This Theory Is Zero

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

David Maker

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

Summary: So **postulate0** (ie "z=zz+C eq1 implies *real*#0") also derives math including δC. So can plug $z=1+\delta z$ into eq1 and get $\delta z+\delta z\delta z=C$ (3) so that $\frac{-1\pm\sqrt{1^2+4C}}{2}=\delta z\equiv dr\pm i dt$ (4) for C<-¼. So C is complex. But the definition of real0 $\equiv z_o$ implies that Cauchy sequence "iteration" so requires

I **Plugging** the **eq1** rel *iteration* ($z_{N+1}-z_N z_N=C$) into $\boldsymbol{\delta C=0}$ implies $\delta C=\delta(z_{N+1}-z_N z_N)=\delta(\infty-\infty)\neq 0$ for some C. The Cs that result instead in finite z_∞s (so $\delta C=0$) define the **Mandelbrot set** in fig1 whose lemniscate continuity (11) along dr≈dR is required by the derivative in $\delta C\equiv(\partial C/\partial R)dR=0$ with its max extremum jump at C_M =-1.75 (at http://www.youtube.com/watch?v=0jGaio87u3A) where there is the (new Mandelbrot set lemniscate fractal scale fig1 shapes $C=C_M 10^{xN}$ with C_M that postulated constant) $0=(\partial C/\partial r)(dr)=dC_M 10^{40N}$ largest x given that elsewhere x<40 (M5). Eg for huge Nth fractal scale $|\delta z|\gg 1/4$. So extreme-¼,-1.75 solve$\delta C=0$.Thus our rational Cauchy sequence is iteration $z_{N+1}-z_N z_N$ =C= **-**¼,-3/16,-55/256,..**0**. So **0** is a real number QED.

II **Plugging eq1** directly **into $\boldsymbol{\delta C=0}$** is also required. So given eq1 and thus equations 3,4

$\delta C=\delta(\delta z+\delta z\delta z)=\delta\delta z(1)+2(\delta\delta z)\delta z\approx\delta(\delta z\delta z)=\delta((dr+idt)^2)=\delta[(dr^2-dt^2)+i(drdt+dtdr)]=\mathbf{0}=$ (5)

Minkowski metric +Clifford algebra≡**Dirac equation** (See eq7a γ^μ derivation from eq5.). But (N=0, 2D) $\delta\delta z1$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1 2D) independent Dirac dr implying 2D Dirac+2D Mandelbrot=4D Dirac **Newpde**$\equiv\gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for ν,e; $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$; $r_H=C_M/\xi=e^2X10^{40N}/m$ (fractal jumps **N**=. -1,0,1.,) $\Delta\varepsilon\equiv m_e$, $\varepsilon=\mu$ are zero if no object B (appendix B, C).

Spherical Harmonic Solutions to Newpde: $2P_{3/2}$, $1S_{1/2}$, $2S_{1/2}$ at $r=r_H$ since Stable $2P_{3/2}$ at $r=r_H$

N=0 at $r=r_H$ **$2P_{3/2}$** 3e **baryons** (QCD not required) Hund's rule **$1S_{1/2}$**,μ,**$2S_{1/2}$**τ **leptons** (Koide)
4 SM Bosons from 4 axis extreme rotations of e,ν.

N=-1 (i.e., $e^2X10^{-40}\equiv Gm_e^2$). κ_{ij} is then by inspection the Schwarzchild metric g_{ij} (For N=-1,Δε<<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 orderTaylor expansion(terms) in $\sqrt{\kappa_{ij}}$ gives the anomalous gyromagnetic ratio and Lamb shift *without* the renormalization and infinities.

So $\kappa_{\mu\nu}$ provides the general covariance of the Newpde.

So we got all this physics by *mere inspection* of this Newpde with no gauges!

fig1

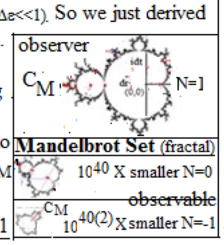


fig2

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.

Factor real eq5 $\delta ds \equiv 0$

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≡ds_1(→±**e**). Squaring&eq.5 gives circle in e,ν (dr,dt) 2nd,3rd quadrants (7)

& dr+dt=ds, dr-dt=ds, dr±dt=0, light cone (→$\nu,\bar{\nu}$) in same(dr,dt) plane fig3 1st,4th quadrants (8)

& dr+dt=0,dr-dt=0 so dr=dt=0 (in eq.11) defines vacuum (while eq.4 derives space-time) (9)

Those quadrants give *positive* scalar drdt in eq.7 (if *not* vacuum) since also, given the Mandelbrot set C_M (Here at -1.75=C_M). C_M iteration definition, implies $\delta z \neq \infty$. This then implies the eq.5 *non* infinite 0 extremum for imaginary≡drdt+dtdr= $0 \equiv \gamma^i dr \gamma^j dt+\gamma^j dt \gamma^i dr=(\gamma^i\gamma^j+\gamma^j\gamma^i)drdt$ so $(\gamma^i\gamma^j+\gamma^j\gamma^i)=0$, i≠j (from real eq5 $\gamma^j\gamma^i=1$) Thus from eqs5: $ds^2= dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ (7a)

QM Operators

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

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

$\delta z \equiv \psi$. Actual upper real limit to set C (eq3) is a tiny negative 'dr' value added to -¼, so not exactly –¼. (ie., -¼>C *not* -¼≥C for eq4). Thus in eq4 Newton quotient $\lim_{dr\to 0}$ dr/ds=1 so dr is real as a limit only. So we proved that *dr is a real number*. **So k =dr/ds is an operator in eq.11 with *real* eigenvalues** dr/ds since eq.11 implies k is an observable defining p/ħ. Also since δz=coskr then k has to be 2π/λ thereby deriving the DeBroglie wavelength λ. Also eq.11 with integration by parts implies $\langle p_r\rangle^* = \int(p_r\psi)^*\psi d\tau = \int\psi^* p_r\psi d\tau = \langle p_r\rangle$ and $\int\psi_a p\psi_b d\tau \equiv \langle a|p|b\rangle$ in Dirac bra-ket notation. Therefore p_r=ħk is Hermitian given dr is *real* which it is.

IIa) Eq5 Minkowski Metric implies Lorentz transformations(9)

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

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

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

So C_M defines charge e^2. ξ defines mass=mc^2. From eqs.3,12 for N=0 small C≈δz=δz/γ= dr/γ= pds/γ. If p=mdr/ds =mv then C=δz/γ=dr/γ= pds/γ=pds/m= (mdr/ds)(ds/m) =dr' the Lorentz contracted dr and so we have shown that for eq12 k mass ħk=p=mv. Recall z=1+δz. So for no noise C=0 (IIIC). So z=zz for z=1,0 electron (ψ≡δz=-1) or no electron (δz=0). Thus:

δz=-1, z=0: So δCM=δ(ξδz')= δξδz'+ξδδz'=0 so if **δz'≈-1,** δξ is **tiny** so stable, electron

δz=0, z=1: So δξδz'+ξδδz'=0. So |ξ| is big and δξ is big so unstable 6e(eg., that D=ξ=τ+μ) (13)

=Kiode. Note N=0 (micro, subatomic) we need ***small*** C≈δz for free particle observables N=0 in fig1 so eq.12 **C**≈C_M/ξ so this large ξ 6e(eg., that D=ξ=τ+μ)is in **C**≈δz/γ≡C_M/ξ =r_H(14)

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

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

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

$\delta(\delta z)/dt\equiv\delta_t(\delta z)/dt=(\partial(\delta z)/\partial t)dt/dt=H\delta z=$**energy**$X\delta z$ (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 $\delta z>>1$) is not normalizable but as we saw observable (fig1) N=0 is normalizable (eg., $\delta z=-1$ electron) implying Bohr's $-1*-1=\delta z*\delta z=\psi*\psi=1$ probability density for electron (so it's not a postulate anymore).

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

That Leap Frog effect (here N=-1→N=1, B5,IIId) 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 $\delta z\delta z<<\delta z\approx C$ so requires an additional 2D δz variation around the light cone of eq.7 but now constrained by those $\delta C=0$ circle ds extreme at 45° of course(eq10). But (N=0, 2D) $\delta\delta z1$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1 2D) independent Dirac dr and so 2D+2D=4dimensions. Recall the required N=-1 tiny $C\approx\delta z$ must be a perturbation (giving large curvature general covariance of eq.17-19.) of the N=1 eq.7 $=\delta z'+\delta z=(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$. But given $\delta z\approx dr\approx dt$ at 45° we must add and subtract $\delta z'$in eq7:

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

with $\delta z'=C_M/\xi\equiv(2e^2/m_ec^2)10^{40N}=r_H10^{40N}$ with (Small scale seen from larger scale as 'dr' is big on that smaller scale 'r') $dr\approx r$ on N=0 for N=1 (10^{40}X larger) observer. Define from eq.16 dr,dr':

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

The partial fractions A_I can be split off from RN and so $\kappa_{rr}\approx1/[1-r_H/r]$ in $ds^2=\kappa_{rr}dr'^2+\kappa_{oo}dt'^2$ (18)

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

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

2D+2D=4D (due to $\delta\delta z1$ term in (from eq3) $\delta C=\delta(\delta z+\delta z\delta z)=\delta\delta z1+\delta(\delta z\delta z)$)

But (N=0, 2D) $\delta\delta z1$ must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1 2D) independent Dirac dr implying a 2D+2D=4D. Thus in $\delta z'+\delta z==(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$ so with $x_1,x_2,x_3,x_4\rightarrow(dr,dt)\rightarrow x,y,z,t$. So (eq 7a) $dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ 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 $(\gamma^r dr+i\gamma^t dt)^2=$ $(\gamma^x_x dx+\gamma^y dy+\gamma^z dz+\gamma^t idt)^2=dx^2+dy^2+dz^2-dt^2=ds^2=dr^2-dt^2$. Thus we have derived the well known 4D Clifford algebra Dirac γ matrices. So the Dirac equation is what gives us our 4D space-time degrees of freedom imbedded in merely that Mandelbrot set 2D complex plane with the r changes in eq17 and time providing the two (holographic, eq.D2) 'phase' exponent changes in

the Hamiltonian H in $\psi=e^{iHt/\hbar}$ mimicking higher dimensionality effects for a Dirac lepton observer! Us! But we must still incorporate those N=-1 fractal scale δz perturbation equations 17-19 in $\kappa_{\mu\nu}$ we get $(\gamma^x\sqrt{\kappa_{xx}}dx+\gamma^y\sqrt{\kappa_{yy}}dy+\gamma^z\sqrt{\kappa_{zz}}dz+\gamma^t\sqrt{\kappa_{tt}}idt)^2 = \kappa_{xx}dx^2+\kappa_{yy}dy^2+\kappa_{zz}dz^2-\kappa_{tt}dt^2= ds^2$. 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,ν, $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$, (20)
$r_H=C_M/\xi= =e^2X10^{40N}/m$ (**N**=. -1,0,1.,), $\Delta\varepsilon=0$ for neutrino ν and N=-1 or no object B (eq.24,B2).

