This theory is 0

Introduction All QM physicists know about *real* eigenvalue (Dirac eq), observables. All mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So all we did here is show we postulated *real*#0 by using it to derive a rational Cauchy sequence with limit 0. We did this because that same postulate (of real#**0**) math *also* implies *the* real eigenvalues we get from a generally covariant generalization of the Dirac equation that does not require gauges (Newpde), clearly an advance over previous physics pdes. To show this

Define0: *with numbers* 1≡1+0 and definition of list 0≡0X0, 1≡1X1 as *symbol* z=zz (algebraic definition of 0). Also

> **Postulate** *real* number 0 *if* **z'=0** and **z'=1** plugged into z'=z'z'+C (**eq.1**) results in *some* C=0 constant(ie δC=0).

There is of course the obvious C=0 solution but including δC=0 in those above *plugins* adds other Cs. So:

Plug z'=0 into eq.1 get 2D Mandelbrot set

So z_0=**0** *into eq1* iteration(plug left side into right side repeatedly) $z_{N+1}=z_Nz_N+C$, (generates the larger numbers z_{N+1} so more *symbol* algebra so calculus defintions) requires we reject the Cs for which **δC**= $\delta(z_{N+1}-z_Nz_N)=\delta(\infty-\infty)\neq$**0**. The Cs that are left over define the **Mandelbrot set** with new eq1 z so **δz**≤$C_M=10^{40N}$1.4..fractal scaleN jumps

Plug z'=1 into eq.1 get Dirac equation (new 2 degrees of freedom from δz)

So **z=1**+**δz** into eq.1is δz+δzδz=C. So $\delta z=(-1\pm\sqrt{1+4C})/2\equiv dr+idt$ So bounded complex (Mandelbrot) set δC=0 extreme $-¼>C\geq-1.4..=C_M$ in fig1. Thus δC=0 extremum -¼ Mandelbrot set iteration becomes the rational Cauchy sequence -¼, -3/16, -55/256, ..,**0**, implying **0** is *real* QED Also for N=0(small C observeable fig1) then δz≈C so $\delta C=\delta\delta z\approx 0$ and so **δC**=δ(δz+δzδz)=δδz+2δδzδz ≈δ(δzδz)=$\delta((dr+idt)^2)=\delta[(dr^2-dt)+i(drdt+dtdr)]$=**0**=Minkowski metric+ Clifford algebra≡**Dirac eq**

Mandelbrot and **Dirac** relation rewritten with extreme observeable(eq.11) plus 2D δz variation gives 4D QM

Newpde≡ $\gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for e,*v*, $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+(2\Delta\varepsilon/(1+\varepsilon))-r_H/r)$, $r_H=C_M/\xi=e^2X10^{40N}/m$ (**N**=., -1,0,1.,), Δε =0 for neutrino *v* and N=-1

See davidmaker.com for backups

Spherical Harmonic Solutions to Newpde: $2P_{3/2}$, $1S_{1/2}$, $2S_{1/2}$ at $r=r_H$ 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**,μ,**2S**,τ **leptons** (Koide)
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N=-1 (i.e., $e^2X10^{-40}\equiv Gm^2$). 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 κ_{uv} provides the general covariance of the Newpde.

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

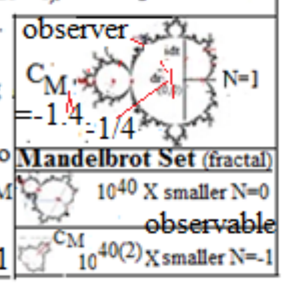

fig1

•**Conclusion:** So by merely (plugging 0,1 into eq.1) **postulating 0**, out pops the whole universe, BOOM! easily the most important discovery ever made or that will ever be made again.
We finally figured it out.

Note a theory with many assumptions is *not* fundamental: so where did those many assumptions come from? Also a first principles theory with the correct ultimate Occam's razor assumption(0), as here, will *not* hit a brick wall, thus the sky is the limit for breakthrough physics innovation coming out of such a theory.

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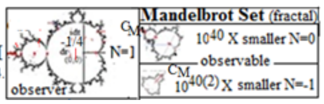
fig1 C_M =-1.4



http://www.youtube.com/watch?v=0jGaio87u3A

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Also for N=0(For small C observable fig1) then δz≈C so δC= δδz≈0 and so **δC**=δ(δz+δzδz)=δδz+ 2δδzδz≈δ(δzδz)=$\delta((dr+idt)^2)=\delta[(dr^2-dt)+i(drdt+dtdr)]=\mathbf{0}$=Minkowski metric+ Clifford algebra≡**Dirac eq**

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So get rel# math and physics, *everything,* no more, no less.

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2)Postulate *real* number **0** *if* **z'=0** and **z'=1** plugged into z'=z'z'+C (**eq.1**) results in *some* C=0 constant(ie δC=0).
There is of course the obvious C=0 solution but including δC=0 adds other Cs:
•Plug in **z=0**=z_o=z'in **eq1.** Note the equality sign in eq.1 demands we substitute z' on left (**eq1**) into right z'z' repeatedly and get iteration $z_{N+1}=z_Nz_N+C$. (Generates the larger numbers z_{N+1} including Cauchy sequence limits so more *symbol* algebra so calculus definitions). So postulate 0 also *generates* the big number algebra and calculus (given this Cauchy sequence completeness) we can now use.
For example we can now define constant C with that **δC=0.** When applied on iteration $z_{N+1}=z_Nz_N+C$, $z_o=0$ it also requires we reject the Cs for which $\delta C=\delta(z_{N+1}-z_Nz_N)=\delta(\infty-\infty)\neq 0$. The Cs that are left over define the fractal **Mandelbrot set** (6) with new eq1 z so **δz**≤$C_M=10^{40N}1.4..$ fractal scale N jumps and so z=**1**+δz must be substituted into eq1 to get δz+δzδz=C (3)

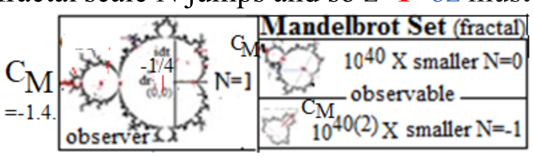

fig1

Defining the 'observers' (required by eq.11, so circle) scale as fractal scale N then M< N (implied by eq.3) is the 'observables' scale M. For example we can define the fig1 'observer' fractal scales as N=1 implying |δz|>>1 since C is then huge in comparison to the M=0 scale..

Plug z'=1 into eq.1 get 2D **Dirac** equation (new 2 degrees of freedom from δz)
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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,v (dr,dt) 2nd,3rd quadrants (7)
& dr+dt=ds, dr-dt=ds, dr±dt=0, light cone (→ν,$\bar{\nu}$) in same (dr,dt) plane 1st,4th quadrants (8)
& dr+dt=0,dr-dt=0 so dr=dt=0 defines vacuum (while eq.4 derives space-time) (9)
Those quadrants give *positive* scalar drdt in eq.7 (if *not* vacuum) since also, given the Mandelbrot set C_M, (Here at -1.4..∈C_M) C_M iteration definition, implies z≠∞. This then implies

the eq.5 *non* infinite extremum for imaginary$\equiv$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 $(\gamma^i\gamma^j+\gamma^j\gamma^i)=0$, $i\neq j$ (from real eq5 $\gamma^j\gamma^i=1$) (7a) Thus from eqs5,7a: $ds^2= dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ Note how eq5 Dirac eq. and C_M Mandelbrot set just fall (pop) out of eq.1, amazing!

We square eqs.7 or 8 or 9 $ds_1^2=(dr+dt)(dr+dt)=(-dr-dt)(-dr-dt$ $=[dr^2+dt^2]+(drdt+dtdr)$ $\equiv ds^2+ds_3$=**Circle**+invariant. **Circle**$\equiv\delta z=dse^{i\theta}= dse^{i(\Delta\theta+\theta o)}= dse^{i((\cos\theta dr+\sin\theta dt)/(ds)+\theta o)}$, $\theta_o=45°$ min of $\delta ds^2=0$ given eq.7 constraint for N=0 δz' perturbation of eq5 flat space implying a further **$\delta C=0$** $(\partial C/\partial r)_t dr+i(\partial C/\partial t)_r dt=$**0** where $dt\approx0$ *and* 45° allowed (so where also $dr\approx0$ on ¼R circle) is the Fiegenbaum and zoom point. We define $k\equiv dr/ds$, $\omega\equiv dt/ds$, $\sin\theta\equiv r$, $\cos\theta\equiv t$. $dse^{i45°}\equiv ds$'. Take ordinary derivative dr (since flat space) of 'Circle'.

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

Recall from above that we proved that dr is a real number. So k =dr/ds is an operator with *real* eigenvalues (So k is an observable). Also $k=2\pi/\lambda$ (eg., in $\delta z=\cos kr$) thereby deriving the DeBroglie wavelength λ. Note the derivation of eq11 from that circle. Also eq.11 with integration by parts implies $\langle p_r\rangle^*=\int(p_r\psi)^*\psi d\tau=\int\psi^*p_r\psi d\tau=\langle p_r\rangle$ and $\int\psi_a p\psi_b d\tau\equiv\langle a|p|b\rangle$ in Dirac notation. Therefore $p_r=\hbar k$ is Hermitian given dr is real.

