This Theory Is Zero

Abstract: All QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues. All mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So here we simply **postulate0**: "z=zz+C eq1 implies *real*#0" (C constant so δC=0, z=zz needed for the multiplicative properties* of 0.) implying a rational Cauchy *sequence* with limit 0 thereby doubling as an *iteration* of eq1 in δC=0 that gives the (fractal)Mandelbrot set. Also plugging eq1 directly into δC=0 gives the Dirac eq. and so fractal (scales10^{40N}X$CM_{N=0}$, fig1) *real* eigenvalues of a *generally* covariant generalization of the Dirac equation(Newpde) that does not require gauges, clearly a major discovery as shown in fig1.

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

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

I **Plugging** the **eq1** rel *iteration* (z_{N+1}-z_Nz_N=C) into **δC=0** implying δC=δ(z_{N+1}-z_Nz_N)=δ(∞-∞)≠0 for some C. The Cs that result *instead* in finite z_∞s (so δC=0) define the **Mandelbrot set** in fig1 whose lemniscate continuity (11) along dr≈dR is required by the derivative in δC≡ (∂C/∂R)dR=0 =dC=$dC_M10^{xN}$with its max extremum scale jump xN at C_M=-1.75 where the largest x≈40, fig.9. Eg.for huge Nth fractal scale |δz| >>**1**: AppA,fig1.So extreme -¼,-1.75 solve δC=0 so are the only zoom pts in: http://www.youtube.com/watc h?v=0jGaio87u3A implying also our rational Cauchy sequence iteration is thereby z_{N+1}-z_Nz_N =C= **-¼**,-3/16, -55/256 ,..**0**. So **0** is a real number (eq M1)

II **Plugging eq1** directly **into δC=0** is also required. So given eq1 and thus equations 3,4

δC=δ(δz+δzδz)=δδz(1)+2(δδz)δz≈δ(δzδz) =δ(($dr+idt)^2$) =δ[(dr^2-dt^2)+ i(drdt+dtdr)] =**0** = (5)

Minkowski metric +Clifford algebra≡**Dirac equation** (See eq7a γ^μ derivation from eq5.). But (N=0, 2D) δδz1 must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1, 2D) independent Dirac dr implying 2D Dirac+2D Mandelbrot=4D Dirac **Newpde**≡$\gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for *ν*,e; $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$; $r_H= C_M/\xi= e^2X10^{40N}/m$ (fractal jumps **N**=. -1,0,1.,) $\Delta\varepsilon\equiv m_e$, ε=μ >>Δε (appendix A,B, C,fig2)

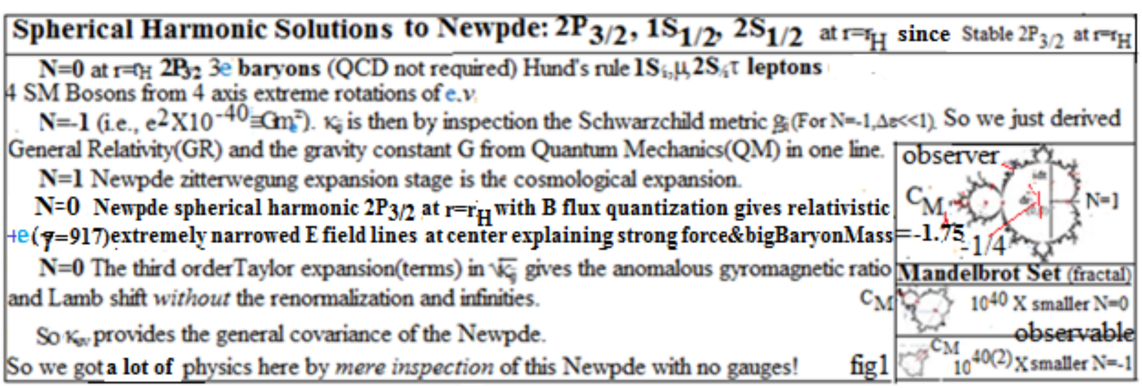


fig1

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

Factor real eq5 $\delta ds\equiv 0$

Next factor real eq.5: $\delta(dr^2-dt^2)=\delta[(dr+dt)(dr-dt)]=0=[[\delta(dr+dt)](dr-dt)]+[(dr+dt)[\delta(dr-dt)]]=0$ (6)

so $-dr+dt=ds,-dr-dt=ds\equiv ds_1 \rightarrow \pm$**e**. (7)

Given constraint $\delta ds^2=0$ then these eq.7 results graphically are diagonals in fig3 2nd,3rd quadrants.