So **Postulate(0)→Newpde**

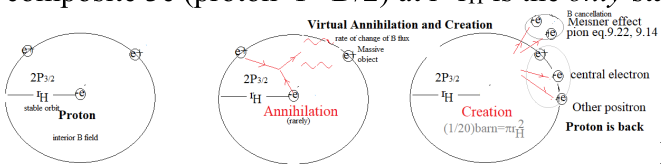
III) Solutions To The Newpde

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

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

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



For $2P_{3/2}$ ground state $3m_e$ representation the interior curved space ultrarelativistic nature of $2P_{3/2}$ at $r=r_H$ allows for *only* a 2 positron $2m_e$ and one central electron bound state allowing for a reduced mass representation of the 2 positron bound state eq.7.1. $D/2=m_p$ with very high γ (=917) due to B field flux (BA) quantization=mh/e=3h/e for SP^2 (PartII). The 2nd pair creation (top one in the above diagram) gives the zpe emf of eq.9.22 partII as a Faraday's law result of these resulting rapid B field changes and so required zpe Meisner effect (the pion cloud origin of the Yukawa nuclear force).

Also in the frame of reference of these two positron (*only*) *observers* the central electron is also ultrarelativistic and so with a tiny Δx uncertainty and so it 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 γ=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 (>>1GeV~bound state), which it does.(see LHC Totem data). Thus these detailed calculations of QCD work as long as this connection to the above Newpde $2P_{3/2}$ state holds, thus when the Gev level $2P_{3/2}$ at $r=r_H$ bound state electrons stay in these lobes.

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

IIIa) $^1S_{1/2}$ $^2S_{1/2}$ **at** $r\le r_H$ Hund rule **States**

Recall from just above eq20:

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

z=1 eq13 Schrodinger equation for Newpde for these $1S_{1/2}$ μ, $2S_{1/2}$ τ, at $r\le r_H$ States.

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

$E=R_b/N^2$ N =principle quantum number

2)The resulting $2S_{½}$, $1S_{½}$, *energy eigenvalues of the Newpde Schrodinger eq*. at $r=r_H$ in contrast are given by the Koide formula: $\frac{m_\tau+m_\mu}{\left(\sqrt{m_\tau}+\sqrt{m_\mu}\right)^2}=\frac{2}{3}$.

(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 $(2m_p)=S=½-½=0$ to make the Schrodinger equation approach exact (eg., does not require a Pauli term) here thereby requiring a reduced mass D/2=P (eq.7.1, partII) so spins can cancel in this singlet black box state. So write $-i\frac{\partial}{\partial t}\psi=H\psi=-\frac{\hbar}{2m}\frac{\partial^2}{\partial r^2}\psi, P\psi=-\frac{\hbar}{2P}\frac{\partial^2}{\partial r^2}\psi=-\frac{\hbar}{D}\frac{\partial^2}{\partial r^2}\psi$. Also using eq.11 $\hbar(dr/ds)\psi=-i\hbar d\psi/dr$ (with ħ canceling out) and eq.21 to get: $i^2\frac{d^2\psi}{Ddr'^2}=\frac{1}{D}\left(\frac{dr'}{ds}\right)^2\psi\rightarrow\left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{2\frac{D}{2}}}\frac{dr}{ds}\right)^2\psi$ (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 $2S_{½}=2P_{3/2}$ Energy eigenvalue (23)

Because of that interior virtual B field annihilation activity we must add Faraday's law zero point energy (eqs. 9.22, 9.14 Sect 9.10) observer $\varepsilon=1S_{½}$ to both sides: $2S_{½}+1S_{½}=2P_{3/2}+1S_{½}$ (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

$$\left(\frac{D_\tau+D_\mu}{2}\right)\psi_1=\left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{\frac{2D_\tau}{2}}}\frac{dr}{ds}+\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{\frac{2D_\mu}{2}}}\frac{dr}{ds}\right)^2\psi_2$$

Here all these ψ 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 ψ by counting the electron contributions to total ψ here in a wave function by merely superposition (adding) of Newpde eigenfunction ψs. 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 for equation 7 electron diagonal ds=√2dr (sect1) and so:

$$(\frac{D_\tau+D_\mu}{2})6\psi = \left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{\frac{2D_\tau}{2}}}\frac{dr}{ds} + \frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{\frac{2D_\mu}{2}}}\frac{dr}{ds}\right)^2 4\psi =$$

$$3(m_\tau + m_\mu) = 4\left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr\tau}}{m_\tau}}\frac{dr}{\sqrt{2}dr} + \frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr\mu}}{m_\mu}}\frac{dr}{\sqrt{2}dr}\right)^2$$

$$3(m_\tau + m_\mu) = 2\left(\sqrt{m_\tau} + \sqrt{m_\mu}\right)^2 \quad \text{so}$$

$$\frac{Nmm_\tau + Nmm_\mu}{(\sqrt{mNm_\tau} + \sqrt{Nmm_\mu})^2} = \frac{2}{3}$$ (N is integer multiples of $^2S_{½}$, $^1S_{½}$. m is derived in PartII.) (24)

Koide

Ratios of the real valued masses that solve
Koide are m_τ/m_μ = 1/.05946=1777Mev/105.6Mev (A1)
good to at least 4 significant figures. A triple header with all free space lepton masses $^1S_{1/2}$ $^2S_{1/2}$ at $r \le r_H$. Since we are at $r=r_H$ here that degeneracy(eq23) alternatively puts τ+μ, instead of the two positrons, in the $^2P_{3/2}$ orbital at $r=r_H$ in the context of the D (=2XP) deuteron the curved space proton as reduced 2X Fitzgerald contraction(partII) mass=$(m_\tau+m_\mu)/2$= Proton =D/2 (25)
the real eigenvalues. So we also have the ratio of muon to proton mass here. N is integer multiples of $^2S_{½}$ $^1S_{½}$ Note we lost the eq8 and eq9 '*v*' here because we went *non*relativistic (ie Schrodinger eq.).

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

The Mandelbrot set fig1 ("snow man shape") lemniscate (appendix M5) continuity along dr≈dR is required by the derivative in δC=(∂C/∂R)dR=0.The ∂C/∂R=0 *extremum* solution is at $C=C_M$=-1.75 given that is where the maximum fractal scale(13) jump $10^{40N}XC_M$ is as we see in the zoom: http://www.youtube.com/watch?v=0jGaio87u3A which explores the Mandelbrot set interior near the tiny limacon near that -1.75 point (see app M5). Since this much smaller object is exactly selfsimilar to the first at this point inside the Lemniscate we can reset the zoom start at such extremum $S_NC_M=10^{40N}C_M$ in appendix D3 and eq.20. In any case the splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So $3^{2.7X62} = 10^N$ so 172log3=N=80. So there are 10^{80} splits. So there are about 10^{80}splits per initial split. But each of these Mandelbrot set -1.75 points is a $C_M/\xi \equiv r_H$ 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 partII. Also the scale difference between Mandelbrot sets as seen in that -1.75 zoom is about **10^{40}, the scale change** between the classical electron radius $r_H=10^{-15}$m andcosmological horizon $r_H=10^{11}$ly

Single field but observed from different frames of reference

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

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

A second implication of this 10^{80} jump=M_1 in mass M_1m_e is that $N_1=10^{-40}X10^{80}=10^{40}$Xscale jump=$(N_1)r_e=2G(M_1m_e)/c^2$ which is also consistent with the N=0 fractal scale charges contributing nothing to re (through the coupling G) by canceling out to one (or 0) left over so implying a "leap frog" effect where the N=1 scale M is composed of the N=-1 scale M (N+1mass composed of N-1 mass).For us (N=0) this means masses M always attract (given eq.17-19) and charges e might cancel out and so their e^2 sources might or might not cancel and so implying possible repulsion (and attraction). Note N=0 thereby also leapfrogs to the N=2 fractal scale, etc.,

N countable 10^{80} electron masses (QM observables) in the Mercuron (apprndixA) frame of reference is "quantization of the field" Each of these zoomed 10^{80} objects is -1.75=CM, -1/4 equation 5 extremum is on the lemniscate so is a Newpde N=0, z=0 e,ν eigenstate $\delta z\equiv\psi$. Note from appendix C the (SU(2)) rotation from 4[th] ν to 1[st] $\tilde{\nu}$ quadrant (AppendixC4) is the (Maxwell eq γ) and of course the (U(1)) is the Dirac eq. electron e (so a SU(2)XU(1) rotation in eq.16) with both having the same ds in fig4. Recall from sect 1 at 45° dr=dt and dr+dt=ds for both e and ν so for (observables) operator $\left(\frac{dr+dt}{ds}\right)\delta z=\left(\frac{ds}{ds}\right)\delta z=(1)\delta z$. And so we counted to 1 real eigenvalue for each δz. But recall $\frac{dt}{ds}=\omega$ in eq. 11 so $\frac{dt}{ds}\delta z=H\delta z=E\delta z=\hbar\omega\delta z.$ Note 1 ħω per one δz solution state in the Newpde. So the number of ways W of filling g_i single Newpde spin½ states with n_i particles is $W=g_i!/(n_k!(g_i-n_i)!)$. (½+½=1, ½-½=0 states have no such above restrictions so BE statistics). You take a Log of both sides and use Stirling's approximation and you get the Fermi Dirac distribution for example thereby giving us klnW≡S and so the thermodynamics of Fermi level states let's say. Note also that
the Mercuron (appendix A) frame of reference N=10^{80} count and E=Nhf are one to one suggesting a a more fundamental Mandelbrot set E&M field quantization.

Mandelbrot set *one-to-one* Counter of N of Nħω=E, N=10^{80} quantizes our unified field in the Mercuron

But in the very hot (billions of degrees) Mercuron frame of reference(appendix B) there is one photon for what was two electrons so our $10^{80}/2$ count gives us the quantization (N=integer) of the electromagnetic field(analogous to being in the special COM frame of reference of the oscillator with speed v in the usual SHM field quantization). This explains why all energy is split into these E=hf quanta, that being the most profound of all our results. Counting these 10^{80} fractal splits is the real method of E&M field quantization, not SHM. 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 , $e^2 10^{40(-1)}=e^2/10^{40}=Gm_e^2$, solve for G, get GR. So we can now write the Ricci tensor R_{uv} (and fractally selfsimilar perturbation Kerr metric since frame dragging decreased by external object B, sect.B2). Also for fractal scale N=0, $r_H=2e^2/m_ec^2$, and for N=-1 $r'_H=2Gm_e/c^2=10^{-40}r_H$.

IIIc) Alternatively C can be white noise (Useful for N=1 macro 45° extreme applications.)
Intuitively: **postulate z=zz** (Note 0=0X0. So we still postulated 0.)
with added white noise C (So z=zz+C eq1)
Constant C so $\delta C=0$. Plug eq1 (and its iteration) into $\delta C=0$ (but without motivation for the iteration).
Get Dirac eq and Mandelbrot set respectively. Same result as before.
But here C=0 is on the 0,1 real axis, 0°, so these extreme particles now at 45° in this noise C formulation

IIIc) Single Slit experiment N=1 so C macro, large (in comparison to micro N=0 eq14 analysis) so from eq3 $\delta z=\sqrt{C}$ large for 45° to our above complex plane extreme.
So our **extreme** (ie dr+dt=ds, $\delta ds^2=0$) nonzero angle C particles(vectors) are now constrained to 45°. Here slit width D is then noise uncertainty C in where the object is.

The appendix C two quadrant rotation ds^2 **wave equations C1** (given the quadratic ds^2 terms on the eq.11 circle.) then apply *all the way around the circle.* Note from the appendix C,(fig4,figs5) the particle is at 45°,(fig4,figs5). There is no e,*v* particle on the axis, at 0°, 90°, just eq C1 waves.

