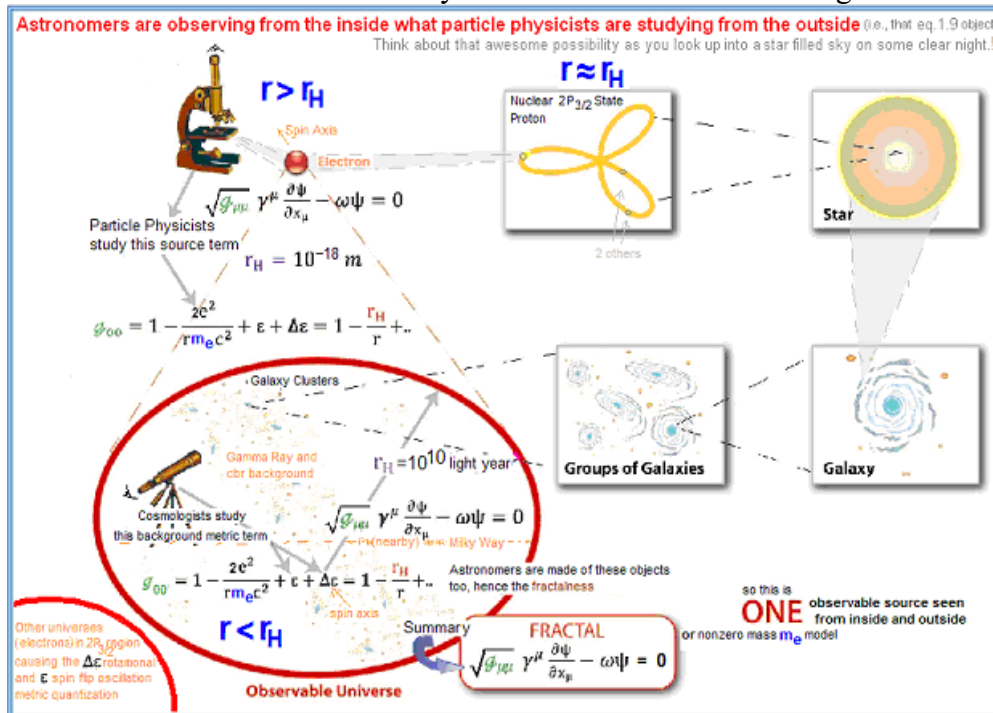
(C constant so  $\delta C=0$  and  $z=zz+C$  eq1 gets us the multiplicative properties of **0**) there then must then be a rational Cauchy *sequence* with limit 0 that then doubles as a *iteration* of eq1 in  $\delta C=0$  that thereby gives the Mandelbrot set. Also we can then plug eq1 into  $\delta C=0$  to directly get the Dirac equation and given that Mandelbrot set perturbation **generally** covariant Dirac *real* eigenvalues of a **Newpde** that gives physics (Also see fig2). Note these 2 algebra plug ins are *not* optional making this is a very powerful postulate

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  $N=-,0,1,...$ )  $\Delta\varepsilon=m_e$ ,  $\varepsilon=\mu$  are zero if no object B(appendix B

### Intuitive Notion (of postulate 0 $\Leftrightarrow$ Newpde+eq13 Copenhagen stuff)

So given that (fig1) CM fractal selfsimilarity “astronomers are observing from the inside of what particle physicists are studying from the outside”, that **ONE New pde e** electron  $r_H$ , **one** thing (fig.3). Just think about that awesome possibility as you look up into the night sky on some clear night! *Everything* we observe big (cosmological) and small (subatomic) is then that (New pde e)  $r_H$ , even baryons are composite  $3e$  (SectIII). So we understand, *everything*. This is the only Occam’s razor *first principles* theory: **postulate0**

**Summary:** So instead of doing the usual powers of 10 simulation we do a single power of  $10^{40}$  simulation and we are immediately back to where we started! Fig4



Object B  $r_H=C_M/m=e^210^{40N}/m$ . CM 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* Feigenbaum point  $C_M$   $C_M=1.4.X10^{40N}$  (fig1) merely contributes to the successive onion shell horizons in  $r_H=C_M/\xi$  in  $\kappa_{00}=1-r_H/r$  in the Newpde. The Mandelbrot set merely contributes these extreme numbers in the  $r_H=C_M/\xi$  in  $\kappa_{00}$  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 2<sup>nd</sup> edition pp.605-607  
 (13) Mandelbrot set fig1 generated by <http://www.youtube.com/watch?v=0jGaio87u3A>

## 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 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 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.

**Table Of Contents** (of appendix) Get  $\kappa_{oo}$  from object A and  $\kappa_{rr}$  from central object B

Appendix A) **Object A** given the structure(A10) in the Newpde gets  $\kappa_{oo}$ .  $\kappa_{rr}$  unaffected.

Appendix B) **Object B** and the fractal rotation Kerr metric puts mass in  $\kappa_{rr}$ .  $\kappa_{oo}$  unaffected.