& $dr+dt=ds$, $dr+dt=0$; $dr-dt=ds$ $dr-dt=0$, light cone $\rightarrow\nu,\bar{\nu}$(diagonals in fig3 1st,4th quadrants) (8)

& $dr+dt=0,dr-dt=0$ so $dr=dt=0$ (in eq.11 dr/ds) defines vacuum (while eq.4 derives spacetime)(9)

Note that those quadrants thereby give the finite *positive* scalar drdt in eq.7 (if *not* vacuum). It is finite because of the above Mandelbrot set C_M (Here at $-1.75=C_M$) iteration definition that implies $\delta z\neq\infty$. This then implies the eq.5 *non* infinite 0 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 $\gamma^j\gamma^i=1$) Thus from eqs5:

$$ds^2= dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2 \quad (7a)$$

QM Operators from eq5

We square eqs.7 or 8 (given fig3) $ds_1{}^2=(dr+dt)(dr+dt)=(-dr-dt)(-dr-dt) =[dr^2+dt^2] +(drdt+dtdr)$ $\equiv ds^2+ds_3=$**Circle**+invariant (10). **Circle**$=\delta z=dse^{i\theta}= dse^{i(\Delta\theta+\theta o)} = dse^{i((\sin\theta dr+\cos\theta dt)/(ds)+\theta o)}$, $\theta_o=45°$ min of $\delta ds^2=0$ given eq.7 constraint $dr+dt=ds$ (with θ measured from the horizontal 'dr' axis) implying the graphical representation (note 45°) in fig4 and fig5.eq. 7 ($\rightarrow\pm$**e**) in fig4 2nd,3rd quadrants. Eq8 ($\rightarrow\nu,\bar{\nu}$) in fig4 1st,4th quadrants. We define this circle (ds= radius) normalized dimensions $k\equiv dr/ds$, $\omega\equiv dt/ds$, $\sin\theta\equiv r$, $\cos\theta\equiv t$. $dse^{i45°}=ds'$ so $\delta ds'=0$ (eg., normalized with ds and so arbitrary units $r\propto$ real r as in meters, feet,etc.,). Take the ordinary derivative of this 'Circle' with respect to this real dr (since flat space).$\frac{\partial\left(dse^{i\left(\frac{rdr}{ds}+\frac{tdt}{ds}\right)}\right)}{\partial r}=i\frac{dr}{ds}\delta z$ so $\frac{\partial\left(dse^{i(rk+wt)}\right)}{\partial r}=$ $ik\delta z,\ k\delta z=-i\frac{\partial\delta z}{\partial r}$ (11)

$\delta z\equiv\psi$. (10) and multiply both sides by ħ. Note **circle** plus that drdt+dtdr invariant makes eq11 a *derivative only in the Dirac equation*. Also the derivative of constant C in $\delta C=\partial C/\partial R)dR=0$ makes postulated 0 a Newton quotient limit so (constant) real0 as a limit. Consistent with that the actual upper real limit to set C (eq3) is that tiny negative 'dr' value added to -¼, so not exactly–¼. (ie., -¼>C *not* -¼≥C for eq4). Thus in eq4 Newton quotient $\lim_{dr\rightarrow 0} dr/ds=1$ so dr is real as a limit only. So we proved that *dr is a real number* and also generated nonzero eigenvalues from the ratio dr/ds, our real# larger numbers as real eigenvalues of operators. Thus **k =dr/ds is an operator in eq.11 with *real* eigenvalues** dr/ds since eq.11 implies k is an observable defining p/ħ: *the central idea of QM which for the first time* is proven from first principles here (postulateo). Also since $\delta z=\cos kr$ then k has to be $2\pi/\lambda$ thereby deriving the DeBroglie wavelength λ. Also eq.11 with integration by parts implies $\langle p_r\rangle^*=\int(p_r\psi)^*\psi d\tau$ $=\int\psi^* p_r\psi d\tau=\langle p_r\rangle$ and $\int\psi_a p\psi_b d\tau\equiv\langle a|p|b\rangle$ in Dirac bra-ket notation. Therefore $p_r=\hbar k$ is Hermitian given dr is *real*. See Nhk count N in sect.IIIb.