Example: So at 45° C is complex, large (since it is large D, large slit , so large uncertainty C of where the particle is) so it is a **particle** (eq11) (eg photoelectric effect). But for~0°, small D so small C, no particles there, just that ds^2 **wave** again (with interference pattern $(2J_1(r)/r))^2$). So wide slit gives particles, small slit gives waves. So we have explained Wave Particle Duality (WPD) from first principles. The mainstream hasn't a clue as to what causes this WPD complementarity.

IIId) **Fractal leap frog dimensions**
$N=r^D$. So the **fractal dimension=** D=logN/logr=log(splits)/log(#r_H in scale jump) =(leap frog) $=\log 10^{80}/\log 10^{40}=\log(10^{40})^2)/\log(10^{40})=2$ (See appendix D for Hausdorf dimension & measure) which is the same as the 2D of our eq.4 Mandelbrot set. The next smaller (subatomic) fractal scale $r_1=r_H=2e^2/m_ec^2$, N=0th, $r_2=r_H=2GM/c^2$ is defined as the N=1 th where $M=10^{82}m_e$ with $r_2=10^{40}r_1$ So the -1.75 pt. gave us a lot of physics:
eg. **#of electrons in the universe, the universe size,..**. With 10^{80} electrons between any two fractal scales we are also *certainly allowed objects B&C*(fig4) in the Newpde $^2P_{2/3}$ state at $r=r_H$

Summary **The Concept**

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

"<u>**Ultimate Occam's razor** postulate(0) implies mathematics&Newpde</u>"

given "0 is the simplest idea imaginable" (Hold the thought: 0, blank; 1, a specific object).
So this is "first principles", thus we have actually figured it out! We completely understand!!!
And so it must work(fig2) and makes sense because all QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues and all mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So by **postulating**

"<u>z=zz+ C implies *real*#0</u>"

(C constant so $\delta C=0$ and z=zz+C eq1 gets us the multiplicative properties of **0.** See M3) there then must be a rational Cauchy *sequence* with limit 0 that then doubles as a *iteration* of eq1in $\delta C=0$ that thereby gives the (fractal) Mandelbrot set. Also plugging eq1 into $\delta C=0$ gives the Dirac equation and so fractal (scales $10^{40N}XCM_{N=0}$, fig1) *real* eigenvalues of a *generally* covariant Dirac Newpde; clearly a big advancement as shown in fig2.
Newpde$\equiv\gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for v,e; $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$;
$r_H=C_M/\xi=e^2X10^{40\mathbf{N}}/m$ (fractal jumps **N**=. -1,0,1.,) $\Delta\varepsilon\equiv m_e$, $\varepsilon=\mu$ are zero if no object B(appendix B

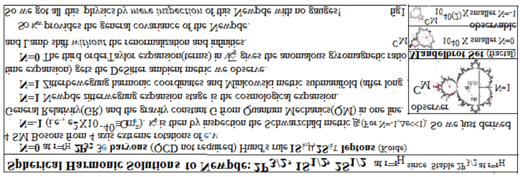
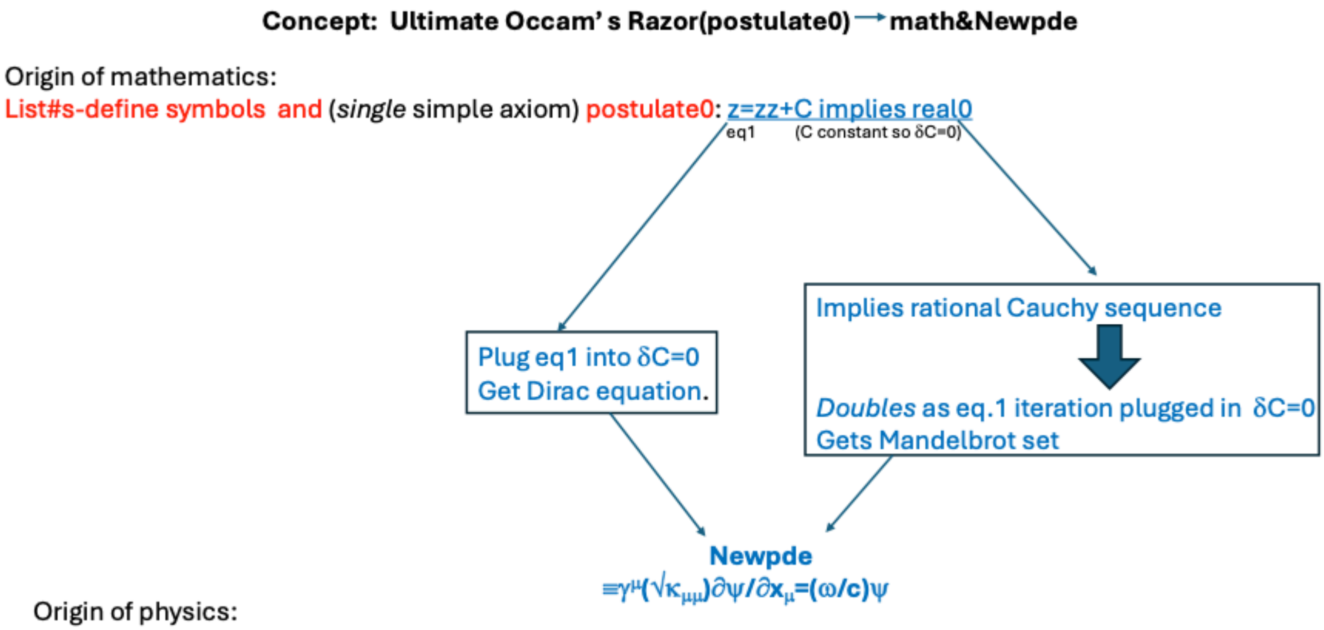
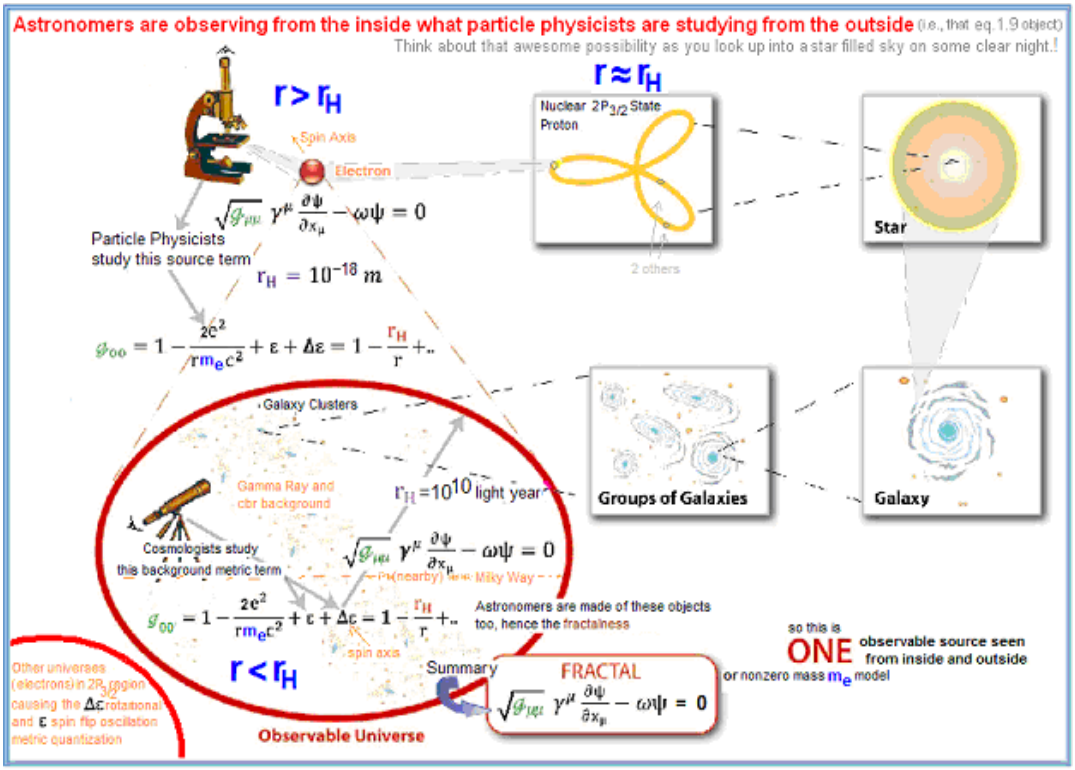


Fig2 There is a 75% chance of being in a fractal scale N=1 cosmological proton since it is 3 electrons with 1 orbiting as in hydrogen. So we are merely in object A, that along with object C orbit object B (figure4 below), all being electron e solutions to the Newpde. Object B drop in A's Kerr inertial frame dragging generates Δε,ε,τ in object A. Thus we have as our appendix designations A,B and C.



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



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

References

(6) Penrose in a utube video implied that the Mandelbrot set might contain physics. Here we merely showed how to find it. I once heard Murray Gell Mann say the same thing in a lecture I attended. For example the lower *extremum* point C_M $C_M=1.76.X10^{40N}$ (fig1) merely contributes to the successive onion shell horizons in $r_H=C_M/\xi$ in $\kappa_{oo}=1-r_H/r$ in the Newpde. The Mandelbrot set merely contributes these extreme numbers in the $r_H=CM/\xi$ in κ_{00} in the Newpde.

(7) Cantor: Ueber die Ausdehnung eines Satzes aus der Theorie der trigonometrischen Reihen, "Ueber eine elementare Frage der Mannigfaltigkeitslehre" Jahresbericht der Deutschen Mathematiker-Vereinigung.". Cantor proved the real#s were dense with a binary # (1,0) argument. But our z=zz *list* (appendixM) is also for #*(1,0) thereby allowing Cantor to use his binary argument* at this fundamental level.

(8)Tensor Analysis, Sokolnikoff, John Wiley $\kappa_{\mu\nu}$ here is covariant given it's Schwarzchild limit

(9)The Principle of Relativity, A Einstein, Dover.The Minkowski metric gives Lorentz transform

(10)Quantum Mechanics, Merzbacher, John Wiley

(11) lemniscate circle sequence (Wolfram, Weisstein, Eric). Implies C^2 continuity for fig1 r axis

(12) Quantum Mechanics, Merzbacher 2nd edition pp.605-607

(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 most common element. The proton in my $^2P_{3/2}$ at $r=r_H$ stable state solution to the Newpde is composed of 3 objects, two orbiting positrons and a central electron which we call objects A, B and C (bottom of fig4) on the cosmological

N=1 fractal scale. We are in one of the two positrons, object A with object B being the central electron also giving us our appendix labels (A,B,C,M). M=ring Math but with one axiom postulate0. M5 is on the lemniscate extreme.

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

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: $\delta z = \psi_r = w^r(0)e^{-i\varepsilon_r\frac{mc^2}{\hbar}t}$ ε_r=+1, r=1,2; ε_r=-1, r=3,4.): This implies an oscillation frequency of $\omega=mc^2/\hbar$. which is fractal here ($\omega=\omega_o 10^{-40N}$). So the eq.16 the 45° line has this ω oscillation as a (that eq.7-9 δz variation) rotation at radius ds. On our own fractal cosmological scale N=1 we are in the expansion stage of one such oscillation. Thus the fractalness of the Newpde explains cosmology. The next higher cosmological scale is independent (but still connected by relativistic superposition of speeds) implying a inverse separation of variables result. As an example my zitterbewegung $r=e^{i\omega t}$=**cosωt**+isinωt can be modeled.