Our postulate 0 implies z=zz+C≈z=zz+0 (if z=1,0 plugged into eq1) **so a small C**

But for N=0 observable eq.3 $\delta z+\delta z\delta z=C$ reads $C\approx\delta z$. So that postulated small $C\approx0$ implies an eq.5 (Minkowski metric) Lorentz contraction (9) $1/\gamma$ boosted frame of reference **small**

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

So take variation

$$\delta C=\delta C_M=(\delta\xi)\delta z+\xi\delta\delta z=0 \quad (13)$$

Given z=1+δz for our above z≈1 (in our postulate plugin)

δz in $\delta\xi\delta z$ is small (eg.,in free space $\delta\delta z\approx0$ and appendix A: $2S_{1/2}$,τ,; $1S_{1/2}$;,μ) so in eq.13 $\delta\xi$ and ξ can be large (**unstable large mass** $\xi=\tau+\mu$) So. $\delta z'\approx C=C_M/\xi=C_M/(\tau+\mu)$ (14)

Given z=1+δz for our above z≈0

Given $|\delta z|$ in in $\delta\xi\delta z$ is large (δz=-1 eg., for $2P_{3/2}$ at $r=r_H$) so $\delta\xi$ and ξ can be small (**stable small mass: electron** $\xi_o=m_e$ ground state δz so $\delta z'\approx C=C_M/\xi_o=C_M/m_e$ (15)

for internal $r\approx r_H$ comoving $2P_{3/2}$ at $r=r_H$ ultrarelativistic observer. For external observer then $2m_e\rightarrow\xi=m_p$ so C is still small. So $C_M\rightarrow C_M/\xi$ which for N=0 defines charge e. ξ defines mass.

Added variation perturbations of eq.7 N=1 δz on ds eq.11 observability circle at 45°

In eq.8 dr±dt=0 puts this *v* solution on the light cone. But eq.7 has NO such dr±dt=0 so requires an additional δz around the light cone as an added variation but still constrained by those $\delta C=0$ circle ds extreme at 45° of course. In the complex plane then (eq.11 δz)+(this added variation) $=\boldsymbol{\delta}z'+\delta z=(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$. Thus the required N=-1,N=0 observable ($C_M/\xi=\delta z'<<\delta z$) is a new variable variation perturbation of the eq.7 $\delta z\approx dr\approx dt$ at 45°

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

But for the high energy big $\delta\delta z$ (see eq.22 and extreme "axis" perturbations of appendix C) δz is small. So finding big $\delta\delta z$ 'observables' requires we artificially stay on the circle (appendix C) implying this additional δz' eq7 perturbation with $\delta z'= C_{M/\xi}\equiv(2e^2/m_ec^2)10^{40N}=r_H10^{40N}$. (Small) $dr\approx r$ on N=0 for N=1 (10^{40}X larger) observer. Also can be dr,dt axis extremum (eq.16) rotations(appendix C)**.** Equation 16 is where the next 2D is added that finally gets us 4D.

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

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

From eq.7a $dr'dt'=\sqrt{\kappa_{rr}}dr'\sqrt{\kappa_{oo}}dt'=drdt$ so $\kappa_{rr}=1/\kappa_{oo}$ (19)

Mandelbrot and **Dirac** relation rewritten with extreme observeable(eq.11) plus 2D δz variation gives 4D QM

•**Both <u>z=0,z=1</u>** rewritten using 3D orthogonality to get (2D+2Dcurved space)). Thus $\delta z'+\delta z=(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$ given $dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ *if* $dr^2\equiv dx^2+dy^2+dz^2$ (3D orthogonality) so that $\gamma^r dr\equiv\gamma^x dx+\gamma^y dy+\gamma^z dz$, $\gamma^j\gamma^i+\gamma^j\gamma^i=0$, $i\neq j,(\gamma^i)^2=1$. From eq.14 $(\gamma^x\sqrt{\kappa_{xx}}dx+\gamma^y\sqrt{\kappa_{yy}}dy+\gamma^z\sqrt{\kappa_{zz}}dz+\gamma^t\sqrt{\kappa_{tt}}idt)^2=\kappa_{xx}dx^2+\kappa_{yy}dy^2+\kappa_{zz}dz^2-\kappa_{tt}dt^2=ds^2$. Multiply both sides by $\hbar^2/ds^2$ and $\delta z^2\equiv\psi^2$ (since extremum C=-2 is harmonic) use eq.11 inside brackets( ) get 4D QM

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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. The only multiparticle stable state is the $2P_{3/2}$ at $r=r_H$ **3e** state.

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 off the 3rd mass (in $2P_{3/2}$) the diagonal metric(eq.17) 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. 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 davidmaker.com.

For $2P_{3/2}$ ground state $3m_e$ representation the interior curved space ultrarelativistic nature of $2P_{3/2}$ at $r=r_H$ allows for *only* a 2 positron $2m_e$ and one central electron bound state allowing for a reduced mass representation of the 2 positron bound state. $D/2=m_p$ with very high γ (=917) due to B flux (BA) quantization =mh/2e. . Given this net singlet scalar D wavefunction motion we can then use the Schrodinger equation to derive the nonrelativistic properties such as rest mass.

Schrodinger equation SP^2 limit for 3e composite stable state

Here the Schrodinger equation is the nonrelativistic limit of the Newpde (modified Dirac) equation for COM motion *so that we can identify rest mass values* with it. For the pure Schrodinger equation (eg.,No Pauli or Ising term) the two body spins must cancel ($D=2m_p$), so just as with the atomic physics Hund rule, this combined energy must contain both the higher principle quantum number N=2 $2P_{3/2}$ (at $r=r_H$ for 3e) and the same principle quantum number N=2 $2S_{1/2}$ τ with the same energy plus the next lower principle quantum number N=1 lower energy μ for $1S_{1/2}$. Note D is two body (τ+μ) so also with reduced mass $D=2m_p$ consistent with the above two body two positrons moving around a central electron reduced mass system. Note associated reduced mass system two body hybrid orbital $SP^2=D=\tau+\mu=2P_{3/2}+\mu=2m_p$. so write

$H\psi=-\frac{\hbar}{2m}\frac{\partial^2}{\partial r^2}\psi$, $P\psi=-\frac{\hbar}{2P}\frac{\partial^2}{\partial r^2}\psi=-\frac{\hbar}{D}\frac{\partial^2}{\partial r^2}\psi$. So $\delta\delta z=-i\delta_t\delta z$ is then energyXδz (22)

Thus eq.11 ħ(dr/ds)ψ=−iħdψ/dr with ħ canceling out from the Newpde $dr' = dr\sqrt{\kappa_{rr}}$ thereby putting all the canceled out spin effects in a scalar black box allowing us to use the ordinary scalar eigenfunction Schrodinger equation. So: $k\psi = -\frac{1}{2m}\frac{\partial^2}{\partial r^2}\psi$ so that:

$$(\frac{D}{2})\psi = \left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr}}{2D/2}}\frac{dr}{ds}\right)^2\psi, \; D= m_\tau+m_\mu+m_e =2m_p. \; m_p=(1777+105.6)/2 -5(.511) \qquad (23)$$

so minus the above 2 excess $2S_{1/2}$, and 2 excess $1S_{1/2}$ and the 1 Lepton ground state electrons (so $-5m_e$) leaving these 3 leptons) =938.7 Mev proton for curved space $2P_{3/2}$ at $r=r_H$ s. See partII B flux BA=mh/2e quantization implications.

Comparison with QCD

The electron (solution to that new pde) spends 1/3 of its time in each $2P_{3/2}$ (at $r=r_H$)trifolium lobe, *explaining the lobe multiples of 1/3e fractional charge* (So these 'lobes' can be named 'quarks' or George if you want). The lobes are locked into the center of mass, can't leave, *giving asymptotic freedom* (otherwise yet another ad hoc postulate of qcd). As derived in PartII the two positrons must be ultrarelativistic (due to interior B flux quantization, so γ=917: sect.7.5, $3e=(\gamma m_e+\gamma m_e)=m_p$) at $r=r_H$ so the field line separation is narrowed into plates at the central electron explaining the strong force (otherwise postulated by qcd). Also there are 6 2P states *explaining the 6 quark flavors.* P wave scattering *gives the jets.* Thus we derived all the properties of quarks from the Newpde $2P_{3/2}$ state at $r=r_H$.. *S*o protons are just 2 Newpde positrons and electron in $2P_{3/2}$ at $r=r_H$ states. Quarks don't exist..

Part II Implications

The resulting 2 positron reduced mass charge motion gives B field Paschen Back ortho-para states each of which requires a Frobenius series solution giving each of the 6 2P states (called u,s,d,c,b,t) particle multiplets (see part II). The exterior to r_H zero point energy $\pi^\pm$ J=0 motion supresses the exterior B through the Meisner effect but adds its own small mass contrbution in the gyromagnetic ratio term (eqs. 8.4, 9.22). See partII for details.

$1S_{1/2}$ $2S_{1/2}$ at $r \le r_H$ Hund rule States

Recall from just above:

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

These same 3e away from $r=r_H$, free space.

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 $r>r_H$ Rydberg formula

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

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

Nonrelativistic reduced COM $r=r_H$ observer model for 2P=D, Free particle $2S_{1/2} + 1S_{1/2}$

Note also τ+μ must each be excited states of 3e (+e,+e,-e). So left side D(3ψ) for 3e in $2P_{3/2}$. 2positrons orbiting an electron. On the right side for this SP^2 hybrid state $2S_{1/2}+1S_{1/2}$=D with 2 operators themselves operating on each 4ψ: SP^2, SP^2, SP^2, 2P given the same principle quantum number N=2 for $2P_{3/2}$ and $2S_{1/2}$: $2S_{1/2} + 1S_{1/2}$:for free particles at $r=r_H$. The 2P and 2S principle quantum numbers are the same so the energy eigenvalues are the same at the same $r=r_H$.