IIa) Eq5 Minkowski Metric implies Lorentz transformations(9)

Recall eq.5 with its Minkowski metric ($ds^2=dr^2-dt^2=dr^2-1^2dt^2=dr^2-c^2dt^2$.). eq8 ν is the light cone making natural unit **1**=c=dr/dt is always a coefficient 1 of dt and so invariant with respect to changes in dt and dr given ds invariance in eq.5 for flat space(See sect C4 for Mandelbrot set $\delta z\approx C$ curved space perturbation eq.16) **thereby implying reference frame Fitzgerald contractions 1/γ (**Lorentz contraction) $\delta z'=\delta z/\gamma$ boosted frame of reference since for **observables** N=0 (so small, eq14) equation 3 extremum $\delta z\approx C$. So **C**$\approx\delta z/\gamma\equiv C_M/\xi=\delta z'$ (12)

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

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

δz=-1, z=0: So δCM=δ(ξδz')= δξδz'+ξδδz'=0 so if **δz'≈-1,** δξ is **tiny** so stable, electron e (13)

δz=0, z=1: So δξδz'+ξδδz'=0. So |ξ| is big and δξ is big so unstable 6e(eg., that Newpde Hund rule stable (sect.IIIa) energy eigenvalue $2P_{3/2}$ =eigenvalue of $2S_{1/2}$,τ; $1S_{1/2}$ μ so D=ξ=τ+μ) (13a).

So for postulate 0 (z=zz so 0=0X0) need (micro, subatomic) ***small*** C_M=C≈δz for free particle observables N=0 in fig1 so in eq.12 large ξ=6e (eg., that D=ξ=τ+μ) in **C**$\approx\delta z/\gamma\equiv C_M/\xi=r_H$ (14) thereby explaining the "observable" and "observer" scale labeling in figure1 and making free electrons point like particles since r_H is thereby very small.

δδz= δ_tδz implies Hamiltonian in eq.11 can't be 0 in equation 5.

Also in δC=δ(δz+δzδz) =δδz+δ(δzδz) so that if (from eq.11)

$\delta(\delta z)/dt\equiv\delta_t(\delta z)/dt=(\partial(\delta z)/\partial t)dt/dt=H\delta z=$**energy**Xδz (15)

implying large δds^2 =0 axis extreme rotations (high energy COM collisions) as well in eq16 (appendix C) below. Also recall that observer fractal scale N=1 (since δz>>1 there) is not normalizable but as we saw observable (fig1) N=0 is normalizable (eg., δz=-1 electron) **implying Bohr's** -1*-1=δz*δz**=ψ*ψ=1 probability density** for the electron (so that's not a postulate anymore).

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

(N=0, 2D) δδz1 must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1, 2D) independent Dirac dr and so 2D+2D=4dimensions (N=0 axis extreme perturbations C1 in appendix C). Recall the required N=-1 tiny C≈δz must be a perturbation (giving large curvature general covariance of eq.17-19.**)** of the N=1 eq.7 =**δ**z'+δz= $(dx_1+idx_2)+(dx_3+idx_4)$≡ dr+idt. But given the above δz≈dr≈dt at 45° we must add and subtract δz' in eq7 to keep the ds: (dr-δz')+ (dt+δz')≡dr'+dt'=ds (16)

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

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

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

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

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

2D+2D=4D (due to nonzero **(**δδz)1 term in (from eq3) δC=δ(δz+δzδz) =δδz1+δ(δzδz))