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

But note that at *mid expansion* we are also close to the cosmological horizon $r_H=2GM/c^2$ so GR severely distorts the time t (in cosωt) with $dt^2=g_{oo}dt^2=(1-r_H/r)dt'^2$ resulting in the distant comoving observers dt' being a lot larger (so older) than dt explaining the high metallicity mature looking spiral galaxies and supermassive black holes seen at even high z and even thermalized CBR (without inflation theory). The Dirac spin (internally a weak Kerr metric) even explains the net individual galaxy rotation direction seen by Webb. The Kerr internal t violation (eg has a dtdθ crossterm), because of CPT, then gives a *ambient CP violation*. Use this same sinusoidal source sinu=R_{22} to find dt'. See appendix A for the solution to this (ie sinu=R_{22}).differential equation.

The reduced Gamow factor explains the low metallicity (partIII). Note fractal Newpde is:

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

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 τ 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 τ 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 τ anyway. tauon τ normalization does change in these distant nonlocal frames but τ doesn't jump locally like ε and $\Delta\varepsilon$ can so it is always a multiplier of $\sin\varepsilon$ 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 (~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 Δ 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 μ is largest at first ($\mu=1$=present value of the tauon mass) in $r_o e^{-\mu}\approx r_o(1-\mu)\approx r$) 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 ε 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 $N=1\rightarrow N=0$) $g_{oo}=\kappa_{oo}$ leading to solutions with multiples of ε and $\Delta\varepsilon$ and stair stepping through the ε 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 $i\rightarrow1$, 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 $\mu\approx1$ 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** (sine→sinh) $\qquad R_{22}=-\sinh\mu \qquad$ (A2A)

$=R_{22}=e^{-\nu}[1+½\, r(\mu'-\nu')]-1=-\sinh\nu=(-(e^{\nu}-e^{-\nu})/2)$, $\nu'=-\mu'$ so

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

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

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

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

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

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 μ=muon=.05946 (X tauon mass) giving us:

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

g factor=g= e/2m and w=gB=2πf with f the Larmor frequency which is what you use to measure the g factor(like in MRI)The anomalous gyromagnetic ratio gy=g-2. Note if the mass is decreasing then gy (and the g factor) goes up as well.The difference in gy between 2023 (FermiLab) and 1974 (CERN) is 116592059[22]-11659100[10] =1 part in 10^5 increase which translates to 1 part in 10^8 increase in g since g is about 2000X larger than gy. Note g is increasing corresponding to a decreasing mass m in g=e/2m, by about 1 part in 10^8 over 50 years so about 1 part in 10^{10} over 1 year, .Note 10^{10} years is the approximate time from (the big uptick) in eq.A3C, the mainstream nominal age of the universe.

. The Newpde zitterbwegung oscillatory sine wave sinμ source for R_{22} should be used for exact answers in which r is close to $r_{bb} \approx$ 30million miles radius.(Mercuron radius)
Metric quantization (see appendix B5) exists so the rebound explosion will be ~100 antinodes=D across the Mercuron r_{bb}, 10 across a supernova explosion neutron star object: see partIII, implying a Rayleigh Taylor instability so web like explosion remnants in both such as in M1 and Mercuron circumferencial 320(=πD) giving the initial radius (~400kLY) 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 eqs17-19 but with ambient metric ansatz: $ds^2=-e^{\lambda}(dr)^2-r^2d\theta^2-r^2\sin\theta d\phi^2+e^{\mu}dt^2$ (A3)
so that $g_{oo}=e^{\mu}$, $g_{rr}=e^{\lambda}$. From eq. $R_{ij}=0$ for spherical symmetry in free space and N=0

$$R_{11}= \tfrac{1}{2}\mu''- \tfrac{1}{4}\lambda'\mu'+ \tfrac{1}{4}(\mu')^2-\lambda'/r =0 \qquad (A4)$$
$$R_{22}=e^{-\lambda}[1+\tfrac{1}{2} r(\mu'-\lambda')]-1=0 \qquad (A5)$$
$$R_{33}=\sin^2\theta\{e^{-\lambda}[1+\tfrac{1}{2}r(\mu'-\lambda')]-1\}=0 \qquad (A6)$$
$$R_{oo}=e^{\mu-\lambda}[-\tfrac{1}{2}\mu''+\tfrac{1}{4} \lambda'\mu'-\tfrac{1}{4}(\mu')^2- \mu'/r]= 0 \qquad (A7)$$
$$R_{ij}=0 \text{ if } i\neq j$$

(eq. A4-A7 from pp.303 Sokolnikof(8)): Equation A4 is a mere repetition of equation A6. We thus have only three equations on λ and μ to consider. From equations A4, A7 we deduce that λ'=-μ' so that radial λ=-μ+constant =-μ+C where C represents a possible ~constant ambient metric contribution which (allowing us to set sinhμ=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: $e^{-C}e^{\mu}(1+r\mu')=1.$ (A9)
Set $e^{\mu}=\gamma$. So $e^{-\lambda}=\gamma e^{-C}$ ε and Δε are time dependent. So integrating this first order equation (equation A9) we get: $\gamma=-2m/r +e^C \equiv e^{\mu} = g_{oo}$ 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 rotater (Δε) for charged if -ε) 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

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

Δε here is reduced ground state mass Δε as in Schrodinger eq $E= \Delta\varepsilon=1/\sqrt{\kappa_{00}}$. (A10a)
does not add anything to r_H/r in κ_{rr} since e^C is not added to r_H/r there. Here the Kiode Δε, ε, τ ratio (so ε in AC3) is normalized so that τ=1 which then ignores the mass effect of object B, discussed in the appendix B below.

Appendix B **Object B** Fig4

Our new (Dirac) pde has spin S=½ 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 (dθdt 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 μ=1 (near the tiny Mercuron radius), far away from the big horizon (eg., the r_H horizon), the frame is not dragged as much due to the nearness of object B as the Webb space telescope discovered (eg., 2/3 galaxies spin clockwise and they formed far away from r_H.). We can write the Kerr metric as:

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

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

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

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

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

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

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

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

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

In summary inertial frame dragging reduction due to object B adds to κ_{rr} (B2) and only oblates 2m/r in κ_{oo} 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 τ+μ and also m_e *non*zero (*v* and γ are stuck on the diagonal because they are |dr|=|dt| light cone solutions.).

τ+μ in free space $r_H=e^2 10^{40(0)}/2m_Pc^2$, $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1+2\Delta\varepsilon/(1+\varepsilon)-r_H/r$ Leptons (B3)

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

Imaginary iΔε 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 $g_{oo}=\kappa_{oo}$ of eq B13 of this paper. Note B3 is still covariant because it comes out of the fractal (covariant) Kerr metric eq B1.

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

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

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

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

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

$[1/\sqrt{\kappa_{rr}}](3/2+J)=3/2+Jgy$, Therefore for J= ½ we have:

$[1/\sqrt{\kappa_{rr}}](3/2+½)=3/2+½gy= 3/2+½(1+\Delta gy)$ B7

Then we solve for Δgy and substitute it into the above dS/dt equation.
Thus solve eq. B7 with Eq.A1 values in $\sqrt{\kappa_{rr}}= 1/\sqrt{(1+2\Delta\varepsilon/(1+\varepsilon))}= 1/\sqrt{(1+2\Delta\varepsilon/(1+0))}= 1/\sqrt{(1+2X.0002826/1)}$. Thus from equation B1:
$[\sqrt{(1+2X.0002826)}](3/2 + ½)= 3/2 + ½(1+\Delta gy)$. Solving for Δgy gives anomalous gyromagnetic ratio correction of the electron Δgy=.00116.
If we set ε≠0 (so Δε/(1+ε)) instead of Δε) in the same κ_{oo} in Newpde we get the anomalous gyromagnetic ratio correction of the muon in the same way.

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

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

The gyromagnetic ratio of the proton

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

$1/\kappa_{rr} =1-r_H/r_H +\varepsilon''= \varepsilon''$ Therefore from equation B7 and case 1 eq.A3 $1/\kappa_{rr} =1-r_H/r_H+\varepsilon''$
$\sqrt{\varepsilon''}(1.5+.5)=1.5+.5(gy)$, 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 κ_{00} application example: Lamb shift

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

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

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

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

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

We have normalized out the e^C in equation B10 to get the pure measured r_H/r coupling relative to a laboratory flat background given thereby in that case by κ_{oo} under the square root in equation B10.
Note for electron motion around hydrogen proton $mv^2/r=ke^2/r^2$ so $KE=½mv^2= (½)ke^2/r$ =PE potential energy in PE+KE=E. So for the electron (but not the tauon or muon that are not in this orbit) $PE_e=½e^2/r$. Write the hydrogen energy and pull out the electron contribution B10a. So in eq.B2 and B8 for free electron equation 14 $r_H=(1+1+.5)e^2/(m_\tau+m_\mu+m_e)/2=2.5e^2/(2m_pc^2)$. B11

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

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 $r=n^2a_o=4a_o$ for n=2 and the $\psi_{2,0,0}$ eigenfunction. Also recall eqA4 eq.11a$\xi_1=m_Lc^2=(m_\tau+m_\mu+m_e)c^2=2m_pc^2$ normalizes ½ke^2 (Thus divide $\tau+\mu$ by 2 and then multiply the whole line by 2 to normalize the $m_e/2$.result. $\varepsilon=0$ since no muon ε here.): Recall in eeq.11a ξ_o has to be pulled in a Taylor expansion as an operator since it a separate observable. So substituting eqs.B1 for κ_{00}, values in eq.B10:

$$E_e=\frac{(tauon+muon)(\frac{1}{2})}{\sqrt{1-\frac{r_{H'}}{r}}}-\left(tauon+muon+PE_\tau+PE_\mu-m_ec^2\right)\frac{1}{2}=$$

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

$$=\frac{2m_ec^2}{2}+2\frac{e^2}{4r}-2\frac{3}{8}\left(\frac{2.5}{rm_Lc^2}\right)^2m_Lc^2=m_ec^2+\frac{e^2}{2r}-2\frac{3}{8}\left(\frac{2.5e^2}{rm_Lc^2}\right)^2m_Lc^2$$

So: $\Delta E_e=2\frac{3}{8}\left(\frac{2.5}{rm_Lc^2}\right)^2m_Lc^2$ = (Third order $\sqrt{\kappa_{\mu\mu}}$ Taylor expansion term)=

$$\Delta E=2\frac{3}{8}\left[\frac{2.5(8.89X10^9)(1.602X10^{-19})^2}{(4(.53X10^{-10}))2((1.67X10^{-27})(3X10^8)^2}\right]^2(2(1.67X10^{-27})(3X10^8)^2$$

=hf=6.626X10^{-34} 27,360,000 so that f=27MHz Lamb shift. (B12)

The other 1050Mhz comes from the zitterbewegung cloud.

Note: Need infinities if **flat space Dirac 1928 equation**. For flat space $\partial g_{ik}/\partial x^j=\mathbf{0}$ as a limit. Then must take field $g^{km}=1/0=\infty$ to get finite Christoffel symbol $\Gamma^m_{ij}\equiv(g^{km}/2)(\partial g_{ik}/\partial x^j+\partial g_{jk}/\partial x^i-\partial g_{ij}/\partial x^k)=(1/\mathbf{0})(\mathbf{0})$=*un*defined but still implying *non*zero acceleration on the left side of the geodesic equation: $\frac{d^2x^\mu}{ds^2}=-\Gamma^\mu_{\nu\lambda}\frac{dx^\nu}{ds}\frac{dx^\lambda}{ds}$. Christofell symbol$\equiv\Gamma^\mu_{\nu\lambda}$. So we need infinite fields for flat space. Thus QED requires (many such) infinities. But we have in general curved space $g_{ij}=\kappa_{ij}$ in the New pde so do not require that anything be infinite and yet we still obtain for the third order Taylor expansion term of $\sqrt{\kappa_{\mu\nu}}$ the Lamb shift and anomalous gyromagnetic ratio correction (see above sections B3,B4).