$(2P_{3/2})\psi_1=(SP^2)\psi_2$ with different eigenfunctions ψ_1,ψ_2. To create the Schrodinger equation these two eigenfunctions ψ_1, ψ_2 must be the same. How do we make them the same?
To get both sides to constitute a Schrodinger equation and so have the same eigenfunction ψ on both sides, we have to *normalize them* to the number of ψs there are to be able use one ψ on both sides. The two $2P_{3/2}$ reduced mass objects have 2X*three* electrons ψ and has the *same principle quantum number* N=2 as the the right side SP^2 hybrid orbital with (SP^2,SP^2,SP^2,P), *four* electrons ψ. So to be able to use the electron eigenfunction ψ on both sides to create a Schrodinger equation we use the 6ψ,4ψ *normalization* given by: (principle quantum number same for both sides)
.

N=2 energy eigenvalue ($2P_{3/2}$ state, $r=r_H$) **for reduced mass 6ψ is equal to N=2 energy eigenvalue(SP^2** state, $r=r_H$) **for 4ψ**

bound ($r=r_H$) Stable $2P_{3/2}$ $=2S_{\cdot 1/2}+1S_{1/2}$ they add for free space at $r=r_H$

$(\frac{D}{2})\psi' = \left(\sqrt{\frac{1}{2D/2}}\frac{dr}{ds}\right)^2\psi$, reduced mass D so Schrodinger equation is scalar singlet ψ

with the four SP^2 electron electron orbitals given by:

$$SP^2 = \phi_0 = \frac{1}{\sqrt{3}}s - \frac{1}{\sqrt{6}}p_x + \frac{1}{\sqrt{2}}p_y$$
$$SP^2 = \phi_1 = \frac{1}{\sqrt{3}}s - \frac{1}{\sqrt{6}}p_x - \frac{1}{\sqrt{2}}p_y$$
$$SP^2 = \phi_2 = \frac{1}{\sqrt{3}}s + \frac{2}{\sqrt{6}}p_x$$
$$P = \phi_3 = p_z.$$

Principle quantum number =same principle quantum number
Energy eigenvalue for 6 ψ $2P_{3/2}$ left side same as 4ψ SP^2 on right side
two 2positrons orbiting 1 electron $=SP^2$ SP^2 SP^2 SP^2 P on right side
(reduced mass operator)6Xeigenfunction=(2Sprinciple quantum operator)4Xeigenfunction $=SP^2$

$$(D/2)6\psi = \frac{(m_\tau+m_\mu)}{2}(2X3)\psi = \left(\sqrt{\frac{1}{2D_\tau/2}}\frac{dr}{ds}+\sqrt{\frac{1}{2D_\mu/2}}\frac{dr}{ds}\right)^2 4\psi$$ Schrodinger equation

Replace black box mass D with its interior ultrarelativistic values

But from eq.21 (and note τ,μ,e are Dirac equation-Newpde particles with 3 ground state electrons each) for τ and μ) we can define the black box eq.21 mass relativistic part: so B10 impies that $\sqrt{\kappa_{rr}}$ =m nonrelativistically
$\gamma^r\sqrt{\kappa_{rr}}dr \equiv dr'$. Use $\gamma^r\gamma^r=1$

$$(D/2)3X6 = \frac{(m_\tau+m_\mu)}{2}6\psi = \left(\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr\tau}}{(2D_\tau/2)}}\frac{dr}{ds}+\frac{\gamma^r}{1}\sqrt{\frac{\kappa_{rr\mu}}{(2D_\mu/2)}}\frac{dr}{ds}\right)^2 4\psi$$

Scalar D operating on the S state eigenfunction for SP^2 equals S state operators operating on 4ψ
Note we have a total of 7 electron ground state masses here, 3 each for the tauon and muon allowing for the free particle representation. Given the black box interior positron ultrarelativistic, $\kappa_{rr}=m^2$ (B10) for 0 relative speed COM motion at $r=r_H$. Recall also for equation 7 electron diagonal $ds=\sqrt{2}dr$ and free space given the addition inside of the brackets:

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

so $(\gamma^r)^2=1$ that (again B10 implies $\sqrt{\kappa_{rr}}$ = D nonrelativistically):

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

$\frac{Nmm_\tau + Nmm_\mu}{\left(\sqrt{mNm_\tau} + \sqrt{Nmm_\mu}\right)^2} = \frac{2}{3}$ (N is integer multples 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 $r \le r_H$** and also the curved space proton as two positron mass = $(m_\tau+m_\mu)/2$= =Proton=D/2: *the* real eigenvalues. So the m is found in partII. N is integer multples of $2S_{½}$ $1S_{½}$

δC=0 2 observable extremum (ie C_M and – ¼)

Upper real C extremum with finite imaginary idt is again δC=0 extremum C= -¼. But that extremum does not support the dr=dt 45°of eq.7-9 and so eq.11 and obervables. (But it does support showing the dr axis is real). But the lower limit is -1.40115..for observables (see zoom). Fiegenbaum pt. is one of those ¼Xcircles(fig1), so each circle allowing a 45° dr=dt. In that regard recall zoom lhttp://www.youtube.com/watch?v=0jGaio87u3A which explores the Mandelbrot set interior near the Fiegenbaum point. 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 D3. eq.20 In any case the splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So $3^{2.7X62}=10^N$ so 172log3=N=82. So there are 10^{82} splits. So there are about 10^{82}splits per initial split. But each of these Mandelbrot set Fiegenbaum points is a $C_M/\xi \equiv r_H$ in electron (eq.10 above). So for each larger electron there are **10^{82} constituent electrons**. Note there is a 75% chance of us being inside of one of these N=1 fractal 10^{82} electrons which itself is inside that stable composite 3me $2P_{3/2}$ at $r=r_H$ objects. See appendix B. and partII.

(Newpde solution determines) *Observed* odd or even source# on a given fractal scale giving for example (eg.,for the electron solution) a 10^{82}XN=-1 gravity fractal scale leap frog over the N=0 fractal scale to the N=1 scale (halo) quantized gravity source.

Note the C_M objects in figure 1 on the next smaller fractal scale are countable and also appear equally to point in the real-imaginary positive and negative directions and so are assumed (appear to) add to zero (all 10^{82} of them) which we can define to be the 'even' cancellation case. Thus adding an additional object (making it an odd number), as some Newpde solutions imply, on this fractal scale makes it a net source again. So the observer on the N=1 scale sees odd or even numbers on the both the N=-1 and N=0 scales. The Newpde solutions themselves then determine if they are either all odd on the N=1, N=0 fractal scales or all even on the N=-1 fractal scale.

For example Newpde solution rotation from the IVth quadrant to the Ist quadrant gives N=-1 is even and N=0 is even so we have complete (source) cancelation on both so we have photons. If odd for N=-1 and even N=0 $(\Sigma G m_e^2)$=(Σover N=-1 tiny masses in the cosmos= $10^{82}e^2 10^{-40}$) $=e^2 10^{40}$ at N=1 thereby surprisingly making the N=1 scale (metric) composed of these N=-1 contributions. This effect(eg.$\Sigma_{10^{82}}$(N=-1) →N=1) thereby 'leapfrogs' through all the other fractal scales as well (eg.$\Sigma_{10^{82}}$(N=0) →N=2).

So for example N=1, because of the sum over 10^{82}, is actualy a ambient N=-1 gravity in $g_{oo}=1-2G\Sigma m_e/(c^2 r)$ but quantized in galaxy halos because of summed N=-1 in $1-2G\Sigma m_e/c^2 r$ =

g_{oo}= Newpde asymptotic N=0 κ_{oo} in the halos at least for circular motion (ie. $mv^2/r=GMm/r^2$) creating a quantized metric. This "leap frog-composition" property makes it so that the observer is observing the next smaller fractal scale N=-1 'observables' by simultaneously observing N=1 even though it is a larger fractal scale than N<1 allowing us to be 'observers' of the cosmos (N=1) as well. But asymptotic κ_{ii} must be $\kappa_{i+1,i+1}$ since that is all ths left over asymptotically. From our leap frog effect this also implies that $\kappa_{i+1,i+1} = \Sigma\kappa_{i-1,i-1}$. For example asymptotically (eg in galaxy halos) (N=0)$\kappa_{00}=\Sigma\kappa_{oo}$(N=-1) =(N=1)$\kappa_{00}=1-2G(\Sigma m)/(c^2r)= 1-2GM/(c^2r)=g_{oo}$. So $\kappa_{00}=g_{00}$ (see partIII).Thus the gravitational metric on cosmological scale is quantized (in part3 we show it is a v=100Nkm/sec halo speed quantization.)

Scale Jump

Also the scale difference between Mandelbrot sets as seen in the zoom is about **10^{40}, the scale change** between the classical electron radius and 10^{11}ly with the C noising giving us our fractal universe.