And gets the 3 massive Bosons of the SM

Appendix C) **Object C** (eg C2) gives us the Fermi G factor and so 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  $\omega$  oscillation as a (that eq.7-9  $\delta z$  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

$$i\hbar \frac{\partial \psi}{\partial t} = \beta \sum_N (10^{-40N} (\omega t)_{\varepsilon+\Delta\varepsilon}) \psi = \beta \sum_N (10^{-40N} m_{\varepsilon+\Delta\varepsilon} c^2 / \hbar) \psi. \quad (A1)$$

which is from the flat space Bjorken and Drell Dirac equation just as the Kiode relation (relative to the tauon=1) the muon  $\mu=\varepsilon=.05946$ , electron  $\Delta\varepsilon=.0005899/2=.0002826$ ) is since it is a Schrodinger equation object so our result is automatically  $\psi=e^{i(\varepsilon+\Delta\varepsilon)}$  with  $\tau$  normalized to 1 here for small  $\varepsilon+\Delta\varepsilon$  in our local inertial free falling frame of reference where the Schrodinger equation and so the Kiode lepton mass ratios hold. So away from that flat space region the  $\tau$  coefficient is allowed to change from the Kiode value. So from eq.2A2 covariance  $R_{22}=\sin\mu$  with  $\mu \approx \sin\mu \sinh\mu = \frac{e^\mu - e^{-\mu}}{2} \approx \frac{1+\mu-(1-\mu)}{2} = \frac{2\mu}{2} = \mu \approx \sin\mu$  in this above near flat space case doesn't depend on  $\tau$  anyway. tauon  $\tau$  normalization does change in these distant nonlocal frames but  $\tau$  doesn't jump locally like  $\varepsilon$  and  $\Delta\varepsilon$  can so it is always a multiplier of sine that can be given unit

value because of the necessity of seeing the Bjorken & Drell zitterbewegung  $eqA=e^{i\varepsilon}$  by the  $N=2$  observer. Also the gravity was so huge at the big bang time ( $\sim$ Mercuron) that it created its own (gravity) source for the Ricci tensor since its energy density is also a source in the Einstein equations (feedback mechanism). So near the time the Mercuron exists

$$R_{ij}=0 \rightarrow R_{ij}=-(1/2)\Delta(g_{ij}) \quad (A2)$$

(where  $\Delta$  is the Laplace-Beltrami second derivative operator) is not =zero and so the right side is the metric source  $-\sin\varepsilon$ . Thus the above Laplace Beltrami source eq. A2  $-\sin\omega t \equiv -\sin\mu = -\sin\varepsilon$  here comes out of the Newpde zitterbewegung  $eqA$  for the  $N=2$  observer.

Also  $\mu$  is largest at first ( $\mu=1$ =present value of the tauon mass) in  $r_0 e^{-\mu} \approx r_0(1-\mu) \approx r$  also explaining the negative sine in  $-\sin\mu$ .

Also to get a metric coefficient we must square eq A1 as in  $e^{i(2\varepsilon+\Delta\varepsilon)} = \kappa_{00}$ . And we can further normalize out  $\varepsilon$  for local space time  $\Delta\varepsilon$  perturbations by  $e^{i2\Delta\varepsilon/(1-2\varepsilon)} = \kappa_{00}$  In part III we also learn that in fractal scale transition regions (eg., where  $N=1 \rightarrow N=0$ )  $g_{00} = \kappa_{00}$  leading to solutions with multiples of  $\varepsilon$  and  $\Delta\varepsilon$  and stair stepping through the  $\varepsilon$  and  $\Delta\varepsilon$  jumps as the universe expands.

**A1 Huge  $N=2$  scale, as the observer of  $N=1$  cosmology scale, sees  $e^{i\varepsilon} \rightarrow e^\varepsilon$**  (because of negative square root in B10) inside the  $N=1$   $r_H$ . So by  $i \rightarrow 1$ ,  $N=2$  sees what we ( $N=1$ ) see making cosmology an observable. Also for  $r < r_H$  then  $R_{22} = -\sinh\varepsilon$  is integrable and the  $\sinh\varepsilon$  source also what we  $N=1$  observers see inside.

Note sine is exponentially increasing at the bottom of a sine wave just as  $\sinh$  is also which should be valid for up to  $\mu \approx 1$  where  $\sin\mu + 1/3 = \sinh\mu$ . But we can't use  $\mu=0$  since  $r=\infty$  there and we also must switch back to  $-\sin\mu$  sine wave anyway since the  $\sinh\mu$  exponential approximation no longer applies near  $\mu=0$ . Also interior strong inertial frame dragging implies we can use the usual spherical (not Boyer Lindquist) coordinates for  $R_{22}$ . With these qualifications we can use the **easily integrable** ( $\sin \rightarrow \sinh$ )

$$R_{22} = -\sinh\mu \quad (A2A)$$

$$= R_{22} = e^{-\nu} [1 + \frac{1}{2} r(\mu' - \nu')] - 1 = -\sinh\nu = -(e^\nu - e^{-\nu})/2, \quad \nu' = -\mu' \text{ so}$$

$$(e^\mu - 1 = -\sinh\mu \text{ for positive } \mu \text{ in } \sinh\mu \text{ then the } \mu = \varepsilon \text{ in the } e^\mu \text{ on the left is negative} \quad (A2B)$$

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

$$e^{-\nu} [-r(\mu')] = 1 - \cosh\mu. \text{ Thus}$$

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

$$\text{This can be rewritten as:} \quad e^\mu d\mu / (1 - \cosh\mu) = dr/r$$

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  $\mu = \mu_{\text{muon}} = .05946$  (X tauon mass) giving us:

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

Note also that the  $gr = e/2m_e(1+\mu)$  gyromagnetic ratio (given  $\mu = m$ ) is changing with time as was discovered recently at Fermi lab 2023 (Ch.7) with CERN 1974 gr muon data for comparison. The 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.