B5 Single field but observed from different frames of reference

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

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

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

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

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

$(\Delta\varepsilon)^m$ is the operator in $\Delta\varepsilon^m\psi=-\frac{i^m\partial^m}{\partial t^m}\psi_{N=1}=H^m\psi_{N=1}$ so each term in this B13 expansion is an independent QM operator so with independent speed=v eigenvalues relative to COM. From eq. B13 for example $v=m100^N$km/sec. m=2,N=1 here (Local arm). In part III we list hundreds of examples of B13 metric quantization: (sun: 1, 2km/sec, galaxy halos m100km/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=δz>>δzδz from eq.3. Recall from section 1that the required N=0 tiny C≈δz must automatically be a perturbation of the N=1 eq.7 =**δ**z'+δz= $(dx_1+idx_2)+(dx_3+idx_4)$≡ dr+idt. But given δz≈dr≈dt at 45° we must add and subtract δz'

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

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

So large rotation angle δδz/ds in eq.5 can then be those large axis' ds extreme thus rotation through the ±45° min ds and so two possible 45° rotations so through a total of two quadrants for ±δz' in eq.16 (a single δz just gives e,*ν* 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 buts 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_o) make nontrivial physical contributions to the Fermi G. So there are the object B leptonic components of the Hamiltonian that give e,*ν* and 2*ν*=γ and these new object C Bosonic components of the Hamiltonian that give the W and Z.

These rotations are

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

Note in fig.3 dr,dt is also a rotation and so has an eq.11 rotation operator observable θ. Thus from equation 11 for (θ) angle rotations $\theta\delta z\equiv(dr/ds)\delta z=-i\partial(\delta z)/\partial r$ for the first 45°rotation. So we got through one Newpde derivative for each 45° rotation. For the next 45° rotation in fig.4 it is then a second derivative $\theta\theta\delta z'=e^{i\theta p}e^{i\theta'}\delta z=e^{i(\theta p+\theta)}\delta z=(dr/ds)((dr/ds)dr')=-i\partial(-i\partial(dr'))/\partial r)\partial r=-\partial^2(dr')/\partial r^2$ large angle rotation in figure 3. In contrast for z=1, δz' small so 45°-45° 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°+45° (fig.4) then $\theta\theta\delta z'=(d^2/dr^2)z'+(d^2/dt^2)\delta z'$ (C1)

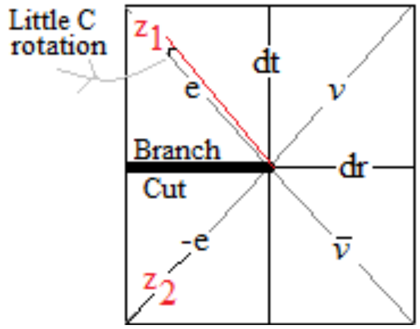


fig.3

fig.3. for **45°-45°** So two body (e,ν) 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°+45° rotations so eq.16 implies Bosons accompany our leptons (given the δz'), **so these leptons exhibit "force".**

Newpde $r=r_H$, z=0, 45°+45 rotation of composites e,ν 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° rotation to the next Reimann surface of eq.16, eq.A1 $(dr^2+dt^2)z''$ from some initial extremum angle(s) θ. Eq.16 solutions imply complex 2D plane Stern Gerlach dichotomic rotations using eq.A1 thereby using Pauli matrices σ_i algebra, which maps one-to-one to the quaternionA algebra. Using eq.16 we start at some initial angle θ and rotate by 90° the noise rotations are: $C=\delta z''=[e_L,\nu_L]^T \equiv \delta z'(\uparrow)+\delta z'(\downarrow) \equiv \psi(\uparrow)+\psi(\downarrow)$ has a eq.16 infinitesimal unitary generator $\delta z''\equiv U=1-(i/2)\varepsilon n*\sigma)$, $n\equiv\theta/\varepsilon$ in $ds^2=U^tU$. But in the limit $n\rightarrow\infty$ we find, using elementary calculus, the result $\exp(-(i/2)\theta*\sigma)=\delta z''$. We can use any axis as a branch cut since all 4 are eq.20 large extremum so for the 2nd rotation we move the branch cut 90° and measure the angle off the next diagonal since Pauli matrix dichotomic rotations are actually axis rotations, leaving our e and v directions the same. In any case $(dr+dt)z''$in eq.16 can then be replaced by eq.A1 $(dr^2+dt^2+..)\delta z''=(dr^2+dt^2+..)e^{\text{quaternionA}}$Bosons because of eq.C1.

C2 Then use eq. 12 and quaternions to rotate δz" since the quaternion formulation is isomorphic to the Pauli matrices. $dr'=\delta z_r=\kappa_{rr}dr$ for **Quaternion** A $\kappa_{ii}=e^{iAi}$ (C1A)

Possibly large δδz in eq.3 δ(δz+δzδz)=0 so large rotations in eq16 i.e., high energy, tiny $\sqrt{\kappa_{oo}}$) since τ normalized to 1 allows formalism for object C

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

For baryons with a 3 particle r_H/r may change sign without third particle ε changing sign so that at $r=r_H$. Can normalize out the background ε in the denominator of $E=(\tau+\varepsilon)/\sqrt{(1+\varepsilon+\Delta\varepsilon-r_H/r)}$ for

Can normalize out the background ε in the denominator of $E=(\tau+\varepsilon)/\sqrt{(1+\varepsilon+\Delta\varepsilon-r_H/r)}$ for small conserved (constant) energies $1/\sqrt{(1+\varepsilon)}$ and (so $E=(1/\sqrt{(1+x)})=1-x/2+$) large r (so large λ so not on r_H)implies the normalization is:

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

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

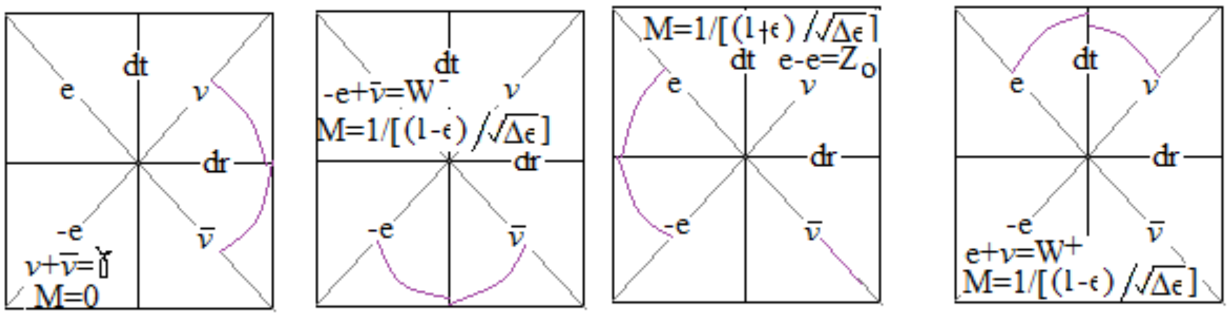


Fig5

Fig.4 applies to eq.9 **45°+45°**=90° 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°+45°=90°, gets Bosons. 45°-45°= leptons. The *ν* in quadrants II(eq.5) and III (eq.9). e in quadrants I (eq.7) and IV (eq.7). Locally normalize out 1+ε (appendix D). For the **composite e,*ν*** on those required large z=0 eq.9 rotations for C→0, and for stability $r=r_H$ (eg.,for $2P_{1/2}$, I→II, III→IV,IV→I) unless $r_H=0$ (II→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→I rotation eq.C2 $(dr^2+dt^2+..)e^{\text{quaternion } A}$ =rotated through C_M in eq.16. example C_M in eq.C1 is a 90° CCW rotation from 45° through *ν* and anti *ν*

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

Then do the time derivative second derivative $\partial^2/\partial t^2(\exp(iA_r+jA_o)=(\partial/\partial t[(i\partial A_r\partial t+\partial A_o/\partial t)$
$(\exp(iA_r+jA_o)]=\partial/\partial t[(\partial/\partial t)iA_r+(\partial/\partial t)jA_o)(\exp(iA_r+jA_o)+$
$[i\partial A_r/\partial r+j\partial A_o/\partial t]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+(i\partial^2A_r/\partial t^2+j\partial^2A_o/\partial t^2)(\exp(iA_r+jA_o)$
$+[i\partial A_r/\partial t+j\partial A_o/\partial t][i\partial A_r/\partial t+j\partial/\partial t(A_o)]\exp(iA_r+jA_o)$ (C4)

Adding eq. C2 to eq. C4 to obtain the total D'Alambertian C3+C4=
$[i\partial^2A_r/\partial r^2+i\partial^2A_r/\partial t^2]+[j\partial^2A_o/\partial r^2+j\partial^2A_o/\partial t^2]+ii(\partial Ar/\partial r)^2+ij(\partial A_r/\partial r)(\partial A_o/\partial r)$
$+ji(\partial A_o/\partial r)(\partial A_r/\partial r)+jj(\partial A_o/\partial r)^2++ii(\partial Ar/\partial t)^2+ij(\partial A_r/\partial t)(\partial A_o/\partial t)+ji(\partial A_o/\partial t)(\partial A_r/\partial t)+jj(\partial A_o/\partial t)^2$.

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

Plugging in C2 and C4 gives us cross terms $jj(\partial A_o/\partial r)^2+ii(\partial Ar/\partial t)^2=jj(\partial(-A_r)/\partial r)^2+ii(\partial Ar/\partial t)^2$
$=0$. 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)

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

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

$$\Box^2 A_\mu=1,\ \Box\bullet A_\mu=0 \qquad \text{(C7)}$$

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 $A\to A+\nabla\psi$ which doesn't change $B=\nabla XA$ either. So formulation in the Lorentz gauge mathematics works (but again C7 is no longer a gauge). Here mass carries energy in the Dirac equation and so cancels out $E_{IV}-E_I=0$. So the two *v* masses in a nonuniform G_{oo} in appendix C8 cancel out in this quadrant IV→I rotation.