C Is Also Noise

Recall again we got from eq.3 $\delta z+\delta z\delta z=C$ with quadratic equation result:

$\delta z = \frac{-1\pm\sqrt{1-4C}}{2}$. is real for noise C<¼ creating our noise on the N=0 th fractal scale. So $¼=(3/2)kT/(m_pc^2)$. So T is 20MK. So here we have *derived the average temperature of the universe* (stellar average). That $z'=1+\delta z$ substitution also introduces Lorentz transformation rotational and translation noise that does not effect the number of splits, analogous to how a homeomorphism does not change the number of holes (which is a Topological invariant).
So the excess C noise (due to that small C' boost) causes the Fiegenbaum point neighborhood internal structure to become randomized (as our boost scene is then) but the number of electrons (10^{82}) remains invariant. See appendix D mixed state case2 for further organizational effects.

FractalDimension

$N=r^D$. So the **fractal dimension=** D=logN/logr=log(splits)/log(#r_H in scale jump) $=\log 10^{80}/\log 10^{40} =\log((10^{40})^2)/\log(10^{40})= 2$. (See appendix C for Hausdorf dimension & measure)
which is the same as the 2D ofour 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 Fiegenbaum pt. gave us a lot of physics:
eg. **#of electrons in the universe, the universe size, temp**. With 10^{82} electrons between any two fractal scales we are also *certainly allowed objects B&C* in the Newpde $2P_{2/3}$ state at $r=r_H$.

Intuitive Notion (of postulate 0⇔Newpde+Copenhagen stuff)

The Mandelbrot set introduces that $r_H = C_M/\xi_1$ horizon in $\kappa_{oo}=1-r_H/r$ in the Newpde, where C_M is fractal by 10^{40}Xscale change(fig.2). So we have found (davidmaker.com) that: Given that fractal selfsimilarity astronomers are observing from the inside of what particle physicists are studying from the outside, that ONE *New pde* e electron r_H, one thing (fig.1). *Everything* we observe big (cosmological) and small (subatomic) is then that (*New pde*) r_H, even baryons are composite 3e. So we understand, *everything*. This is the only Occam's razor first principles theory.

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

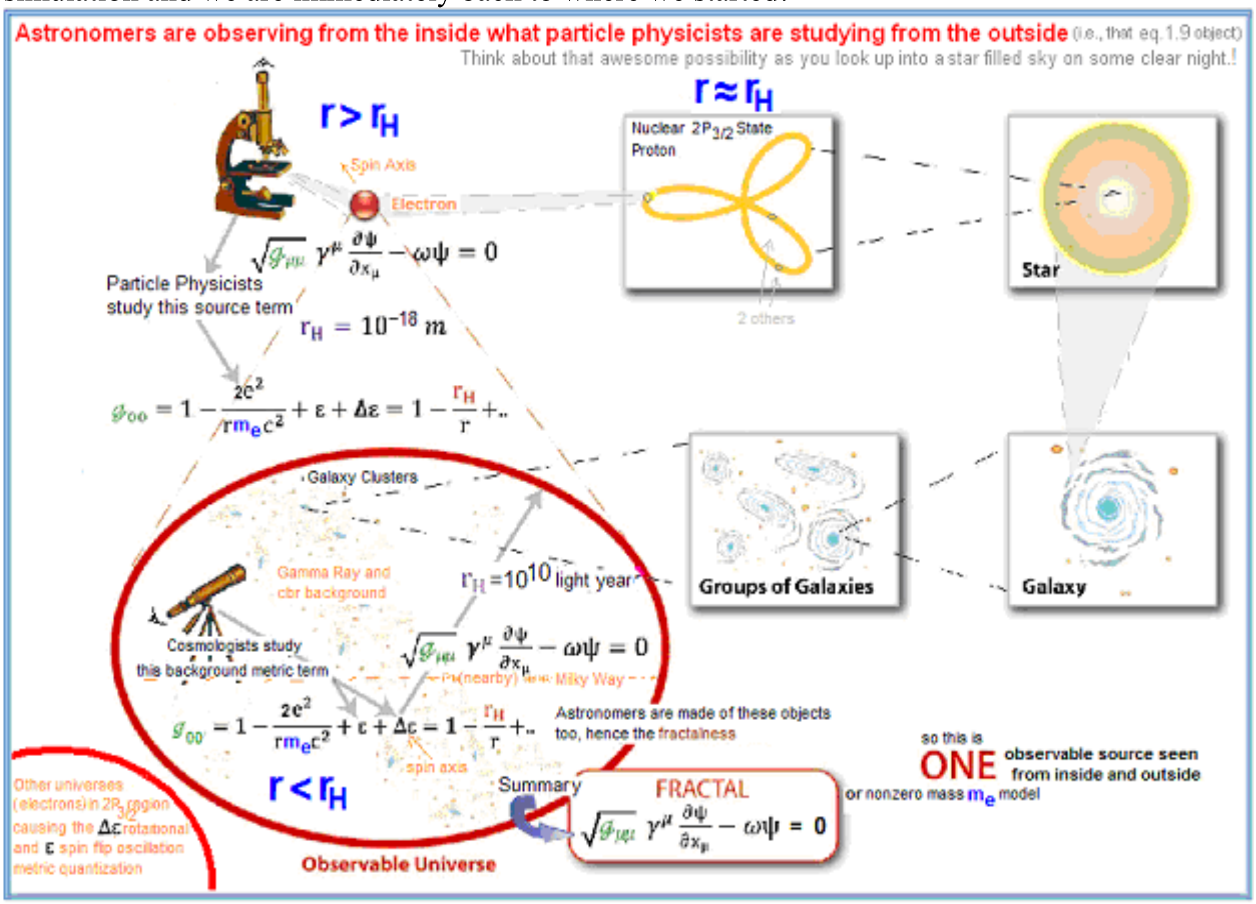


fig2.

(↑lowest left corner) Object C $g_{oo}=\kappa_{00}$ caused caused metric quantization jumps: Reyleigh Taylor->galaxy→globular->protostar nebula,etc. X100 scale change metric quantization jumps (PartIII)

This theory is 0

Define0: *numbers* 1≡1+0 in 0≡0X0, 1≡1X1 as *symbol* z=zz (algebraic definition of 0). Also

Postulate *real* number 0 *if* **z'=0** and **z'=1** plugged into z'=z'z'+C (**eq.1**) results in *some* C=0 constant(ie δC=0).

.so

<u>Plug</u> <u>z'=0</u> into <u>eq.1</u> get 2D **Mandelbrot** set iteration and rel**0** (with 10^{40N}X fractal scaling, N=integer)
<u>Plug</u> <u>z'=1</u> into <u>eq.1</u> get 2D **Dirac** equation (Pluggin gives Minkowski metric and Clifford algebra so Dirac eq.)

Mandelbrot and **Dirac** rewritten as (δz observability(eq.11)) as 3D orthogonalization is QM
Newpde≡ $\gamma^{\mu}(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_{\mu}=(\omega/c)\psi$ for e,ν, $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$,
$r_H=C_M/\xi=e^2X10^{40N}/m$ (**N**=. -1,0,1.,) Δε =0 for neutrino ν and N=-1

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

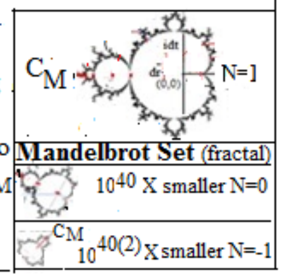
N=-1 (i.e., e^2X10^{-40}=Gm_e^2). κ_{ij} is then by inspection the Schwarzchild metric g_{ij} (For N=-1,Δε<<1). So we just derived General Relativity(GR) and the gravity constant G from Quantum Mechanics(QM) in one line.

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 of physics here by *mere inspection* of this Newpde with no gauges!



•**Conclusion:** So by merely (<u>plugging</u> <u>0,1</u> into <u>eq.1)</u> **postulating 0**, out pops the whole universe, BOOM! easily the most important discovery ever made or that will ever be made again.
We finally figured it out.

References

(6) Penrose in a utube video implied that the Mandelbrot set might contain physics. Here we merely showed how to find it. For example the (fractal Mandelbulb neighborhood area |drdt|>0 of the) Fiegenbaum point is a subset (containing that 10^{40}Xselfsimiilar scale jump: Fig1)
(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# were dense with a binary # (1,0) argument (Our z=zz solutions also implying 11c and appendix F). Thus we capture all the core real# properties with postulate0
(8)Tensor Analysis, Sokolnikoff, John Wiley
(9)The Principle of Relativity, A Einstein, Dover
(10)Quantum Mechanics, Merzbacher, John Wiley
(11) lemniscate circle sequence (Wolfram, Weisstein, Eric
(12) Quantum Mechanics, Merzbacher 2nd edition pp.605-607
(13) http://www.youtube.com/watch?v=0jGaio87u3A

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 Schwarchild 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 generate the Ricci tensor.
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 self similar 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 $r'_H=2Gm_e/c^2=10^{-40}r_H$.

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 δz' 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.

Summary of Appendices A, B and C

In this fractal model we have a 75% chance of being in a (cosmological) proton (as opposed to a free electron). The proton in my $2P_{3/2}$ at $r=r_H$ stable state solution to the Newpde is composed of 3 objects, two orbiting positrons and a central electron which we call objects A, B and C on the cosmological N=1 fractal scale. We are in one of the two positrons, object A let's say, with object B being the central electron.