Metric quantization exists so the rebound explosion will be  $\sim 100$  antinodes  $= D$  across the Mercuron  $r_{bb}$ , 10 across a supernova explosion neutron star object: see part III, 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 ( $\sim 400$  kLY) of those 'BAO' structures at reionization.

**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. First local approximation object B N=1 ambient metric C=constant ([nonrotating](#))

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

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

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

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

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

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

(eq. A4-A7 from pp.303 Sokolnikof(8)): Equation A4 is a mere repetition of equation A6. We thus have only three equations on  $\lambda$  and  $\mu$  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 ~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:

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

Set  $e^\mu = \gamma$ . So  $e^{-\lambda} = \gamma e^{-C}$   $\varepsilon$  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  $\kappa_{rr}$  since  $e^C$  is not added to  $r_H/r$  there. Here the Kide  $\Delta\varepsilon$ ,  $\varepsilon$ ,  $\tau$  ratio (so  $\varepsilon$  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 Off diagonal Kide added terms** ( $dr^2 - dt^2 = 0$   $\gamma$  and  $\nu$  are diagonal). So add perturbative Kerr [rotation](#)  $(a/r)^2$  to  $r_H/r$  in  $\kappa_{rr}$  Here nothing gets added to  $r_H/r$  in  $\kappa_{00}$

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  $r_H$ ).

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

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:

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



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

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

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

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

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

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  $\kappa_{rr}$  (B2) and only oblates  $2m/r$  in  $\kappa_{\theta\theta}$  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  $\gamma$  are stuck on the diagonal because they are  $|dr|=|dt|$  light cone solutions.).

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

$$\tau + \mu \text{ on } 2P_{3/2} \text{ sphere at } r_H = r, r_H = e^2 10^{40(0)}/2m_e c^2, \text{comoving with } \gamma = m_p/m_e. \text{ Baryons, part2} \quad (\text{B4})$$

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.

## 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:

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

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

Using the above Dirac equation component we find the anomalous gyromagnetic ratio  $\Delta gy$  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

$$\left( \sqrt{\kappa_{rr}} \frac{d}{dr} + \frac{j+3/2}{r} \right) f \text{ in equation B5 with } \kappa_{rr} \text{ from B3. Thus to have the same rescaling of } r \text{ in the}$$

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:

$$[1/\sqrt{\kappa_{rr}}] (3/2 + J) = 3/2 + Jgy, \text{ Therefore for } J = 1/2 \text{ we have:}$$

$$[1/\sqrt{\kappa_{rr}}] (3/2 + 1/2) = 3/2 + 1/2 gy = 3/2 + 1/2 (1 + \Delta gy) \quad (\text{B7})$$

Then we solve for  $\Delta gy$  and substitute it into the above  $dS/dt$  equation.

$$\text{Thus solve eq. B7 with Eq.A1 values in } \sqrt{\kappa_{rr}} = 1/\sqrt{(1+2\Delta\varepsilon/(1+\varepsilon))} = 1/\sqrt{(1+2\Delta\varepsilon/(1+0))} =$$

$$1/\sqrt{(1+2 \times 0.0002826/1)}. \text{ Thus from equation B1:}$$

$[\sqrt{(1+2X.0002826)}](3/2 + 1/2) = 3/2 + 1/2(1+\Delta gy)$ . Solving for  $\Delta gy$  gives anomalous **gyromagnetic ratio correction of the electron**  $\Delta gy = .00116$ .

If we set  $\epsilon \neq 0$  (so  $\Delta\epsilon/(1+\epsilon)$ ) instead of  $\Delta\epsilon$  in the same  $\kappa_{00}$  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:  $1/\kappa_{rr} = 1+r_H/r_H + \epsilon'' = 2 + \epsilon''$ .  $\epsilon'' = .08$  (eq.9.22). Thus from eq.B17  $\sqrt{2 + \epsilon''}(1.5+.5) = 1.5+.5(gy)$ ,  $gy = 2.8$

**The gyromagnetic ratio of the proton**

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

$$1/\kappa_{rr} = 1 - r_H/r_H + \epsilon'' = \epsilon \quad \text{Therefore from equation B7 and case 1 eq.A3 } 1/\kappa_{rr} = 1 - r_H/r_H + \epsilon''$$

$$\sqrt{\epsilon''}(1.5+.5) = 1.5+.5(gy), \quad gy = -1.9.$$

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 $\kappa_{00}$ application example: Lamb shift

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

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

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

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  $\kappa_{00}$  under the square root in equation B10.

Note for electron motion around hydrogen proton  $mv^2/r = ke^2/r^2$  so  $KE = \frac{1}{2}mv^2 = (\frac{1}{2})ke^2/r = PE$  potential energy in  $PE+KE=E$ . So for the electron (but not the tauon or muon that are not in this orbit)  $PE_e = \frac{1}{2}e^2/r$ . Write the hydrogen energy and pull out the electron contribution B10a. So in eq.B2 and B8  $r_H = (1+1+.5)e^2/(m_\tau+m_\mu+m_e)/2 = 2.5e^2/(2m_p c^2)$ . 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 eqA4 eq.11a  $\xi_1 = m_L c^2 = (m_\tau + m_\mu + m_e)c^2 = 2m_p c^2$  normalizes  $\frac{1}{2}ke^2$  (Thus divide  $\tau+\mu$  by 2 and then multiply the whole line by 2 to normalize the  $m_e/2$ . result.  $\epsilon=0$  since no muon  $\epsilon$  here.): Recall in eq.11a  $\xi_0$  has to be pulled in a Taylor expansion as an operator since it a separate observable. So substituting eqs.B1 for  $\kappa_{00}$ , values in eq.B10:

$$E_e = \frac{(tauon+muon)(\frac{1}{2})}{\sqrt{1-\frac{r_H'}{r}}} - (tauon + muon + PE_\tau + PE_\mu - m_e c^2) \frac{1}{2} =$$

$$2(m_\tau c^2 + m_\mu c^2) \frac{1}{2} + 2 \frac{m_e c^2}{2} + 2 \frac{2.5e^2}{2r(m_L c^2)} m_L c^2 - 2 \frac{2e^2}{2r(m_L c^2)} m_L c^2 - 2 \frac{3}{8} \left( \frac{2.5e^2}{r m_L c^2} \right)^2 m_L c^2$$

$$- 2(m_\tau c^2 + m_\mu c^2) \frac{1}{2}$$

$$\begin{aligned}
&= \frac{2m_e c^2}{2} + 2 \frac{e^2}{4r} - 2 \frac{3}{8} \left( \frac{2.5}{rm_L c^2} \right)^2 m_L c^2 = m_e c^2 + \frac{e^2}{2r} - 2 \frac{3}{8} \left( \frac{2.5 e^2}{rm_L c^2} \right)^2 m_L c^2 \\
\text{So: } \Delta E_e &= 2 \frac{3}{8} \left( \frac{2.5}{rm_L c^2} \right)^2 m_L c^2 = (\text{Third order } \sqrt{\kappa_{\mu\mu}} \text{ Taylor expansion term}) = \\
\Delta E &= 2 \frac{3}{8} \left[ \frac{2.5(8.89 \times 10^9)(1.602 \times 10^{-19})^2}{(4(.53 \times 10^{-10}))^2 ((1.67 \times 10^{-27})(3 \times 10^8)^2)} \right]^2 (2(1.67 \times 10^{-27})(3 \times 10^8)^2) \\
&= hf = 6.626 \times 10^{-34} \times 27,360,000 \text{ so that } f = 27 \text{ MHz Lamb shift.} \\
&\text{The other 1050 MHz comes from the zitterbewegung cloud.}
\end{aligned} \tag{B12}$$

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

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  $\phi$ . 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  $\phi$  (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”.  $N=1$   $g_{00} = 1 - 2GM/(c^2 r)$  has to transition into the asymptotic component of  $N=0$   $\kappa_{00} = 1 - (2\Delta\epsilon/(1-2\epsilon))^2/2$  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  $\epsilon\Delta\epsilon$**  (Again  $GM/r = v^2$  so  $2GM/(c^2 r) = 2(v/c)^2$ .)

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

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

$(\Delta\epsilon)^m$  is the operator in  $\Delta\epsilon^m \psi = -\frac{i^m \partial^m}{\partial t^m} \psi_{N=1} = H^m \psi_{N=1}$  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, 2 km/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  $=\delta z' + \delta z = (dx_1 + i dx_2) + (dx_3 + i dx_4) \equiv dr + i dt$ . But given  $\delta z \approx dr \approx dt$  at  $45^\circ$  we must add and subtract  $\delta z'$

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

The  $\delta ds^2=0$ ,  $45^\circ$  small extreme gave the  $e$  and  $\nu$ . 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  $45^\circ$  rotations so through a total of two quadrants for  $\pm \delta z'$  in eq.16 (a single  $\delta z$  just gives  $e, \nu$  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  $e, \nu$  and  $2\nu = \gamma$  and these new object C Bosonic components of the Hamiltonian that give the  $W$  and  $Z$ .

**These rotations are**

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

Note in fig.3  $dr, dt$  is also a rotation and so has an eq.11 rotation operator observable  $\theta$ . Thus from equation 11 for  $(\theta)$  angle rotations  $\theta \delta z \equiv (dr/ds) \delta z = -i \partial(\delta z)/\partial r$  for the first  $45^\circ$  rotation. So we got through one Newpde derivative for each  $45^\circ$  rotation. For the next  $45^\circ$  rotation in fig.4 it is then a second derivative  $\theta \theta \delta z' = e^{i\theta} p e^{i\theta'} \delta z = e^{i(\theta + \theta')} \delta z = (dr/ds)((dr/ds) dr') = -i \partial(-i \partial(dr'))/\partial r \partial r = -\partial^2(dr')/\partial r^2$  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)

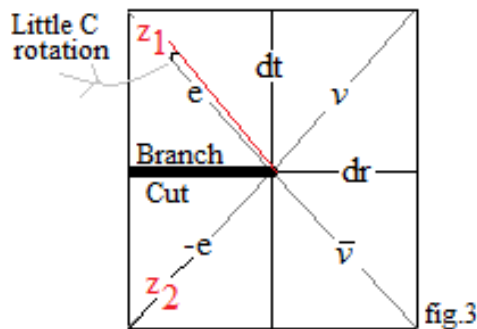


fig.3. for  $45^\circ$ - $45^\circ$  So two body  $(e, \nu)$  singlet  $\Delta S = \frac{1}{2} - \frac{1}{2} = 0$  component so pairing interaction (sect.4.5). Also ortho  $\Delta S = \frac{1}{2} + \frac{1}{2} = 1$  making 2 body (at  $r=r_H$ )  $S=1$  Bosons and so a field theory. Note we also get these 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  $e, \nu$  implied by Equation 16**