Geodesics for eq. C7

Recall equation 17 eq C1: $g_{oo}=1-2e^2/rm_ec^2\equiv 1-eA_o/mc^2v^o$). We determined A_o,(andA_1,A_2,A_3) in above eq.C1A. We plug this eq.C1A A_i into the geodesics

$$\frac{d^2x^\mu}{ds^2}=-\Gamma^\mu_{\nu\lambda}\frac{dx^\nu}{ds}\frac{dx^\lambda}{ds} \qquad (5.9)$$

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

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

$A'_0\equiv e\phi/m_\tau c^2$, $g_{00}\equiv 1-\dfrac{e\phi(x,t)}{m_\tau c^2}=1-A'_0$, and define $g'_{\alpha\alpha}\equiv 1-A'_\alpha/v_\alpha$, $(\alpha\neq 0)$ 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 $\dfrac{\partial g_{11}}{\partial x^\alpha}dx^\alpha=dg_{11}$ 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:

$$-\frac{d^2x^1}{ds^2}=\Gamma^1_{11}v_1v_1+\Gamma^1_{12}v_1v_2+\Gamma^1_{13}v_1v_3+\Gamma^1_{10}v_0v_1+\Gamma^1_{21}v_2v_1+\Gamma^1_{22}v_2v_2+\Gamma^1_{23}v_2v_3+\Gamma^1_{20}v_2v_0+$$

$$\Gamma^1_{31}v_3v_1+\Gamma^1_{32}v_3v_2+\Gamma^1_{33}v_3v_3+\Gamma^1_{30}v_3v_0+\Gamma^1_{01}v_0v_1+\Gamma^1_{02}v_0v_2+\Gamma^1_{03}v_0v_3+\Gamma^1_{00}v_0v_0=$$

$$\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^1}\right)v_1+\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^2}\right)v_2+\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^3}\right)v_3+\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^0}\right)v_0+$$

$$\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^2}\right)v_2-\frac{g^{11}}{2}\left(\frac{\partial g'_{22}}{\partial x^1}\right)v_2+0+0+\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^3}\right)v_3+0-\frac{g^{11}}{2}\left(\frac{\partial g'_{33}}{\partial x^1}\right)v_3+0+$$

$$\frac{g^{11}}{2}\left(\frac{\partial g'_{11}}{\partial x^0}\right)v_0+0+0-\frac{g^{11}}{2}\left(\frac{\partial g'_{00}}{\partial x^1}\right)v_0+O\left(\frac{A_i dv}{v^2 dt}\right)=v_2\left(\frac{\partial g''_{11}}{\partial x^2}-\frac{\partial g''_{22}}{\partial x^1}\right)+v_3\left(\frac{\partial g''_{11}}{\partial x^3}-\frac{\partial g''_{33}}{\partial x^1}\right)+$$

$$\left(\frac{\partial g''_{11}}{\partial x^\alpha}v_\alpha+\frac{\partial g''_{11}}{\partial x^0}v_0\right)-\left(\frac{\partial g''_{00}}{\partial x^1}\right)v_0+O\left(\frac{A_i dv}{v^2 dx}\right)\approx-\left(\frac{\partial g''_{00}}{\partial x^1}\right)v_0+v_2\left(\frac{\partial g''_{11}}{\partial x^2}-\frac{\partial g''_{22}}{\partial x^1}\right)+$$

$$v_3\left(\frac{\partial g''_{11}}{\partial x^3}-\frac{\partial g''_{33}}{\partial x^1}\right)+O\left(\frac{A_i dv}{v^2 dt}\right)\approx\frac{e}{m_\tau c^2}\left(-\vec\nabla\phi+\vec v X\left(\vec\nabla X\vec A\right)\right)_x+O\left(\frac{A_i dv}{v^2 dr}\right)$$

. Thus we have the **Lorentz force equation** form $\left(-\left(\frac{e}{m_\tau c^2}\right)\left(\vec\nabla\phi+\vec v X\left(\vec\nabla X\vec A\right)\right)\right)_x$ plus the derivatives of 1/v which are of the form**:** $\mathbf{A_i(dv/dr)_{av}/v^2}$.This new term $A(1/v^2)dv/dr$ is the SC pairing interaction. So we discovered the origin of superconductivity eg if denominator v=0 asymmetric normal mode so nonidentical oscillators with equal mass(Cu=4O, 64=4X16)and so big pairing interaction nonlocal force(sect.5.4, partI) Schrodinger eq operator added to the Hamiltonian.

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

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

For the **composite e,*v*** on those required large z=0 eq.16 rotations for C≈0, and for stability $r=r_H$ for $2P_{1/2}$ (I→II, III→IV,II→III) unless $r_H=0$ (IV→I);

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

$$E=\mu_B B=\frac{\mu_B BA}{A}=\frac{e\hbar}{2m_\mu}\frac{h}{e}\frac{1}{\pi r_H^2}=\frac{9.27234X10^{-24}}{206.65}\left(\frac{4(2.0678X10^{-15})}{2.481X10^{-29}}\right)=\frac{7.669X10^{-38}}{5.126X10^{-27}}$$

$=1.5X10^{-11}$J=93.364Mev≈muon. $\delta z=\psi\approx e^{i\varepsilon}$ is the fundamental Dirac state with the electron as usual the Newpde ground state even as in atomic physics. So the muon ε produces a second muon ε so the 2muon 2ε is also the **fundamental** 2εX917 para state *inside* r_H

Muon shrink: 917(ε/(1±ε)) weak interaction.

917(ε/(1+ε))= Z_0, 80 Gev Proca spin1

917(ε/(1-ε))= W±, 91 Gev; " "

2 Muon shrink: 917(2ε/(1±2ε)) **the fundamental para state**

917(2ε/(1+2ε))=t, 173Gev. Para state so Klein Gordon spin 0

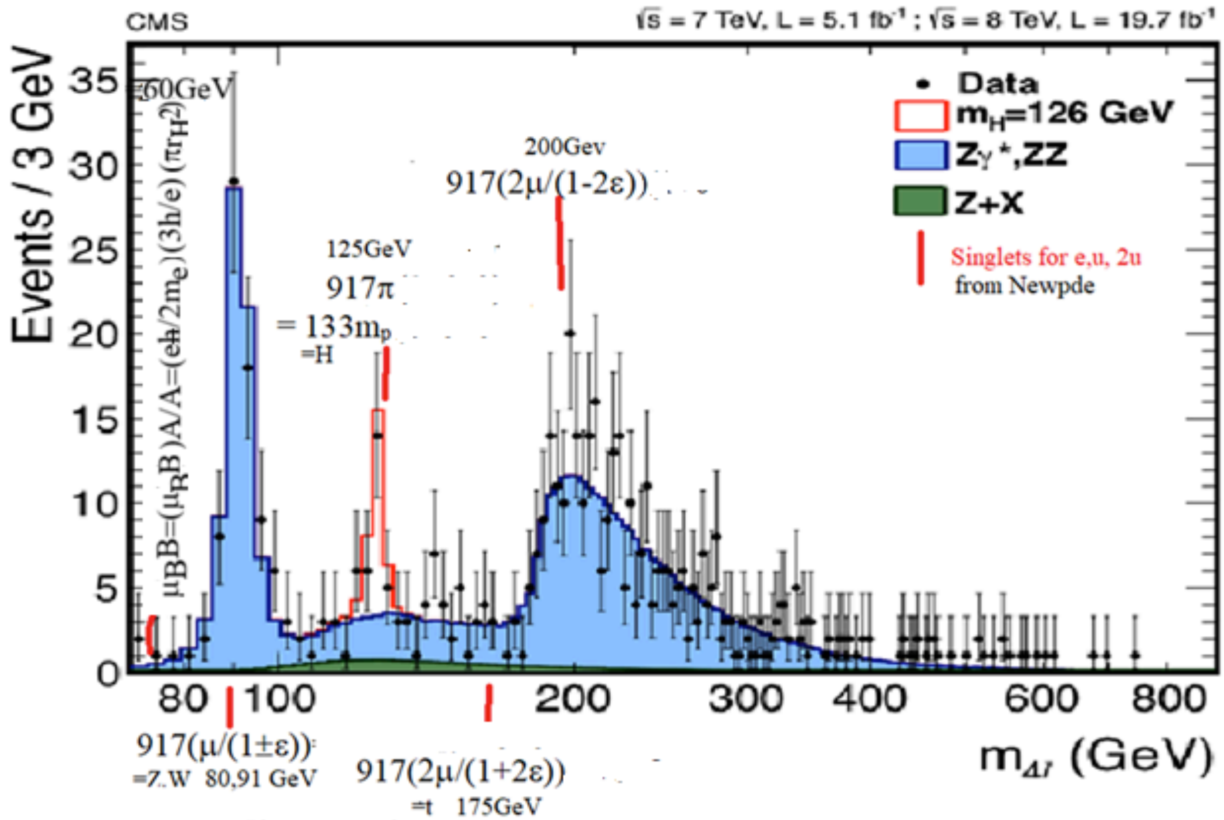
917(2ε/(1-2ε))=207GeV. I call this J=0 particle the James.

Outside r_H

Pion Shrink: 917π Klein Gordon spin 0

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

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



Particle Predictions of new particles and their properties

So there should also be a 2pion shrink 917(2π) explaining the asymmetry of that part of the CMS curve centered at 200Gev. A 2pion shrink is near 250Gev with the usual 3,4 pion shrinks etc extending that 200Gev asymptote out to 400Gev. For proton-proton LHC collisions, there is net charge, so neutral particle counts are smaller (eg u Z_o=80Gev; 2u t_o=173GeV,1π H=135Gev 2pion charged at 280GeV.

W,Z Proca eq.(spin 1=J)W has ν in the rotation so accompanied by ν in decays. The min energy state for 2u gives 1-1=0=S, Pions=π Klein Gordon field equation for spin0 0-0=0=S

For the **composite e,ν** on those required large z=0 eq.16 rotations for C≈0, and for stability $r=r_H$ for $2P_{½}$ (I→II, III→IV,II→III) unless $r_H=0$ (IV→I) are:

Ist→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 $\varepsilon\rightarrow1=\tau$ (D13) in ξ_1 at $r=r_H$.since Hund's rule implies $\mu=\varepsilon=1S_{½}\le2S_{½}=\tau=1$. So the ε is negative in $\Delta\varepsilon/(1-\varepsilon)$ as in case 1 charged as in appendix A1 case 2.

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

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

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

$E=1/\sqrt{(\kappa_{oo})}-1=[1/\sqrt{(1-\Delta\varepsilon/(1-\varepsilon)-r_H/r)}]-1=[1/\sqrt{(\Delta\varepsilon/(1-\varepsilon))}]-1$. $E_t=E+E=2/\sqrt{(\Delta\varepsilon/(1-\varepsilon))}$=W- mass. E_t=E-E gives E&M that also interacts weakly with weak force.

II → III quadrant rotation is the Z_o. Do the math and get a Proca equation. C_M charge cancelation. B14 gives $1/(1+\varepsilon)$ gives 0 charge since $\varepsilon\to1$ to case 1 in appendix C2.
$E=1/\sqrt{(\kappa_{oo})}-1=[1/\sqrt{(1-\Delta\varepsilon/(1+\varepsilon)-r_H/r)}]-1=[1/\sqrt{(\Delta\varepsilon/(1+\varepsilon))}]-1$. $E_t=E+E=2/\sqrt{(\Delta\varepsilon/(1+\varepsilon))}-1=Z_o$ mass. E_t=E-E gives E&M that also interacts weakly with weak force. Seen in small left handed polarization rotation of light. Recall that $\Delta\varepsilon$=.00058. If contracted to $r=r_H$ by this singlet state contraction then for the two ±leptons (10^{-18}m). From eq.B10: $2\mu\gamma(1/(1\pm\varepsilon))=2\mu917(1/(1\pm\varepsilon))=$

$$E=\frac{2m_p}{\sqrt{1-\Delta\varepsilon-\frac{r_H}{r}}}\left(\frac{1}{1\pm\varepsilon}\right)=\frac{2m_p}{\sqrt{1-\Delta\varepsilon-\frac{r_H}{r_H}}}\left(\frac{1}{1\pm\varepsilon}\right)=\frac{2m_p}{\sqrt{\Delta\varepsilon}}\left(\frac{1}{1\pm\varepsilon}\right)=85\left(\frac{1}{1\pm\varepsilon}\right)=Z_0,W^{\pm}$$ as our IV quadrant to Ist quadrant rotation Proca equation showed us. $Z_0 or\ W=85\frac{1}{1\pm\varepsilon}$negative ε means charged. Positive ε is neutral.