But (N=0, 2D) δδz1 must be small but not zero so it *automatically* provides 2 extra degrees of freedom for the (N=1, 2D) independent Dirac dr implying a 2D+2D=4D. Thus in δz'+δz= $=(dx_1+idx_2)+(dx_3+idx_4)$≡dr+idt so with $x_1,x_2,x_3,x_4\to$(dr,dt) → x,y,z,t with dr then 3D with orthogonal axis $dr^2=dx^2+dy^2+dz^2$. But (eq 7a) $dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ also applies so dr can point in the direction of any dx_i (eg., $dx^2-dt^2=(\gamma^x dx+i\gamma^t dt)^2$). Note also that all dx s are squared and added to $-dt^2$. So writing eq7a for orthogonal axis' $dr^2\equiv dx^2+dy^2+dz^2$ ***then*** (to be able to individually square those dx's (if let's say dy=dz=0) to get dr^2 and the eq.7a γ^μs) in 7a we *must* define $\gamma^r dr\equiv\gamma^x dx+\gamma^y dy+\gamma^z dz$ with $\gamma^j\gamma^i+\gamma^j\gamma^j=0$, i≠j,$(\gamma^i)^2=1$ in $(\gamma^r dr+i\gamma^t dt)^2= (\gamma^x_x dx+\gamma^y dy+\gamma^z dz+\gamma^t idt)^2 = dx^2+dy^2+dz^2-dt^2= ds^2=dr^2-dt^2$. Thus we have derived the well known 4D Clifford algebra Dirac γ matrices. So the **Dirac equation is what gives us our 4D** space-time degrees of freedom imbedded in merely that Mandelbrot set 2D complex plane with the r changes in eq17 and time providing the two (holographic, eq.D2) 'phase' exponent changes in the Hamiltonian H in $\psi=e^{iHt/\hbar}$ mimicking higher dimensionality effects for a Dirac lepton observer! Us! But we must still incorporate those N=-1 fractal scale δz perturbation equations 17-19 in $\kappa_{\mu\nu}$ to get $(\gamma^x\sqrt{\kappa_{xx}}dx+\gamma^y\sqrt{\kappa_{yy}}dy+\gamma^z\sqrt{\kappa_{zz}}dz+\gamma^t\sqrt{\kappa_{tt}}idt)^2 = \kappa_{xx}dx^2+\kappa_{yy}dy^2+\kappa_{zz}dz^2-\kappa_{tt}dt^2= ds^2$. Multiply both sides by $\hbar^2/ds^2$ and $\delta z^2\equiv\psi^2$ (since lemniscate extremum C=-2 is harmonic) use eq.11 inside the brackets( ) and use object A and B perturbation appendix eqs A10 and B3 and get the 4D QM

Newpde$\equiv \gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for e,ν, $\kappa_{00}=e^{i(2\Delta\varepsilon/(1-2\varepsilon))}-r_H/r$, $\kappa_{rr}=1/(1+2\Delta\varepsilon-r_H/r)$, (20)

$r_H=C_M/\xi= e^2X10^{40N}/m$ (**N**=. -1,0,1.,), $\Delta\varepsilon=0$ for neutrino ν and N=-1 or no object B (eq.24,B2).

So **Postulate(0)→Newpde**

III) Solutions To The Newpde (ie applications)

z=0 Newpde N=0 stable state $2P_{3/2}$ at=r_H (baryons) implying also $2S_{1/2}$,τ; $1S_{1/2}$,μ