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  $90^\circ$  rotation to the next Reimann surface of eq.16, eq.A1  $(dr^2+dt^2)z''$  from some initial extremum angle(s)  $\theta$ . Eq.16 solutions imply complex 2D plane Stern Gerlach dichotomic rotations using eq.A1 thereby using Pauli matrices  $\sigma_i$  algebra, which maps one-to-one to the quaternion algebra. Using eq.16 we start at some initial angle  $\theta$  and rotate by  $90^\circ$  the noise rotations are:  $C=\delta z''=[e_L, \mathbf{v}_L]^T \equiv \delta z'(\uparrow)+\delta z'(\downarrow) \equiv \psi(\uparrow)+\psi(\downarrow)$  has a eq.16 infinitesimal unitary generator  $\delta z''=U=1-(i/2)\epsilon n^* \sigma$ ,  $n=\theta/\epsilon$  in  $ds^2=U^*U$ . 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 2<sup>nd</sup> rotation we move the branch cut  $90^\circ$  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**  $\kappa_{ii}=e^{iA_i}$  (C1A)

Possibly large  $\delta\delta z$  in eq.3  $\delta(\delta z+\delta z\delta z)=0$  so large rotations in eq16 i.e., high energy, tiny  $\sqrt{\kappa_{00}}$  since  $\tau$  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  $\kappa_{ij}$  for small  $\delta z'$  ( $z=1$ ) and large  $\theta=45^\circ+45^\circ$  we use  $A_r$  in  $dr$  direction with  $dr^2=x^2+dy^2+dz^2$ . 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  $\epsilon$  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  $\epsilon$  changing sign so that at  $r=r_H$ . Can normalize out the background  $\epsilon$  in the denominator of  $E=(\tau+\epsilon)/\sqrt{(1+\epsilon+\Delta\epsilon-r_H/r)}$  for Can normalize out the background  $\epsilon$  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  $\lambda$  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  $e, v$  eq.9.23  $\pi^\pm, \pi^0$ . 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

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

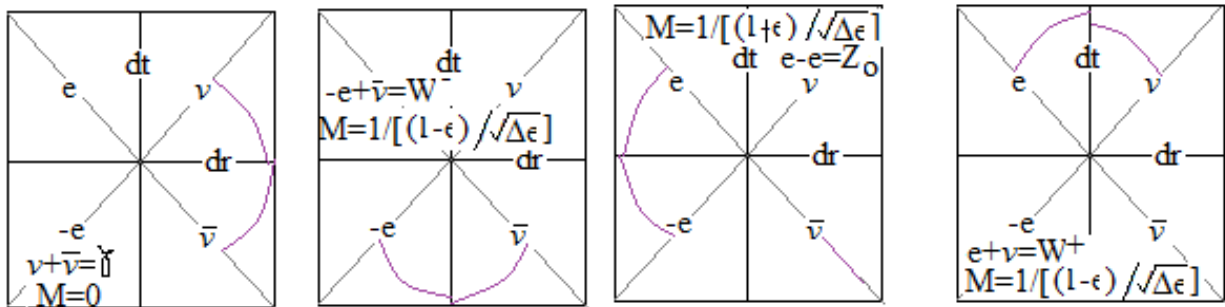


fig4

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  $\nu$  in quadrants II(eq.5) and III (eq.9).  $e$  in quadrants I (eq.7) and IV (eq.7). Locally normalize out  $1+\varepsilon$  (appendix D). For the **composite  $e,\nu$**  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  $(dr^2+dt^2+...)e^{\text{quaternion } A} = \text{rotated through } C_M$  in eq.16.

example  $C_M$  in eq.C1 is a  $90^\circ$  CCW rotation from  $45^\circ$  through  $\nu$  and anti  $\nu$

$A$  is the 4 potential. From eq.17 we find after taking logs of both sides that  $A_o=1/A_r$  (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  $dr^2\delta z = (\partial^2/\partial r^2)(\exp(iA_r+jA_o)) = (\partial/\partial r)[(i\partial A_r/\partial r + \partial A_o/\partial r)(\exp(iA_r+jA_o))] = \partial/\partial r[(\partial/\partial r)iA_r + (\partial/\partial r)jA_o](\exp(iA_r+jA_o)) + [i\partial A_r/\partial r + j\partial A_o/\partial r]\partial/\partial r(\exp(iA_r+jA_o)) + (i\partial^2 A_r/\partial r^2 + j\partial^2 A_o/\partial r^2)(\exp(iA_r+jA_o)) + [i\partial A_r/\partial r + j\partial A_o/\partial r][i\partial A_r/\partial r + j\partial/\partial r(A_o)] \exp(iA_r+jA_o)$  (A3)

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

$(\exp(iA_r+jA_o))] = \partial/\partial t[(\partial/\partial t)iA_r + (\partial/\partial t)jA_o](\exp(iA_r+jA_o)) + [i\partial A_r/\partial t + j\partial A_o/\partial t]\partial/\partial t(\exp(iA_r+jA_o)) + (i\partial^2 A_r/\partial t^2 + j\partial^2 A_o/\partial t^2)(\exp(iA_r+jA_o)) + [i\partial A_r/\partial t + j\partial A_o/\partial t][i\partial A_r/\partial t + j\partial/\partial t(A_o)]\exp(iA_r+jA_o)$  (C4)

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

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

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)

$i[\partial^2 A_r/\partial r^2 + i\partial^2 A_r/\partial t^2] = 0$ ,  $j[\partial^2 A_o/\partial r^2 + i\partial^2 A_o/\partial t^2] = 0$  or  $\partial^2 A_\mu/\partial r^2 + \partial^2 A_\mu/\partial t^2 + \dots = 1$  (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  $A$  around a closed loop, and this integral is not changed by  $A \rightarrow A + \nabla\psi$  which doesn't change  $B = \nabla \times A$  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  $\nu$  masses in a nonuniform  $G_{oo}$  in appendix C8 cancel out in this quadrant IV $\rightarrow$ I rotation.