IV→I quadrant rotation through those 2 neutrinos gives 2 objects. $r_H=0$
$E=1/\sqrt{\kappa_{oo}}-1=[1/\sqrt{(1-\Delta\varepsilon/(1+\varepsilon)}]-1=\Delta\varepsilon/(1+\varepsilon)$. Because of the +- square root E=E+-E so E rest mass is 0 or $\Delta\varepsilon=(2\Delta\varepsilon)/2$ reduced mass.
Note we get SM particles out of composite e,v using required eq.16 rotations.
In these eq.16 axis to axis 4 rotations (getting the 4 Bosons:W+,W-,Zo,γ)we have a short cut way of deriving the Standard Model of particle physics (SM): The ultimate reality check!!!

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

The fractal implications are that we are inside a cosmological positron inside a proton $2P_{3/2}$ at $r=r_H$ state. The cosmological object (electron) we are inside of is a positron and call it object A which orbits electron object B with a given distant 3rd object C. Object B is responsible for the mass of the electron since it's frame dragging creates that Kerr metric $(a/r)^2=m_ec^2$ (B9) result used in eq.D9. So Newpde ground state $m_ec^2\equiv\langle H_e\rangle$ is the fundamental Hamiltonian eigenvalue defining idea for composite e,v, $r=r_H$ implying Fermi 4 point $E=\int\psi^tH\psi dV=\int\psi^t\psi HdV=\int\psi^t\psi G$
Recall for composite e,v all interactions occur inside r_H $(4\pi/3)\lambda^3=V_{rH}$. $\frac{1}{V^{1/2}}=\psi_e=\psi_3\frac{1}{V^{1/2}}=\psi_v=\psi_4$ so 4pt $\iiint_0^{r_{rH}}\psi_1\psi_2\psi_3\psi_4dV=2G\iiint_0^{r_H}\psi_1\psi_2\frac{1}{V^{1/2}}\frac{1}{V^{1/2}}V$
$\equiv\iiint_0^{r_H}\psi_1\psi_2G\equiv\iiint_0^{r_H}\psi_1\psi_2(2m_ec^2)dV_{rH}=\iiint_0^{V_{rH}}\psi_1(2m_ec^2)\psi_2dV_{r_H}$ (A8)

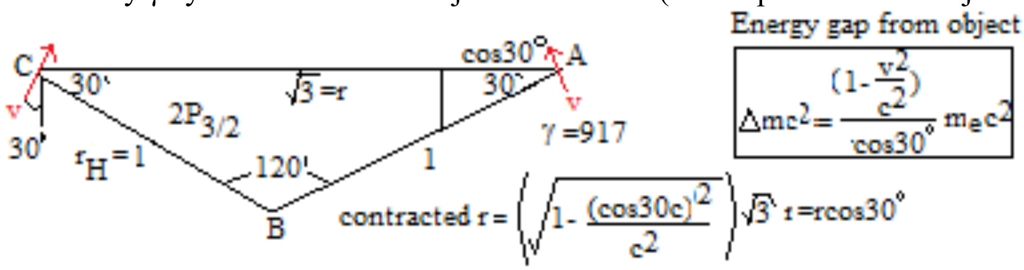
Object C adds it's own spin (eg., as in 2nd derivative eq.A1) to the electron spin (1,IV quadrants) and the W associated with the $2P_{3/2}$ state at $r=r_H$ thereby adds a derivative in a neutrino quadrant (fig.4) thereby including neutrinos in the Fermi 4pt. So 2nd derivative

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

In that regard the expectation value of γ^5 is speed and varies with $e^{i3\phi/2}$ in the trifolium. The spin½ decay proton $S_{1/2}\propto e^{i\phi/2}\equiv\psi_1$, the original ortho $2P_{1/2}$ particle is chiral $\chi=\psi_2\equiv\frac{1}{2}(1-\gamma^5)\psi=\frac{1}{2}(1-\gamma^5e^{i3\phi/2})\psi$. Initial $2P_{1/2}$ electron ψ is constant. Start with initial ortho state χ. These γ^5 terms then modify equation A8 to read $=\iiint_0^{V_{rH}}\psi_1\psi_2(2m_ec^2)dV_{rH}=\iint\psi_{S1/2}^*(2m_ec^2V_{rH}))\chi dV_\phi=$
$K\int\langle e^{i\frac{i\phi}{2}}[\Delta\varepsilon V_{r_H}]\left(1-\gamma^5e^{i\phi\frac{3}{2}}\right)\psi\rangle d\phi=KG_F\int\langle e^{i\phi/2}-\gamma^5ie^{i(4/2)\phi}\rangle d\phi=KG_F\left(\frac{2e^{i\phi}}{i}|_0^{2\pi+C}-\frac{2\gamma^5e^{i4\phi}}{i4}|_0^{2\pi+C}\right)=k1(1/4+i\gamma^5)=k(.225+i\gamma^5 0.974)=k(\cos13°+i\gamma^5\sin13°)$ **deriving the 13° Cabbibo angle**. With previously mentioned CP result(direct evidence of fractal universe) get CKM matrix

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

Review of $2P_{3/2}$ Next higher fractal scale ($X10^{40}$), cosmological scale. Recall from B9 $m_ec^2=\Delta\varepsilon$ 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. Observor in objectA. Δm_ec^2 gap=object C scissors eigenstates. is what we see at object A but Δm_ec^2 gets boosted by γ by rotation into the object B direction.(to compare with the object B m_ec^2 gap).



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

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

$r_{CA}=1\sqrt{1-\frac{\cos^2 30°c^2}{c^2}}\sqrt{3}$ =.866=cos30°=CA and Fitzgerald contracted AB= $r_{BA}=x/\gamma=1/\gamma$ so for Fitzgerald contracted x=1 for AB (fig7). We can start at t=0 with the usual Lorentz transformation for the time component.

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

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

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

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

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

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

Take the ratio of $\frac{k\gamma\Delta m_ec^2}{km_ec^2}$ to eliminate k: thus

$$\frac{k\gamma\Delta m_ec^2}{km_ec^2}=\frac{\gamma\beta\left(\frac{x}{\gamma}\right)}{\gamma\beta r_{CA}}=\frac{1\beta 1}{\gamma\beta\cos 30°}=\frac{1}{\gamma\cos 30°}$$ so

$$\Delta m_e c^2 = \frac{\beta m_e c^2}{\beta cos30°° \gamma^2} = \frac{\left(1-\frac{v^2}{c^2}\right) m_e c^2}{cos30°} \qquad \text{(A10)}$$

allowing us to finally compare the energy gap caused by object C ($\Delta m_e c^2$) to the energy gap caused by object B ($m_e c^2$. C8). So to summarize $\Delta E= (m_e c^2/((\cos 30°)917^2) = m_e c^2/728000$. So the energy gap caused by object C is $\Delta E=(m_e c^2/((\cos 30°)917^2) = m_e c^2/728000$. The weak interaction thereby provides the ΔE perturbation ($\int\psi^*\Delta E\psi dV$) inside of r_H creating those Frobenius series (partII) r≠0 states, for example in the unstable equilibrium $2P_{1/2}$ electrons m_e. so in the context of those e,ν rotations giving W and Z_o.. The G can be written for E&M decay as $(2mc^2)XVr_H= 2mc^2 [(4/3)\pi r_H^3]$. But Object Hamiltonian is a higher ranked tensor then (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= $(2m_e c^2/728{,}000)Vr_H$=$\mathbf{G_F}$ $=1.4X10^{-62}$ J-m^3 =.9X10^{-4} MeV-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 $2m_e c^2/729{,}000=1.19X10^{-19}$J. So $\Delta E=1.19X10^{-19}/1.6X10^{-19}$=.7eV which ±that r perturbation (instability) states in the Frobenius solution (partII) and so weak decay.
is our ΔE gap for the weak interaction (from operator H) inside the Fermi 4pt. integral for G_F.

The perturbation r in the Frobenius solution is caused by this ΔH in ($\int\psi^*\Delta H\psi dV$) with available phase space $\psi^*=\psi_p\psi_e\psi_\nu$ for $\psi=\psi_N$ decay where ψ_e and ψ_ν are from the factorization. The neutrino adds a $e^2(0)$ to the set of $e^2 10^{40N}$ electron solutions to Newpde r_H with electron charge ±e and intrinsic angular momentum conservation laws S=½ holding for both e and ν.

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

C8 NONhomogeneous and NONisotropic Space-Time

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

In that regard for 2D for a homogenous and isotropic g_{ij} we have identically $R_{\mu\mu}-½g_{\mu\mu}R= 0$ ≡source $=G_{oo}$ since in 2D $R_{\mu\mu}=½g_{\mu\mu}R$ identically (Weinberg, pp.394) with μ=0, 1... Note the 0 ($=E_{total}$ 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_{oo}=0. Also from sect.2 eqs. 7 and 8 (9) occupy the same complex 2D plane. So eqs. 7+8 is $G_{oo}=E_e+\sigma\bullet p_r=0$ 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_{oo} is not zero and so the **neutrino gains mass** (These two ν masses cancel out in the IV→I rotation of C4 γ)

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

Since we have now derived M_W, M_Z and their associated Proca equations, and Dirac equations for m_τ,m_μ,m_e etc., and G,G_F,ke^2 Maxwell's equations, etc. we can now write down the usual Lagrangian densities that implies these results. In the formulation $M_Z=M_W/\cos\theta_W$ you can find the Weinberg angle θ_W, $g\sin\theta_W=e$, $g'\cos\theta_W=e$; solve for g and g', etc., We will have thereby derived the standard model from first principles (i.e.,postulate0). **It no longer contains free parameters.**

Note C_M=Figenbaum 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 = $G_{oo}=E_e+\sigma\bullet p_r=0$ gets the left handedness. Recall the genius of the SM is getting all those properties (of γ, Z_o, W^+, W^-) from $SU(2)XU(1)_L$ so we really have completely derived the standard electroweak model from eq.16 which comes out of the Newpde given we even found the magnitude of its input parameters (eg., G_F (appendix C7), Cabbibo angle C6).

Appendix M (for underlying math)

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

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

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

Recall from section 1 that adding the N=0 fractal scale 2D δz perturbation to N=1 eq.7 2D gives curved space 4D. So $(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$ given (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 $\gamma^r dr\equiv\gamma^x dx+\gamma^y dy+\gamma^z dz$, $\gamma^j\gamma^i+\gamma^j\gamma^i=0$, $i\neq j$, $(\gamma^i)^2=1$, 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_ix_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 spin½ component ω (angular velocity) axial vector of the Newpde lepton (eqs.7-9); which we get anyway from lepton equation Newpde. Also see M5.

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

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

simply by *defining* symbols as numbers, thereby making them the same thing. So instead of writing the "**laws of mathematics**" as a long list of ring and field axioms it is replaced with one simple **axiom** postulateo. Note that here we postulated that "eq1 z=zz+C implies some real 0=z" which also implies *some* z=zz case. So the **origin of mathematics** is eq.13 z=0 *stable* eq.11 real eigenvalue eq.5 e,*ν* and so 2*ν*=γ (appendix C4) and so real **countability**(and thus the origin of **numbers**) since we can N count **e**,*ν*,γ (eg Mercuron section sect IIIb and appendix A1) with fractal scale one to one E=Nhf countability) without them actually disintegrating even though the act of counting does change f as is well known. Note that even the proton is 3**e** (See partII). So you are still counting electrons even when you count everything else making eq13 the source of mathematics.