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

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

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

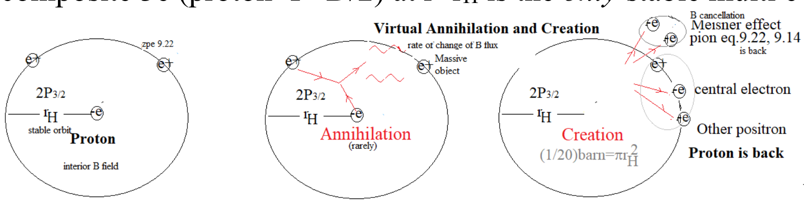


Fig1a For $2P_{3/2}$ ground state $3m_e$ representation the interior curved space ultrarelativistic nature of $2P_{3/2}$ at $r=r_H$ allows for *only* a 2 positron $2m_e$ and one central electron bound state allowing for a reduced mass representation of the 2 positron bound state eq.7.1. $D/2=m_p$ with very high γ (=917) due to B field flux (BA) quantization=mh/e=3h/e for SP^2 (PartII). The 2nd pair creation (top one in the above diagram) gives the zpe emf of eq.9.22 partII as a Faraday's law result of these resulting rapid B field changes and so required zpe Meisner effect (the pion cloud origin of the Yukawa nuclear force).

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

Comparison with QCD

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

But note these purely mathematical lobes don't leave but the electron physical objects *can* leave so QCD must fail at very high energies (>>1GeV~bound state), which it does (see LHC

Totem data). Thus these detailed calculations of QCD work as long as this connection to the above Newpde $2P_{3/2}$ state holds, thus when the Gev level $2P_{3/2}$ at $r=r_H$ bound state electrons stay in these lobes. *So we can reproduce QCD from our Newpde half integer spherical harmonics*! So the bottom line is that protons are just 2 Newpde positrons and an electron in $^2P_{3/2}$ at $r=r_H$ states. We simply must throw away QCD as quickly as possible, adding all these unnecessary (qcd) postulates to physics is nonsense.

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

in the zoom: http://www.youtube.com/watch?v=0jGaio87u3A near the tiny limacon near that -1.75 point (see fig 9, appendix M5) we follow that dR thread to the right and find after a $10^{40}X=r$ scale a second Mandelbrot set lemniscate. In between there are splits in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So $3^{2.7X62}=10^N$ so 172log3=N=80. So there are about 10^{80}splits per initial split. But each of these Mandelbrot set -1.75 points is a $C_M/\xi\equiv r_H$ in electron (eq.10 above). So for each larger electron there are **10^{80} constituent electrons**. Recall $10^{80}=N=r^D$ where D, the fractal dimension, is thereby 2.

Therefore in $CM=CM_{N=0}10^{40}Xr_{HN=0}=2G(10^{80}m_e)/c^2$, $2Gm_e/c^2$ must apply to the (10^{80}) N=-1 scale, not to N=0. This requires the N=0 fractal charges e^2 to actually cancel out (so don't contribute to $2G(10^{80}m_e)/c^2$ at all) and so their e^2 sources (See sect.A2.) might or might not cancel even implying possible e^2 repulsion (and $-e^2$ attraction).There is also the equation A10A $\kappa_{00}=\text{rel } e^{i2\Delta\varepsilon/(1-2\varepsilon))}$ (for the $\Delta\varepsilon$ in relativistic $^2P_{3/2}$ at $r=r_H$) flat background N=0 metric becoming for $r>r_H=10^{11}$Ly a baryon number relativistic chargeXmass$=C=C_M/\xi=e^2(1-(\text{rel } e^{i2\Delta\varepsilon/(1-2\varepsilon))}))$ component force, where the mass goes into the numerator, thus becoming, given the relativistic nature, a ±'net baryonic charge' for our entire proton-matter universe that thereby can cancel out over the many universes at cosmological N=1 scales. Thus N=0 thereby also leapfrogs to the N=2 fractal scale, etc., *Thus we explained why charges can repel and masses always attract,* even cosmological baryon ones.

Single field but observed from different frames of reference

These fields on the different fractal scales **are really all the same** field but seen from the different frames of reference created by the different fractal 10^{40N}X jump mass contributions to the zitterbewegung frequency oscillation (BD 1.13) frames of reference (top of appendix A) of the Newpde. But that also means that the fields from consecutive fractal scales have to be the same at the small asymptotes (eg., $g_{oo}=\kappa_{00}$ locally in the halo(partIII) and homogenous Mercuron (B5) which then connects, "bridges", the N=0 to N=1 fractal scales let's say(see partIII or bottom of appendix B). This certainly makes this then a true "unified field", a TOE.