### Geodesics for C7

Recall equation 17.  $g_{oo} = 1 - 2e^2/rm_e c^2 \equiv 1 - eA_o/mc^2 v^o$ . 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

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

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

$g''_{\alpha\alpha} \equiv g'_{\alpha\alpha}/2$  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:  $A_i(dv/dr)_{av}/v^2$ . **This new term  $A(1/v^2)dv/dr$  is the pairing interaction (5.11)** so we discovered the origin of superconductivity.

## C5 Other 45°+45° Rotations (Besides above quadrants IV→I)

Proca eq

In the 1<sup>st</sup> to 2<sup>nd</sup>, 3<sup>rd</sup> to 4<sup>th</sup> quadrants the  $A_u$  is already there as a single  $\nu$  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,  $\nu$**  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:

From partII the para parallel internal  $\mu$ , external  $\pi$  solutions radius is Fitzgerald contracted by  $917=\gamma$  resulting in a small Compton wavelength and so large masses. From partII: At high enough positron energies the positron  $\Delta\epsilon$  becomes a single muon  $\epsilon$  moving inside  $r_H$ :

$$E = \mu_B B = \frac{\mu_B B A}{A} = \frac{e \hbar}{2 m_\mu} \frac{h}{e \pi r_H^2} = \frac{9.27234 \times 10^{-24}}{206.65} \left( \frac{4(2.0678 \times 10^{-15})}{2.481 \times 10^{-29}} \right) = \frac{7.669 \times 10^{-38}}{5.126 \times 10^{-27}} = 1.5 \times 10^{-11} \text{ J} = 93.364 \text{ MeV} \approx \text{muon.}$$

$\delta z = \psi \approx e^{i\epsilon}$  is the fundamental Dirac state with the electron as usual the Newpde ground state even as in atomic physics. So the muon  $\epsilon$  produces a second muon  $\epsilon$  so the  $2\mu\text{on } 2\epsilon$  is also the **fundamental**  $2\epsilon \times 917$  para state *inside*  $r_H$

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

$$917(\epsilon/(1+\epsilon)) = Z_0, \text{ 80 GeV}$$

$$917(\epsilon/(1-\epsilon)) = W^\pm, \text{ 91 GeV};$$

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

$$917(2\epsilon/(1+2\epsilon)) = t, \text{ 173 GeV. So the top is two para parallel } \mu$$

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

**Outside  $r_H$**

**Pion Shrink:**  $917\pi$

$$917\pi = H, \text{ 125 GeV. } H \text{ is merely a para parallel } \pi, \text{ outside } z_{pe} \text{ for the para solutions}$$

For the **composite e,  $\nu$**  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 $\rightarrow$ IInd quadrant rotation** is the  $W^+$  at  $r=r_H$ . Do similar math to C2-C7 math and get instead a Proca equation The limit  $\epsilon \rightarrow 1 = \tau$  (D13) in  $\xi_1$  at  $r=r_H$ . since Hund's rule implies  $\mu = \epsilon = 1S_{1/2} \leq 2S_{1/2} = \tau = 1$ . So the  $\epsilon$  is negative in  $\Delta\epsilon/(1-\epsilon)$  as in case 1 charged as in appendix A1 case 2.

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

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

**IIIrd  $\rightarrow$ IV quadrant rotation** is the  $W^-$ . Do the math and get a Proca equation again.

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

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

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

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

$$E_t = E - E \text{ gives E\&M that also interacts weakly with weak force. Seen in small left handed polarization rotation of light. Recall that } \Delta\epsilon = .00058. \text{ If contracted to } r=r_H \text{ by this singlet state contraction then for the two } \pm \text{leptons } (10^{-18} \text{ m}). \text{ From eq.B10:}$$

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

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

Positive  $\epsilon$  is neutral.

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

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

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

In these eq.16 axis to axis 4 rotations (getting the 4 Bosons:  $W^+, W^-, Z_0, \gamma$ ) 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 3<sup>rd</sup> 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,v,  $r=r_H$  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,v all interactions occur inside  $r_H$   $(4\pi/3)\lambda^3 = V_{rH}$ .  $\frac{1}{V^{1/2}} = \psi_e = \psi_3 \frac{1}{V^{1/2}} =$

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

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

**Object C adds** it's own spin (eg., as in 2<sup>nd</sup> derivative eq.A1) to the electron spin (1,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 2<sup>nd</sup> derivative