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

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

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

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

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

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

List all *numbers* such as 0X(1X0)=(0X1)X0 and 1+(1+1) =(1+1)+1] defining *symbols* aX(bXc)=(aXb)Xc and a+(b+c)=(a+b)+c multiplicative and additive **associativity** respectively.

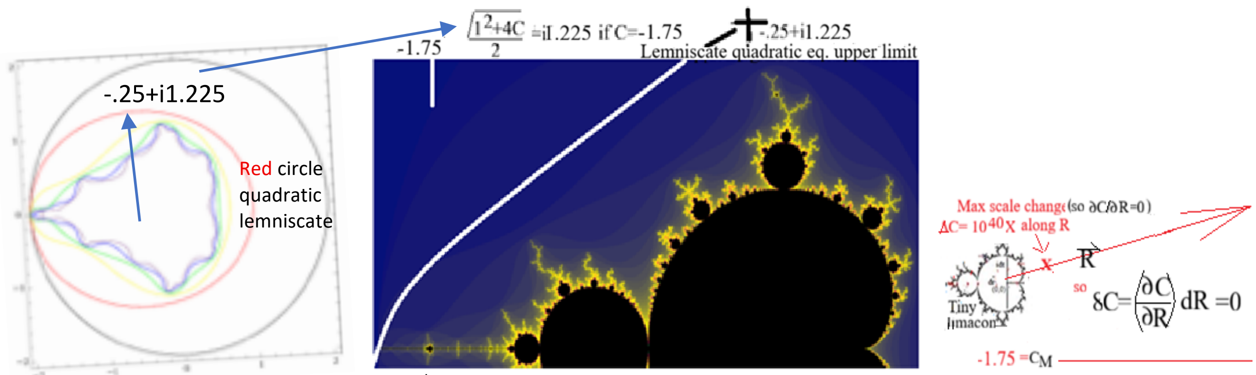
0X1=0 and 0X0=0 come from the distributive law.

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≡δC=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 1.1km=1100m 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**.

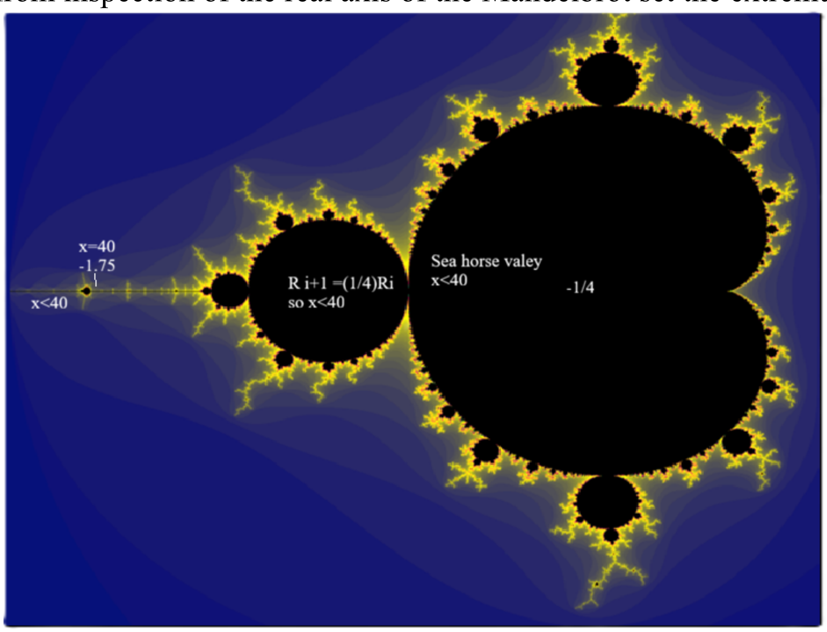
M5 Lemniscates required in dr,dt zoom: http://www.youtube.com/watch?v=0jGaio87u3A

The fig1 Lemniscate (as a function of adding continuous circles fig3) is continuous(13) along dr. So these δz fields of real numbers allow us to define the general case of ε, δ arbitrarily small(and not just snippets) in the limit definition of the Newton quotient derivative=$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h} = \frac{df(x)}{dx}$ 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 ∂C/∂R=0) as the postulate demands. So to define δC=0 we *must* pull only the lemniscates of fig1 out of the zoom. Also a lemniscate boundary and so the maximum jump fractal scale provide our two extreme since they are just two ways of writing the same boundary, one as 1.75 on the Nth fractal scale and the other as $1.75X10^{40}$ (maximum) on the **N-1 th fractal scale, making them two separate extreme giving one boundary**. To find this boundary (and thereby this number -1.75) reverse engineer the lemniscates down to the second circle iteration where the 2nd circle C_n is not 0=C_o creating our fundamental lemniscate quadratic equation border containing point (-.25, i1.225) on that 1st extremum upper boundary. We must use that quadratic equation for that boundary because it is just as fundamental as eqs.1 & 3 and so also has its own solutions like they do. We could have even postulated this circle equation instead of equation 1. Recall the lemniscate iteration sequence is $C_{N+1}=C_NC_N+C$. $C=C_1=dr^2+dt^2$, $C_0=0$. So that quadratic circle equation is $C_2=C_1C_1+C$ (Note similarity to eq.1.). To find the smallest boundaries we first write



. lemniscate sequence ↑tiny limacon -¼ real extreme 2nd extreme at X fig3

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



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

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

-¼ upper extremum eq1 quadratic equation so rational Cauchy sequence ($z_{N+1}-z_N z_N=C$) =**-1/4**, -3/16,-55/256, ..**0**. So **0** is a real #. QED

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

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" (0 is no objects, a blank, 1 is some specific object). So this is "first principles", thus we have actually figured it out! We completely understand!!!

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

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

(C constant so $\delta C=0$ and z=zz+C eq1 gets us the multiplicative properties of **0**) there then must then be a rational Cauchy *sequence* with limit 0 that then doubles as a *iteration* of eq1in $\delta C=0$ that thereby gives the (fractal) Mandelbrot set. Also plugging eq1 into $\delta C=0$ gives the Dirac equation and so fractal (scales $10^{40N}XCM_{N=0}$, fig1) *real* eigenvalues of a *generally* covariant Dirac Newpde; clearly a big advancement as shown in fig2.

Newpde$\equiv\gamma^{\mu}(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_{\mu}=(\omega/c)\psi$ for ν,e; $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$;
$r_H=C_M/\xi=e^2X10^{40\mathbf{N}}/m$ (fractal jumps **N**=. -1,0,1.,) $\Delta\varepsilon\equiv m_e$, $\varepsilon=\mu$ are zero if no object B(appendix B

Questions answered:

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

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

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

2) Where does the Mandelbrot set come from?

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

3) Where does the Dirac equation come from?

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

4) Where does the vacuum come from?

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

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

Answer: eq1 is a quadratic equation resulting in eq.4 giving complex numbers (negative under the discriminant sqrt sign) dr+i**1**dt=ds which is also **the origin of space-time** dr,dt.

6) Why is the speed of light c constant?

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

7) Where does charge come from?

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

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

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

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

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

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

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

11) Where does the strong force come from?

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

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

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

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

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

14) Is there dark matter?

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

15) How does the universe work?

Answer: Postulate0.

16) Where does gravity come from?

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

17) Where does the neutrino come from?

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

18) Where does the neutrino mass come from?

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

19) Why is there more matter than antimatter?

There isn't. Two positrons and one electron in the proton and one orbiting electron making up hydrogen the most common element. So they are in equal amounts.

20) What is the pion field?

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

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

Answer: The $2P_{3/2}$ two positrons at $r=r_H$ move at ultrarelativistic speeds(γ=917) because of B field flux quantization. $\Phi = BA = \frac{\mu_0 i}{2r_H}(\pi r_H^2) = \frac{\mu_0}{2r_H}\left(\frac{e}{\left(\frac{2\pi r_H}{\gamma c}\right)}\right)(\pi r_H^2) = \Phi_0 N = 3\Phi_0 = \frac{h}{e}3$

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

22) What are magneto stars?

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

23) What is the deuteron?

Answer: Two 2P3/2 (protons) with an electron in between at r_H. Can compute its binding energy= $2e^2/r_H$ The neutron is half a deuteron: So $2P_{3/2}$ with electron. It's extra mass is from $m_pc^2+e^2/r_H+m_ec^2$.

24) Where do the 4 SM Bosons come from?

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

25 Why does the photon have no mass?

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

26) Why is the neutrino left handed?

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

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

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

Inside r_H Para states (from top, X917)

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

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

$917(\varepsilon/(1-\varepsilon))= W\pm$,J=1, 91 Gev; e-$\nu$ rotation so charged with ν decay

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

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

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

Outside Para state

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

Ortho States (from side, X2)

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

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

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

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

Predictions

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

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

3) **cosωt universe expansion** and **contraction** ($r=r_o(1+\cos(\omega t-\pi))$) with clocks dt' running fast for distant observers ($dt'^2=(1-r_H/r)dt^2$) implying a universe much older than the nominal 13by. (cosωt from newpde zitterbewegung e^{iwt}=**cosωt**+isinωt). The DES-DES-CBR measurements imply the possibility of a cosωt oscillation already eg.,."acceleration slowing" so big crunch? Much older universe implied by mature galaxies and black holes at 200MY. Selfsimilar Dirac spin from excess of galaxies spinning one way.
4) **$F=(Adv/dt)/v^2$ pairing interaction force** for superconductors (appendix C4), thereby explaining them (without using those adhoc Lagrangian densities, eg., BCS.).
Graphene SC 's already confirm this. Just show that in a future publication I guess.

5) The **neutrino mass** is not fixed, **varies with gravitational field gradients**. (In fact they have yet to determine its mass, appendix C8)
The 3 Neutrino's in the sun have a different mass than these neutrinos here. It is possible to experimentally confirm this too by observing the neutrino oscillations at different locations.

6) Wave particle duality comes from that 45° angle of the electron on that e,*v* graph (sect.IIIC) where C noise position uncertainty is largest (wide slit) with ds^2 circle always wave (eq C1) then C=0 (narrow slit) gives only the wave: so wide slit particle (photoelectric effect), narrow slit wave, airy diffraction pattern hence wave -particle duality. Has already been verified experimentally.
7) There is no dark matter. It is a metric quantization phenomena. Just set $g_{oo}=\kappa_{oo}$ to get the mathematics (a fractal scale bridging condition) deriving the whole shebang (v~N100km/sec halos, N integer). Can confirm this with *careful* asymptotic rotational velocity measurements of nearby galaxies. Actually, I already have this data (partIII davidmaker.com).

8) So there should also be a 2pion shrink 917(2π) explaining the asymmetry of that part of the CMS curve peaked at 200Gev. A 2pion shrink is near 250Gev with the usual 3,4 pion shrinks etc extending that 200Gev asymptote out to 400Gev. For proton-proton LHC collisions, there is net charge, so neutral particle counts are smaller (eg u Z_o=80Gev; 2u t_o=173GeV,1π H=135Gev 2pion charged at 280GeV. W,Z Proca eq.(spin 1=J)W has *v* in the rotation so accompanied by *v* in decays. The min energy state for 2u gives 1-1=0=S, Pions=π Klein Gordon field equation 9.22 for spin0 0-0=0=S.