Table Of Contents (of appendix) Get κ_{oo} from object A and κ_{rr} from 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: $\delta z=\psi_r=w^r(0)e^{-i\varepsilon_r\frac{mc^2}{\hbar}t}$ $\varepsilon_r=+1$, r=1,2; $\varepsilon_r=-1$, r=3,4.): This implies an oscillation frequency of $\omega=mc^2/\hbar$. which is fractal here ($\omega=\omega_o10^{-40N}$). 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 relativistc superposition of speeds) implying a inverse separation of variables result: $i\hbar\frac{\partial\psi}{\partial t}=\beta\sum_N(10^{-40N}(\omega t)_{\varepsilon+\Delta\varepsilon})\psi$ $=\beta\sum_N(10^{-40N}m_{\varepsilon+\Delta\varepsilon}\,c^2/\hbar)\psi$). For time spans smaller than the expansion time of the universe we can set $m_{\tau.}=1$ and $e^{i\tau}=1$. So from Kiode at this time (relative to the tauon) the muon =ε=.05946, electron Δε=.0005899/2=.0002826 is invariant (A1)

Given this ω, α, τ, ε, Δε are getting larger with time (See Mercuron equation) B3a. Set average $e^{(-\varepsilon+\Delta\varepsilon)2}=\delta|e^{i\tau}|$ Newpde zitterbewegung oscillation but τ constant(fig6), doesn't jump by a integer number in observable jumps in cosmological time. We then allow 1,ε, Δε to be $n_1 1$, $n_2\varepsilon$, $n_3\Delta\varepsilon$ where these n_i are integer values whose jumps in n are observable in $e^{i(\varepsilon+\Delta\varepsilon)}$ in ($\sqrt{\kappa_{rr}}=e^{i(\varepsilon+\Delta\varepsilon)}$) $dr'^2=\kappa_{rr}dr^2=e^C\kappa_{00}dr^2=e^{i(-\varepsilon+\Delta\varepsilon)2}\kappa_{00}dr^2$ (A2)

But seen from inside at N=1 $E=1/\sqrt{\kappa_{oo}}=1/\sqrt{(1-r_H/r)}$ (B20) then $r<r_H$ & E becomes imaginary in $e^{iEt/h}=\delta z=\sqrt{\kappa_{oo}}dt=e^{-i\varepsilon_r\frac{mc^2}{\hbar}t}dt\to e^{(-n_2\varepsilon+\Delta\varepsilon n_3)}dt$ (A2)

The negative sign from equation B2a below. The reduced mass ground state rotater (Δε) for ε for this κ_{00} part of derivation). This $n_2=1$, $n_3=1$ then $e^{i2\Delta\varepsilon/(1-2\varepsilon)}=\kappa_{00}$ asymptotic value must be equal to g_{oo} in galaxy halos in the plane of the galaxy (sect.11.4). Ricci tensor is given by oscillating source.

'Observer' scale N > M 'observables' scale.

Recall from sect.1 if our scale N>M for some object then N is the observer scale and M is the 'observable' scale. Note the scale difference can be very small. Since we are all electrons that means a slightly smaller scale electron is the observable. But this seems to eliminate astronomy as observation of 'observables' since those objects exist at a *larger* scale N=1. But not to the N=2 scale (the 'gid' scale as I call it) since to him(N=2) the N=1 astronomy scale is an 'observable' scale since N=2 > N=1.

A2 Two perturbations of the N=1 scale as seen by N=2

We also have two perturbations of the N=1 scale here. The first perturbation is due to the Dirac equation object A zitterbewegung harmonic oscillation (which equivalently could be the source *or* the manifold). Recall in that regard Weinberg(eg., eq 10.1.9 "Gravitation & Cosmology") calls it a "harmonic coordinate system"(here as eq.1.13 Bjorken and Drell) thereby also providing our manifold in that 2nd case. The second much smaller perturbation is due to the drop in inertial frame dragging due to nearby object B.(So 3 objects in this N=1 $2P_{3/2}$ 3e cosmological proton A,B,C.). Appendix C derives the effects of object C.

Ricci tensor source term for interior to object A

In that regard the Ricci tensor = $R_{ij}=-(1/2)\Delta(g_{ij})$ (where Δ is the Laplace-Beltrami second derivative operator) is not zero and the right side is the metric source. Recall limit R_{ij} as $r\rightarrow 0$ is the source, where alternatively gravity creates gravity feedback loop in the Einstein equations which becomes the modulation of the DeSitter ball implied by the zitterbewegung oscillation of object A. Geometrically, the Ricci curvature is the mathematical object that controls the (comoving *observer*) *growth rate of the volume* of metric balls in a manifold in this case given by the New pde source zitterbewegung. Thus the above Laplace Beltrami source eq. A2 $-\sin\omega t\equiv -\sin\mu\approx -\sin\varepsilon$ here comes out of the Newpde zitterbewegung A2.

N=2 'observer' sees what we see if $i\rightarrow 1$ in $\sin\mu\rightarrow\sinh\mu$ in $R_{22}=-\sinh\mu$**:** which makes our N=1 'observables'.

But $R_{22}=e^{-\lambda}[1+½\, r(\mu'-\nu')]-1$ with $\mu=\nu$ (spherical symmetry) and $\mu'=-\nu'$. So as $r\rightarrow 0$, $ImR_{22}= Im(e^{\mu}-1)=\mu+..=\sin\mu=\mu+..$for outside r_H imaginary μ for small r (at the source) so zitterbewegung $\sin\mu$ becomes a gravitational source (alternatively gravity itself can create gravity in a feedback mechanism). The N=2 observer then multiplies by i iR_{22}, $-i\sin\mu$ and μ to get $R_{22}=-\sinh\mu$ (A2A)

to see what the N=2 observer sees that we see inside r_H so:

$R_{22}=e^{-\nu}[1+½\, r(\mu'-\nu')]-1=-\sinh\nu=(-(e^{\nu}-e^{-\nu})/2)$, $\nu'=-\mu'$ 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 (A2B).

Object B mostly contributes to μ' in $-r\mu w$, with object C providing a tiny perturbation of μ', mplying there is no such positive $\sinh\mu$ constraint for object C. Thus the object C *perturbation* μ_c in $e^{\mu c}$ coefficient can be positive or negative

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

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

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

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

We set the phase μ so that when t=0 then r=0 so use r=sinωt in eq.A1. Given the fractal universe a temporarily comoving proper frame at minimum radius lowest γ must imply a μ Mandelbulb chord 45° intersection that implies minimally the Newpde ground state (Which can't go away analogously as for a hydrogen atom orbital electron.) Δε electron for comoving outside observer where then at time=0, in B1,B2 τ-ε≈ωt=Δε ≈1-1=0 so that ωt=Δε when sinωt≈0. So the integration of B3 is from ξ_1= μ=ε=1 to the present day mass of the μ=muon=.05946 (X tauon mass) giving us: $\ln(r_{M+1}/r_{bb})+2=[1/(e^{\mu}-1)-\ln[e^{\mu}-1]]2$ (A3C)

implying gr=e/2me(1+mu) gyromagnetic ratio (μ=m) is changing with time as was discovered recently at Fermi lab 2023 (Ch.7) with CERN 1974 gr muon data for comparison.

A2 Writing The feedback mechanism two different ways

Introduction to Δε contribution to what N=2 sees

We have two perturbations, one due to the zitterbewrunng and a smaller one due to the drop in inertial frame dragging due to nearby objectB.

So inside object A we can include the zitterbewegung oscillation $\delta z=\sqrt{\kappa_{oo}}dt=\ e^{-i\varepsilon_r\frac{mc^2}{\hbar}t}dt \rightarrow e^{(-\varepsilon+\Delta\varepsilon)2}dt$ in the source as $-\sinh\mu=R_{22}$

Alternatively zitterbewegung oscillation $\delta z=\sqrt{\kappa_{oo}}dt=\ e^{-i\varepsilon_r\frac{mc^2}{\hbar}t}dt \rightarrow e^{(-\varepsilon+\Delta\varepsilon)2}dt$, with r→∞, $g_{\alpha\alpha}\rightarrow$constant≠1, can be the manifold itself, so relative to this manifold the motion is flat space so sourceless. Thereby we set $R_{22}=-\sinh\mu=0$ with $R_{\alpha\alpha}=0$.

So these 2 perturbations then give the N=1 contribution to what N=2 sees.

N=2 sees local interior contribution of object A

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

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

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

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

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

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

(eq. A4-A7 from pp.303 Sokolnikof(8)): Equation A4 is a mere repetition of equation A6. We thus have only three equations on λ and μ to consider. From equations A4, A7 we deduce that 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 ambent 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

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

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.