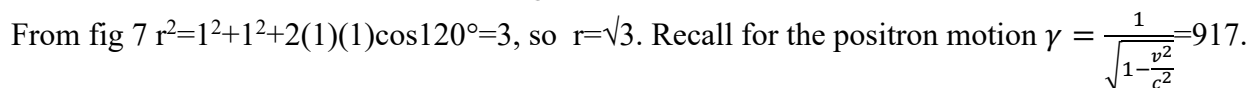
$$\Sigma((\gamma^\mu \sqrt{\kappa_{\mu\mu}} dx_\mu) - i\kappa)(\gamma^\nu \sqrt{\kappa_{\nu\nu}} dx_\nu + i\kappa)\chi = \Sigma((\gamma^\mu \sqrt{\kappa_{\mu\mu}} dx_\mu) - i\kappa)\psi \text{ so } \frac{1}{2}(1\pm\gamma^5)\psi = \chi. \quad (A9)$$

In that regard the expectation value of  $\gamma^5$  is speed and varies with  $e^{i3\phi/2}$  in the trifolium. 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  $\psi$  is constant. Start with initial ortho state  $\chi$ . These  $\gamma^5$  terms then modify equation A8 to read  $= \iiint_0^{r_H} \psi_1 \psi_2 (2m_e c^2) dV_{rH} = \iint \psi_{S1/2}^* (2m_e c^2 V_{rH}) \chi dV_\phi =$

$$K \int \langle e^{i\frac{\phi}{2}} [\Delta\epsilon V_{rH}] (1 - \gamma^5 e^{i\phi/2}) \psi \rangle d\phi = K G_F \int \langle e^{i\phi/2} - \gamma^5 i e^{i(4/2)\phi} \rangle d\phi = K G_F \left( \frac{2e^{i\phi}}{i} \Big|_0^{2\pi+C} - \frac{2\gamma^5 e^{i4\phi}}{i4} \Big|_0^{2\pi+C} \right) = k(1/4 + i\gamma^5) = k(.225 + i\gamma^5 0.974) = k(\cos 13^\circ + i\gamma^5 \sin 13^\circ) \text{ deriving the } 13^\circ \text{ Cabbibo angle.}$$

## 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 objectA.  $\Delta m_e c^2$  gap=object C scissors eigenstates. is what we see at object A but  $\Delta m_e c^2$  gets boosted by  $\gamma$  by rotation into the object B direction.(to compare with the object B  $m_e c^2$  gap).



$r_{CA} = 1 \sqrt{1 - \frac{\cos^2 30^\circ c^2}{c^2}} \sqrt{3} = .866 = \cos 30^\circ = CA$  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.

since time components are Lorentz contracted proportionally also to  $mc^2$ , both with the  $\gamma$  multiplication.

$$t'' = k\gamma\Delta m_e c^2 = \gamma\beta r_{AB} = \gamma\beta \left(\frac{x}{\gamma}\right) = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\beta \left(\sqrt{1-\frac{v^2}{c^2}}\sqrt{1}\right) = \beta$$
$$t'=\gamma(ct-\beta x)=kmc^2=t'=km_e c^2 = \gamma \beta r_{CA} = \left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\right) \beta \left(\sqrt{1-\frac{cos^2 30^\circ c^2}{c^2}} \sqrt{3}\right) = \gamma \beta cos 30^\circ$$
$$\frac{k\gamma\Delta m_e c^2}{km_e c^2} = \frac{\gamma\beta\left(\frac{x}{\gamma}\right)}{\gamma\beta r_{CA}} = \frac{1\beta_1}{\gamma\beta\cos 30^\circ} = \frac{1}{\gamma\cos 30^\circ} \quad \text{SO}$$

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  $\Delta E = (m_e c^2 / ((\cos 30^\circ) 917^2)) = m_e c^2 / 728000$ . So the energy gap caused by object C is  $\Delta E = (m_e c^2 / ((\cos 30^\circ) 917^2)) = m_e c^2 / 728000$ . The weak interaction thereby provides the  $\Delta E$  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  $e, \nu$  rotations giving  $W$  and  $Z_0$ . The  $G$  can be written for E&M decay as



$(2m_e c^2) X V_{r_H} = 2m_e c^2 [(4/3)\pi r_H^3]$ . 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 (part II) and so weak decay. is our  $\Delta E$  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  $\Delta H$  in  $(\int \psi^* \Delta H \psi dV)$  with available phase space  $\psi^* = \psi_p \psi_e \psi_\nu$  for  $\psi = \psi_N$  decay where  $\psi_e$  and  $\psi_\nu$  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  $\nu$ .

The neutrino mass increases with nonisotropic 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 correlatable 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  $G_{00} = E_e + \sigma \bullet p_r = 0$  so  $E_e = -\sigma \bullet p_r$ . 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  $\nu$  masses cancel out in the IV $\rightarrow$ I rotation of C4  $\gamma$ )

## 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  $m_\tau, m_\mu, m_e$  etc., and  $G, G_F, k e^2$  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  $\theta_W$ ,  $g \sin \theta_W = e$ ,  $g' \cos \theta_W = e$ ; 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  $C_M = \text{Feynman}$  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 =  $G_{00} = E_e + \sigma \bullet p_r = 0$  gets the left handedness. Recall the genius of the SM is getting all those properties (of  $\gamma, Z_0, W^+, W^-$ ) from SU(2)XU(1)<sub>L</sub> 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

### 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  $\delta z$  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  $N=-1$ .