Appendix B Object B

Add **Perturbative Kerr rotation $(a/r)^2$ to r_H/r in κ_{rr}** Here nothing gets added to r_H/r in κ_{oo}

Our new pde has spin S=½ and so the self similar ambient metric on the N=0 th fractal scale is the Kerr metric which contains those ambient metric **perturbation rotations** (dθdt T violation so (given CPT) then **CP violation)** due to object B caused drop in inertial frame dragging in object A

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

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:

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

$\rho^2(r,\theta)\equiv r^2+a^2\cos^2\theta;\quad \Delta(r)\equiv r^2-2mr+a^2$, $r\hat{}^2\equiv r^2+a^2\cos^2\theta$, $r'^2\equiv r^2+a^2$ .Inside r_H a<<r, r>>2m

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

The $(r\hat{}/r')^2$ term is $\frac{(r')^2}{(r\hat{})^2}=\frac{r^2+a^2}{r^2+a^2cos^2\theta}=\frac{1+\frac{a^2}{r^2}}{1+\frac{a^2}{r^2}cos^2\theta}\approx 1/g_{rr}(\approx g_{oo})$

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

$$1+\frac{a^2}{r^2}sin^2\theta+..\equiv 1+\left(\frac{a}{r}\right)^2u^2=\left(\text{from fig. 6 mass}=\frac{C_M}{\delta z\delta z}\right)=1+2(\varepsilon+\Delta\varepsilon)+.. \qquad \text{(B2)}$$

since ε+Δε are time dependent, and add 2m/r to this 1+ε+Δε at the end. Δε is *total* (Mandlebulb) mass as in $C_M/(\delta z\delta z)=(a/r)^2$ in fig6 contribruting to inertial frame dragging drop

We can normalize out 1+ε over a region we know it is (at least appromately) a constant. That in turn makes the metric coefficients at r>>>0 flat which is what they should be. In contrast rotation adds to κ_{rr} (B2) and only oblates 2m/r in κ_{oo}.

Summary: Our Newpde metric including the effect of object B (with $\tau+\mu=2m_p=\xi_1$.) is for the τ+μ+e Kiode

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 shif but is the core of partIII cosmological application $g_{oo}=\kappa_{oo}$ of eq B13 of this paper.

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

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

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

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

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.

A4 eq.B3 κ_{00} application example: Lamb shift

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

$$\left[\left(\frac{dt}{ds}\sqrt{\kappa_{00}}m_p\right)+m_p\right]F-\hbar c\left(\sqrt{\kappa_{rr}}\frac{d}{dr}+\frac{j+3/2}{r}\right)f=0 \qquad B8$$

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

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

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

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 $r_{H'}=(1+1+.5)e^2/(m_\tau+m_\mu+m_e)/2=2.5e^2/(2m_pc^2)$. 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 τ+μ by 2 and then multiply the whole line by 2 to normalize the $m_e/2$.result. ε=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.
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: $\frac{d^2x^\mu}{ds^2}=-\Gamma^\mu_{\nu\lambda}\frac{dx^\nu}{ds}\frac{dx^\lambda}{ds}$ 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).
So renormalization is a perturbative way (given it's flat space Dirac equation and minimal interaction gauge origins) of calculating these (above) same, *NON*perturbative results, it's a perturbative GR theory. But renormalization gives lots of wrong answers too, eg.,10^{96}grams/cm^3 vacuum density for starters. (So we drop it here since we don't need it any longer for the high precision QED results.) In contrast note near the end of reference 5 our $G_{oo}=0$ for a 2D MS. Thus a vacuum really is a vacuum. Also that large $\xi_1=\tau(1+\varepsilon')$ in r_H in eq.B13,11a is the reason leptons appear point particles (in contrast to the small ξ_0 in the composite 3e baryons).

B5 eq.B3 κ_{00} application example: metric quantization from asymptotic $\kappa_{oo}=g_{00}$

Given the subatomic fractal scale is dominated by quantum mechanics phenomena in a fractal universe the next higher N=1 fractal scale should bring the QM back: In galaxy halos the Scharzchild metric g_{oo} should equal the background N=0 fractal scale metric κ_{00} at large enough distances. So that 10^{82} $\Sigma\kappa_{oo(N=-1)} \equiv g_{00} = \kappa_{oo(N=0)}$ (eq.4.13) with resulting Metric Quantization N=1 result $g_{oo}=\kappa_{oo}$ in galaxy halos (eg.,replacing need for dark matter) and making N=1 observable since it is made of N=-1 which is observable. Note we have yet to use the $e^{i(2\Delta\varepsilon/(1-2\varepsilon))}$ in $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$ of equation B13. $mv^2/r=GMm/r^2$ is always true (eg.,globulars orbiting out of plane) but so is $g_{oo}=\kappa_{00}$ *in the plane* of a flattened galaxy (rotating central black hole planar effect partIII). That $g_{oo}=\kappa_{oo}$ in the *halo of the Milky Way galaxy* is the fundamental equation of metric quantization. So again

$mv^2/r=GMm/r^2$ so $GM/r=v^2$ COM in the galaxy halo(circular orbits) $(1/(1-2\varepsilon)$ term from κ_{00} in B13) so

Pure state Δε (ε *excited* $1S_{1/2}$ state of ground state Δε, so not same state as Δε)

$Rel\kappa_{oo}=\cos\mu$ from B13 κ_{00}

Case1 $1-2GM/(c^2r)=1-2(v/c)^2=1-(2\Delta\varepsilon/(1-2\varepsilon))^2/2$ (B12)

So $1-2(v/c)^2=1-(2\Delta\varepsilon/(1-2\varepsilon))^2/2$ so $=(2\Delta\varepsilon/(1-2\varepsilon))c/2=2X.0002826/(1-(.05946)2)(3X10^8)/2$ =98km/sec ≈100km/sec (Mixed Δε,ε, states classically here are grand canonical ensembles with nonzero chemical potential.). For ringed (not hub) galaxies the radial value becomes 100/2=50km/sec.

Also $v=(2\Delta\varepsilon/(1-2\varepsilon))c/2$ so v/c=constant.

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

Case 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. 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)

From eq. B23 for example $v=m100^N$km/sec. m=2,N=1 here (Local arm). In part III we list hundreds of examples of B13: (sun1,2km/sec, galaxy halos m100km/sec). The linear mixed state subdivision by this ubiquitous ~100 scale change factor in r_{bb} (due to above object B zitterbewegung spherical Bessel function resonance boundary conditions resulting in nodes) created the voids. Same process for N-1 (so 100X smaller) antinodes get galaxies, 100Xsmaller: globular clusters, 100Xsmaller solar systems, etc., So these smaller objects were also created by mixed state metric quantization (eq.B13) resonance oscillation inside initial radius r_{bb}.

We include the effects of that object B drop in inertial frame dragging on the inertial term m in the Gamow factor and so lower Z nuclear synthesis at earlier epochs (t>18by)BCE. (see partIII)

Appendix C Object C with spinor ansatz for eq.17(gives ordinary field theory SM)

For the N=1 huge observer δz>>δzδz from eq.3. Thus the required N=-1,N=0 tiny observable (δz'<<δz) is a perturbation of the eq.7 δz≈dr≈dt at 45° (dr-δz')+(dt+δz')≡dr'+dt'=ds (16)

But for the high energy big δδz (extreme "axis" perturbations) δz is small. So finding big δδz 'observables' requires we artificially stay on the circle (appendix C) implying this additional δz' eq7 perturbation. These large rotations can then be done as

spinor rotations→Pauli matrices→isomorphic to quaternions

So we finally include the orthogonal axis' to orthogonal axis extreme ds rotations in eq. 16.

So on the circle. Recall from sect.1 eq.3 that $\delta C=\delta(\delta z+\delta z\delta z)=\delta\delta z(1)+\delta\delta z(\delta z)+(\delta z)\delta\delta z=\delta C=0$ so C is split between $\delta\delta z$ noise and $\delta z\delta z$ and classical ds^2 proper time. Note for N=1 $|\delta z|>>1$ and $C_M>>1$. So eq.5 holds then. But for high energies (like those provided by an accelerator) as γ is boosted observer $\delta z/\gamma$, C/γ gets smaller than the huge N=1 scale (so higher energy, smaller wavelength beam probes) $\delta\delta z(1)/ds$ noise angle gets relatively larger (relative to $\delta(\delta z\delta z)/ds$, sect.1) until finally the next smaller (and next smaller one after that at N=-1) is the N=0 fractal scale becomes relatively large.

Large rotation angle $\delta\delta z/ds$ can then be those large axis' ds extreme ±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 back) One such rotation around a axis (SM) and the other around a diagonal (SC).

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)

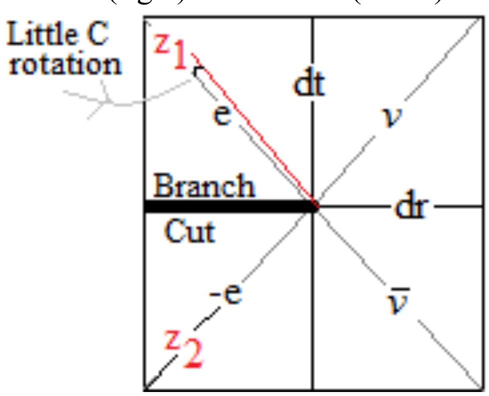


fig.3

fig.3. for **45°-45°** So two body (e,ν) singlet ΔS=½-½ =0 component so pairing interaction (sect.4.5).Also ortho ΔS=½+½=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 12

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.12, 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.12 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.12 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 $n\to\infty$ we find, using elementary calculus, the result $\exp(-(i/2)\theta*\sigma)=\delta z''$. We can use any axis as a branch cut since all 4 are eq.20 large extremum so for the 2nd rotation we move the branch cut 90° and measure the angle off the next diagonal since Pauli matrix dichotomic rotations are actually axis rotations, leaving our e and v directions the same. In any case $(dr+dt)z''$ in eq.16 can then be replaced by eq.A1 $(dr^2+dt^2+..)\delta z''=(dr^2+dt^2+..)e^{\text{quaternion}A}$ Bosons because of eq.C1.
C2 Then use eq. 12 and quaternions to rotate $\delta z''$ since the quaternion formulation is isomorphic to the Pauli matrices. $dr'=\delta z_r=\kappa_{rr}dr$ for **Quaternion** A $\kappa_{ii}=e^{iAi}$.