### M2) Alternative ways of adding $2D+2D \rightarrow 4D$

Recall from section 1 that adding the  $N=0$  fractal scale 2D  $\delta z$  perturbation to  $N=1$  eq.7 2D gives curved space 4D. So  $(dx_1 + idx_2) + (dx_3 + idx_4) \equiv dr + idt$  given (eqs5,7a)  $dr^2 - dt^2 = (\gamma^r dr + i\gamma^t dt)^2$  if  $dr^2 \equiv dx^2 + dy^2 + dz^2$  (3D orthogonality) so that  $\gamma^r dr \equiv \gamma^x dx + \gamma^y dy + \gamma^z dz$ ,  $\gamma^i \gamma^j + \gamma^j \gamma^i = 0$ ,  $i \neq j$ ,  $(\gamma^i)^2 = 1$ , 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 postulate1): 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  $\omega$  (angular velocity) axial vector of the Newpde lepton (eqs.7-9); which we get anyway from lepton equation Newpde.

### 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 there is just **one axiom**. Note that here we postulated that "eq1  $z = zz + C$  implies some **real**  $0 = z$ " which also implies *some*  $z = zz$  case. More importantly

The **origin of mathematics** is eq.13  $z=0$  stable eq.11 **real** eigenvalue eq.5  $e, v$  and so  $2v = \gamma$  (appendix C4) and so **countability** (and thus the origin of **numbers**) since we can  $N$  count  $e, v, \gamma$  (eg sect IIIb with  $E = Nh_f$ ) 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.

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

List all *numbers* such as  $(1+0)X(1+0) \equiv 0X0 + 1X1 + 0X1 + 1X0$  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.

**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**.

## Conclusion

## 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 to get the idea.).

So this is "first principles", thus we have actually figured it out! We completely understand!!!

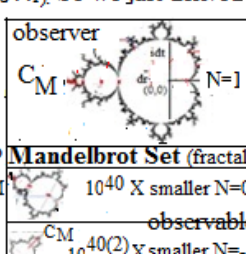
And so it must work(fig2) and makes sense because all QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues and all mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So by **postulating**

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

( $C$  constant so  $\delta C=0$  and  $z=zz+C$  eq1 gets us the multiplicative properties of **0**) there then must then be a rational Cauchy *sequence* with limit 0 that then doubles as a *iteration* of eq1 in  $\delta C=0$  that thereby gives the Mandelbrot set. Also we can then plug eq1 into  $\delta C=0$  to directly get the Dirac equation and given that Mandelbrot set perturbation *generally* covariant Dirac *real* eigenvalues of a **Newpde** that gives physics (Also see fig2). Note these 2 algebra plug ins are *not* optional making this is a very powerful postulate

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

$r_H=C_M/\xi=e^2 \times 10^{40}N/m$  (fractal jumps  $N=-1, 0, 1, \dots$ )  $\Delta\varepsilon=m_e$ ,  $\varepsilon=\mu$  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 $1S_{1/2}, \mu, 2S_{1/2}$ leptons (Koide)	
4 SM Bosons from 4 axis extreme rotations of $e, \nu$	
$N=-1$ (i.e., $e^2 \times 10^{-40} \equiv G_N$ ). $\kappa_i$ 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 $\sqrt{\kappa_i}$ gives the anomalous gyromagnetic ratio and Lamb shift <i>without</i> the renormalization and infinities.	
So $\kappa_{\nu}$ provides the general covariance of the Newpde.	
So we got all this physics by mere inspection of this Newpde with no gauges!	
	

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-define definitions and** (single simple *axiom*) **postulate0:  $z=zz+C$  implies *real*0**

( $C$  constant so  $\delta C=0$ .  $z=zz+C$  eq1 needed for multiplicative properties of 0. See math appendixM)

2) Where does the Dirac equation come from?

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

3) Where does the vacuum come from?

Answer: **eq.9** (One of the eq6 factors of *real*(eq5))

4) 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**  $dr,dt$ .

5) Why is the speed of light  $c$  constant?

Answer: In eq4 the above natural unit  $1=c=dr/dt$  is always a coefficient 1 for **light cone solutions eq.8** of eq6 in uniform space-time (C8). So sect C4 IVth to Ist quadrant rotation through these two  $v$  solution diagonals also implies a light cone photon since excess mass then cancels given these two Dirac eq. applications.

7) Where does charge come from?

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

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  $\kappa_{ij}$  for  $N=-1$  fractal scale(top of fig2).

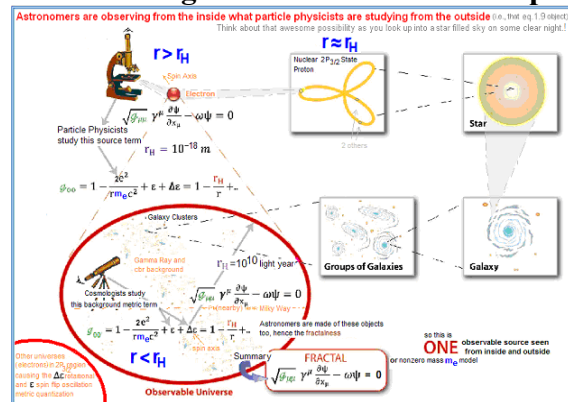
10) Where does quantum mechanics (QM) come from?

Answer: Invariance of eq5 *circle* and so eq11 QM operator formalism. So **QM comes from a circle**. 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 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 (partII, [davidmaker.com](http://davidmaker.com). QCD and gluons are not required.)

**SomeResults:** The selfsimilar scale jumps ( $10^{40N}XC_M$ ,  $N$  integer) of fig2 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!

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 complex plane, so from **eq.4**. SM is the ultimate reality check  $U(1)$  is CM (see C9)

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 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 (See end of appendix B and partIII  
davidmaker.com.).