Possibly large $\delta\delta z$ in eq.3 $\delta(\delta z+\delta z\delta z)=0$ so large rotations in eq12 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 $\delta z'$ (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)) $E=1/\sqrt{\kappa_{oo}}=1/\sqrt{e^{iAi}}.=e^{i-A/2}$. 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 $\pm$ 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,$\nu$ eq.9.23 $\pi^{\pm},\pi^o$. For large $l/\sqrt{\Delta\varepsilon}$ energies given small $r=r_H$, Here $1+\varepsilon$ is locally constant so can be normalized out as in

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

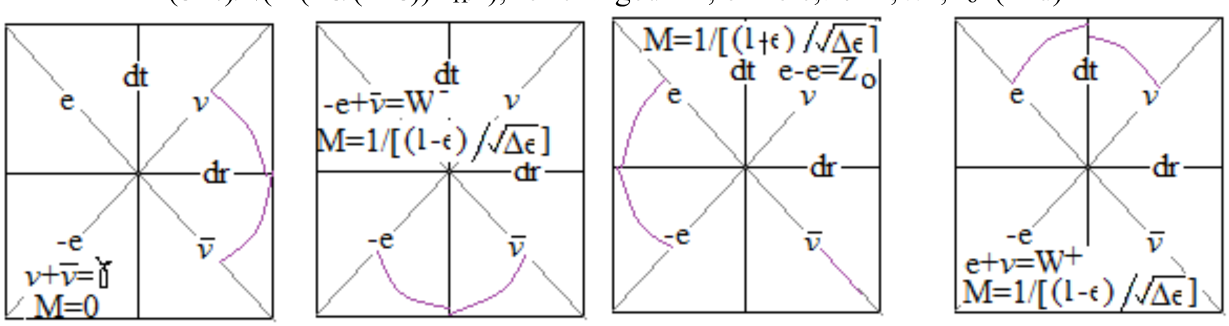


fig4
Fig.4 applies to eq.9 **45°+45°**=90° case: **Bosons.**
C2 These quadrants were defined in eq.7-9 and used in eq.12. The Appendix C4 derivation applies to the far right side figure. Recall from eq.16 z=0 result C_M=45°+45°=90°, gets Bosons. 45°-45°= leptons. The ν in quadrants II(eq.5) and III (eq.9). e in quadrants I (eq.7) and IV (eq.7). Locally normalize out $1+\varepsilon$ (appendix D). For the **composite e,ν** on those required large z=0 eq.9 rotations for $C\to 0$, and for stability $r=r_H$ (eg.,for $2P_{1/2}$, I→II, III→IV,IV→I) unless $r_H=0$ (II→III)

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 *v* and anti *v*
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.

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

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).

Geodesics

Recall equation 17. $g_{oo}=1-2e^2/rm_ec^2\equiv1-eA_o/mc^2v^o$). We determined A_o,(andA_1,A_2,A_3) in appendix A4, eq,A2. We plug this A_i into the geodesics

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

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

above g_{ij} quaternion ansatz $g_{ii}\equiv\eta_{ii}+h_{ii}=1-\frac{eA_i(x,t)}{m_\tau c^2v^i},i\neq0$, (5.10)

$A'_0\equiv e\phi/m_\tau c^2$, $g_{00}\equiv1-\frac{e\phi(x,t)}{m_\tau c^2}=1-A'_0$, and define $g'_{\alpha\alpha}\equiv1-A'_\alpha/v_\alpha$, ($\alpha\neq0$) and

$g''_{\alpha\alpha}\equiv g'_{\alpha\alpha}/2$ for large and near constant v,,see eq. 14 also . In the weak field $g^{ii}\approx1$. Note e=0 for the photon so it is not deflected by these geodesics whereas a gravity field does deflect them. The photon moves in a straight line through a electric or magnetic field. Also use the total differential $\frac{\partial g_{11}}{\partial x^\alpha}dx^\alpha = dg_{11}$ so that using the chain rule gives us:

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

gives a new A(1/v²)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/v²)dv/dr is the pairing interaction (5.11) so SC.

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 wmultiply 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 $2P_{½}$ (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 ε→1=τ (D13) in ξ_1 at $r=r_H$.since Hund's rule implies $\mu=\varepsilon=1S_{½} \le 2S_{½}=\tau=1$. So the ε is negative in Δε/(1-ε) 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+ε) gives 0 charge since ε→1 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.
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 Δε=(2Δε)/2 reduced mass.
Et=E+E=2E=2Δε is the pairing interaction of SC. The E_t=E-E=0 is the 0 rest mass photon Boson. Do the math (eq.C2-C7) and get Maxwell's equations. Note there was no charge C_M on the two *v* s.Note we get SM particles out of composite e,*v* using required eq.9 rotations for

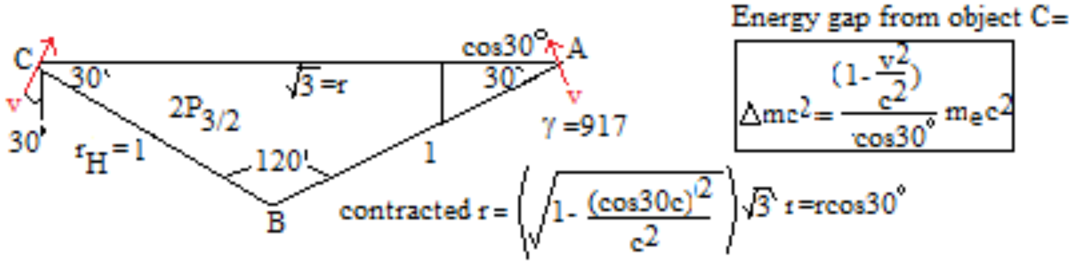
C6 Object B Effect On Inertial Frame Dragging (from appendix B)

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 $\iiint_0^{r_{rH}}\psi_1\psi_2\psi_3\psi_4dV=2G\iiint_0^{r_H}\psi_1\psi_2\frac{1}{V^{1/2}}\frac{1}{V^{1/2}}V$
$$\equiv\iiint_0^{r_H}\psi_1\psi_2G\equiv\iiint_0^{r_H}\psi_1\psi_2(2m_ec^2)dV_{rH}=\iiint_0^{V_{rH}}\psi_1(2m_ec^2)\psi_2dV_{r_H}\quad (A8)$$

Object C adds it 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 thec 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 $=\iiint_0^{V_{rH}}\psi_1\psi_2(2m_ec^2)dV_{rH}=\iint\psi_{S1/2}^*(2m_ec^2V_{rH}))\chi dV_\phi=$
$K\int\langle e^{i\frac{i\phi}{2}}[\Delta\varepsilon V_{r_H}]\left(1-\gamma^5e^{i\phi\frac{3}{2}}\right)\psi\rangle d\phi=KG_F\int\langle e^{i\phi/2}-\gamma^5ie^{i(4/2)\phi}\rangle d\phi=KG_F\left(\frac{2e^{i\phi}}{i}\Big|_0^{2\pi+C}-\frac{2\gamma^5e^{i4\phi}}{i4}\Big|_0^{2\pi+C}\right)$ = $k1(1/4+i\gamma^5)$= $k(.225+i\gamma^5 0.974)$ =$k(\cos13°+i\gamma^5\sin13°)$ **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 iegenstates of composite 3e (vibrational perturbation r is the only variable in Frobenius solution, partII Ch.8,9,10) proton. Observor in objectA. $\Delta m_e c^2$ gap=object C scissors eigenstates. is what we see at object A but $\Delta m_e c^2$ gets boosted by γ by rotation into the object B direction.(to compare with the object B $m_e c^2$ gap).



From fig 7 $r^2=1^2+1^2+2(1)(1)\cos 120°=3$, 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 $\Delta m_e c^2$ which is the average of left and right object C motion effect. We go into the AB frame of reference to compare the object B $m_e c^2$ with this $\Delta m_e c^2$. Going into the AB frame automatically boosts $\Delta m_{ec}{}^2$ to $\gamma\Delta m_e c^2$. So start from a already Fitzgerald contracted x/γ. Next do the time contraction γ to that frame:

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

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

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

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

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

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

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) $r\neq0$ 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 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 $G_F= (2m_ec^2/728{,}000)Vr_H=$**$G_F$** $=1.4X10^{-62}$ 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 $2m_ec^2/729{,}000=1.19X10^{-19}$J. So $\Delta E=1.19X10^{-19}/1.6X10^{-19}=.7$eV 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 correlatable so we have 2D+2D=4D degrees of freedom. But this is all still embedded in the same complex (2D) plane. So this theory is still geometricall 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 $R_{\mu\mu}-½g_{\mu\mu}R= 0$ (3.1.1) ≡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 the **neutrino gains mass.**

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 = $G_{oo}=E_e+\sigma\bullet p_r=0$ gets the left handedness. Recall the genius of the SM is getting all those properties (of χ,,Z_o,W^+,W^-) from $SU(2)XU(1)_L$ so we really have completely derived the electoweak standard model from eq.16

which comes out of the Newpde given we even found the magnitude of its itnput parameters (eg., G_F (appendix C7), Cabbibo angle C6).

Appendix D Counting actual quanta numbers N (instead of just n energy level 2nd quantization states |n>)

D1 Recal from equation 11 $\left[\left(\frac{dr+dt}{ds}\right)\right]\delta z=\frac{ds}{ds}\delta z=$ (1)δz In that "implied iteration of the first application $\left[\left(\frac{dr+dt}{ds}\right)+\left(\frac{dr+dt}{ds}\right)\right]\delta z=2\frac{ds}{ds}\delta z=$ 2(1)δz For all the rotations in fig.4 (except the eq.11 IVth to Ist quadrants: in eq.6.1 each quadrant rotation provides one derivative for each *v*)$\left[\left(\frac{dr+dt}{ds}\right)+\left(\frac{dr+dt}{ds}\right)\right]\delta z=2\frac{ds}{ds}\delta z=$ 2(1)δz. Equation 11 (sect.1) then counts units N of each 2 half integer S=½ angular momentums=1 unit oelectrons (spin1 for W and Z) off the light cone. For the rotation in the eq.11 IVth to Ist quadrants (each quadrant rotation provides one derivative for each *v*) at 45° dr=dt (on the light cone in fig.4) so for Hamiltonian H: 2Hδz=2(dt/ds)δz =2(½)δz= (1)ħωδz=ħckδz on the diagonal so that E=p_t=ħω for the two *v* energy components, universally. Thus we can state the most beautiful result in physics that E=Nhf for the energy of light with N equal N monochromatic photons. Thus this eq.11c counting N does not require the (well known) quantization of the E&M field with SHM (sect.6.10 below). Which seemed to me at least a adhoc process on the face of it since the Maxwell equations have nothing to do with SHM.

Given this comes from equation 11, these numbers are thereby "observables". We have come full circle, getting eq.11 'observables' and using equation 11 to define our inputs into the '1 'in 1=1+0,1=1X1,0=0X0 as an observable (Newpde electrons) , thereby starting our entire derivation all over again..

All defined numbers, and resulting symbols and rules, that are larger than 1 (N>1) we define as "applications" given our ultimate Occam's Razor attribute of the postulate of 0. Note applications can be arbitrearily complicated.

D2 Postulate 0 also implies the underlying 1,0 rela#math and n>1 "applications"

Review Postulate 0: No need for a complicated definition because there is nothing there to define! The null set would be simpler and ultimate occam's razor but you don't postulate it, since it is subset of every set anyway.

So by the process of elimination we arrive at the ultimate Occam's razor *postulate* real#0, the very next level up.

But we need to define the algebra first and use it to write the postulate0. So define 1)*numbers* 1≡1+0 and **0≡**0X0,1≡1X1 as *symbol* **z=zz**: the *simplest* algebraic definition of **0**. So **2)Postulate** *real* number **0** *if* **z'=0** and **z'=1** plugged into z'=z'z'+C (**eq.1**) results in *some* C=0 constant(ie δC=0).

This is our *entire* (Ultimate Occam's Razor **postulate(0)**) ***theory***

Application: (i.e.,*plug* **z= 1,0** into eq.1 as required by above theory.)

Plug in **z=0**=z_o=z'in **eq1.** The equality sign in eq,1 demands we substitute z' on left (**eq1)** into right z'z' repeatedly and get iteration $z_{N+1}=z_Nz_N+C$. If C=1 and z_N=1 then z_{N+1}=2. If C=2 and z_N=1 then z_{N+1}=3, etc., . So the *numbers* z_N possibly are larger than 1 so the larger 1+1≡2, 1+2≡3, etc (*defined* to be a+b=c) and define rules of algebra on these *numbers* like a+b=b+a (eg.,ring-field) with no new axioms. So postulate 0 also *generates* the big *numbers* and thereby the algebra we can now use:

If we state different rules than the standard ring-field algebra rules we still get the same physics but using these different math rules in the physics laws.

Postulate 1 also gets us set theory. For example 1∪C≡1+C (If A∩B=∅). with algebraic definition of 1 z=zz having both 1,0 as solutions so defining negation ~with 0=1-1 Thus we can define interesectioon∩ with ~((A∪B)~B~A)≡A∩B. So we have defined both union ∪ and intersection ∩ so we have derived set theory.
So in postulate 1 z=zz why did 0 come along for the ride? The deeper reason in set theory is that ∅ is an element of every set**.** Note ∅ and 0 aren't really new postulates since they postulate literaly "nothing".So we just derived set theory from the postulate of 1.

D2 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 $(dx_1+idx_2)+(dx_3+idx_4)$ ≡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 $\gamma^r dr \equiv \gamma^x dx+\gamma^y dy+\gamma^z dz$, $\gamma^j\gamma^i+\gamma^i\gamma^j=0$, i≠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 alternaives 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 ωdt≡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.

Δ Modification of Usual Elementary Calculus ε,δ 'tiny' definition of the limit.

Recall that: given a number ε>0 there exists a number δ>0 such that for all x in S satisfying

$|x-x_o| < \delta$

we have

$|f(x)-L|<\varepsilon$

Then write $\lim_{x\to x_o} f(x) = L$

Thus you can take a smaller and smaller ε here, so then f(x) gets closer and closer to L even if x never really reaches x_o."Tiny" for h $\to L_1$ and f(x+h)-f(x)$\to L_2$ then means that L=0 =L_1 and L_2 . 'Tiny' is this difference limit.

Hausdorf (Fractal) s dimensional measure using ε, δ

Diameter of U is defined as $|U| = sup\{|x-y|: x,y \in U\}$. $E\subset \cup_i U_i$ and $0<|U_i|\le\delta$

$$H^s_\delta(E) = inf \sum_{i=1}^{\infty} |U_i|^s$$

analogous to the elementary $V=U^s$ where of s=3, U=L then V is the volume of a cube Volume=L^3. Here however 's' may be noninteger (eg.,fractional). The volume here would be the respective Hausdorf outer measure.
The infimum is over all countable δ covers{U_i} of E.
To get the Hausdorf outer measure of E we let δ→0 $H^s(E) = \lim_{\delta\to 0} H^s_\delta(E)$
The restriction of H^s to the σ field of H^s measurable sets is called a Hausdorf s-dimensional measure. Dim E is called the Hausdorf dimension such that
$H^s(E) = \infty$ if $0\le s<\dim E$, $H^s(E)=0$ if $\dim E<s<\infty$
So if s implies a zero H or infinite H it is not the correct dimension. This rule is analogous to the definition of the (fractal) Mandelbrot set itself in which a C that gave infinity is rejected by the definition δC=0 we can model as a binary pulse (z=zz solution is binary z=1,0) with

Review Recall from eq.7 that dr+dt=ds. So combining in quadrature eqs 7&11 SNRδz=(dr/ds+dt/ds)δz =((dr+dt)/ds)δz=(1)δz (11c,append) and so having come *full circle* back to postulate 1 as a real eigenvalue (1≡Newpde electron). For all the rotations in fig.4 (except the eq.11 IVth to Ist quadrants: in eq.B1 each quadrant rotation provides one derivative for each *v* *v*)$\left[\left(\frac{dr+dt}{ds}\right)+\left(\frac{dr+dt}{ds}\right)\right]\delta z = 2\frac{ds}{ds}\delta z = 2(1)\delta z$ Equation 11 (sect.1) then counts units N of each 2 half integer S=½ angular momentums=1 =2 units of electrons (spin1 for W and Z) off the light cone. Alernatively diagonal ds=√2dr in $\int\left(\frac{dr}{\sqrt{2}dr}+\frac{dr}{\sqrt{2}dr}\right)^2 dV = 1$For the rotation in the eq.11 IVth to Ist quadrants (each quadrant rotation provides one derivative for each *v*) at 45° dr=dt (on the light cone in fig.4) so for Hamiltonian H: 2Hδz=2(dt/ds)δz =2(½)δz= (1)ħωδz=ħckδz on the diagonal so that E=p_t=ħω for the two *v* energy components, universally. Thus we can state the most beautiful result in physics that E=Nhf for the energy of light with N equal N monochromatic photons. Replaces 2nd quantization of 2 given allowed Newpde 10^{82} electrons(appendix A2) So we really do have a binary physics signal. So, having come *full circle* then: (**postulate 0⇔ Newpde**)
Digital communication anology: Binary (z=zz) 1,0 signal with white noise δC=0 in z'+C=z'z'. Recall the algebraic definition of 1 is z=zz which has solutions 1,0.(11c). Boolean algebra. Also you could say white noise C has a variation of zero (δC=0) making it easy to filter out (eg., with a Fourier cutoff filter). So you could easily make the simple digital communication analogy of this being a binary (z=zz) 1,0 signal with white noise δC=0 in z'+C=z'z'. (However the noise is added a little differently here (z+C=zz) than in statistical mechanics signal theory (eg.,There you might use deconvolved signal=convolution integral [(transfer function)signal]dA)). where the' signal' actually would equal z+C, not the usual $(2J_1(r)/r)^2$ psf So this is not quite the same math as in signal theory statistics statistical mechanics.)

The Whole Shebang:

This theory is 0

Postulate real number 0 if **z'=0** and **z'=1** plugged into z'=z'z'+C (**eq.1**) results in some C=0 constant(ie $\delta C=0$)

Plug 0 into **eq.1** and get the Mandelbrot set
Plug 1 into **eq.1** and get the Dirac eq.

Dirac plus Mandelbrot gets the Newpde

So Ultimate Occam's razor postulate(0) implies ultimate math-physics

So this theory is 0. Hold that thought.