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

But in the very hot (billions of degrees) Mercuron frame of reference(eq A3C) there is one photon for what was two electrons (Wein's displacement law) so our $10^{80}/2$ count gives us the quantization (N=integer) of the electromagnetic field(analogous to being in the special COM frame of reference of the oscillator with speed v in the usual SHM field quantization). This Mandelbrot set count N explains why all energy is split into these E=hf quanta, that being the most profound of all our results. Counting these 10^{80} fractal splits is the correct method of E&M field quantization.

IIIc) Alternatively postulate z=zz (Note 0=0X0. So we still postulated 0.) with added white noise C (So z=zz+C eq1)**.** Single slit experiment Wave Particle Duality(WPD) complementarity comes from that 45° angle of the (Dirac equation eq.20) electron particle e on that e,*v* graph (sect.IIIC,fig3) where C noise position uncertainty is largest (so wide slit, photoelectric effect) with ds^2 circle always wave (equation) *on* the axis' (eqC1) then C=0 (narrow slit, Airy pattern) 0° gives only the wave. *No one,* except here, *has ever done a first principles derivation of WPD*.

Summary **The Concept** (not to be confused with these thousands of applications)

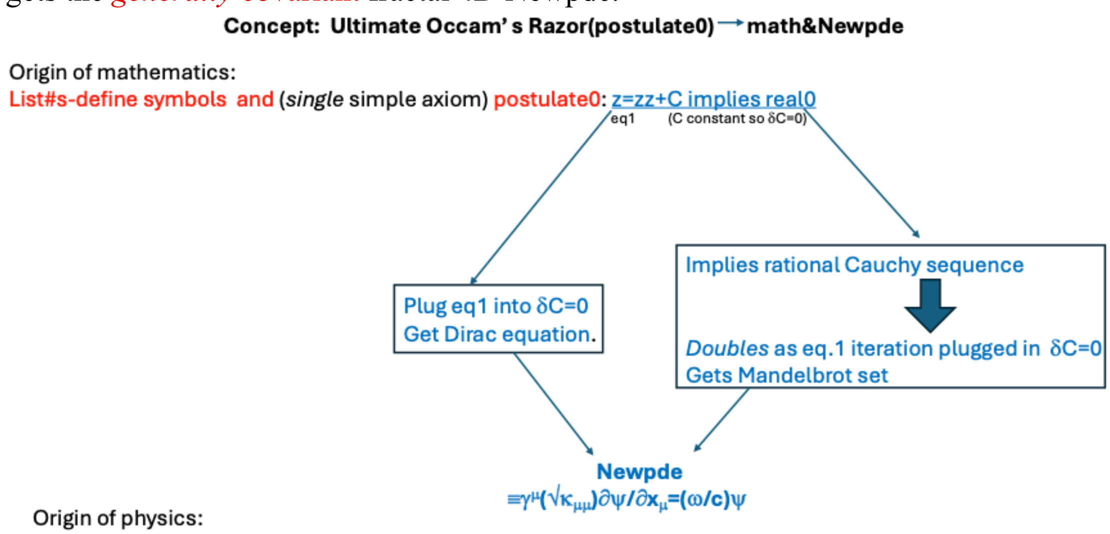
The concept is simple because it is "simplicity" itself:

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

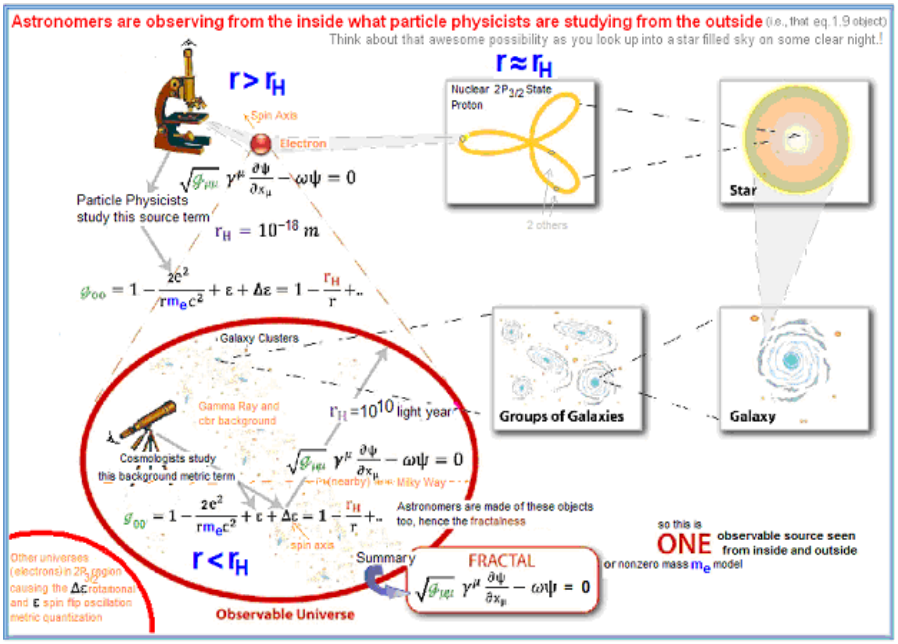
given "0 is the simplest idea imaginable" (Hold that thought: 0, "I drew a blank".)

So this is "first principles", thus we have actually figured it out! We completely understand!!! It works(fig1) because it is THE first principle! And it makes sense because all QM physicists know about *Lorentz* covariant(9) Dirac equation *real* eigenvalues and all mathematicians know that the limit of a Cauchy sequence of rational numbers is a Cauchy *real* number. So by merely **postulatingo** "z=zz+ C implies *real*#0"

(C constant so $\delta C=0$ and z=zz+C eq1 gets us the multiplicative properties of **0.** See M3) there then must be a rational Cauchy *sequence* with limit 0 that then doubles as an *iteration* of eq1 in $\delta C=0$ that thereby gives the (fractal) Mandelbrot set. Also the required plugging eq1 into $\delta C=0$ gives the Dirac equation(eq5). The 2D Mandelbrot set perturbation of this 2D Dirac eq gets the *generally* covariant fractal 4D Newpde.



The Mandelbrot set fractal scale jumps ($10^{40N}XC_M$, N integer in Newpde) of fig1 implies that by increasing the scale by 10^{40}X we are right back to where we started!



Object B Object A Nearby objectC fig2

From equation A11 rebound explosion will be (~100 antinodes =D across the Mercuron) on r_{bb},: see partIII, even so implying a Rayleigh Taylor instability so web like explosion remnants in both such as in M1 and Mercuron circumferencial 320(=πD) giving(in fig4) the initial radius (now at~400MLY) of those 'BAO' cbr web like structures at reionization. On average single galaxys dominate a 4MyLY wide region 100Xsmaller, the next metric quantization down. Globulars next(100X smaller) and stellar neighborhoods next (100Xsmaller) and planets (100Xsmaller), then moons (100Xsmaller) ,etc. So in fig4 A11 gets all the rest! Even supernova rings at high enough resolution (eg beads split at least at 1987a) are ~100 antinodes

References

(6) Penrose in a utube video implied that the Mandelbrot set might contain physics. Here we merely showed how to find it. I once heard Murray Gell Mann say the same thing in a lecture I attended. For example the lower *extremum* point C_M=1.75X10^{40N} (fig1) merely contributes to the successive onion shell horizons in $r_H=C_M/\xi$ in $\kappa_{oo}=1-r_H/r$ in the $\sqrt{\kappa_{ij}}$ in the Newpde. The Mandelbrot set merely contributes these extreme numbers in the $r_H=C_M/\xi$ in κ_{00} in the Newpde.
(7) Cantor: Ueber die Ausdehnung eines Satzes aus der Theorie der trigonometrischen Reihen, "Ueber eine elementare Frage der Mannigfaltigkeitslehre" Jahresbericht der Deutschen Mathematiker-Vereinigung.". Cantor proved the real#s were dense with a binary # (1,0) argument. But our z=zz *list* (appendixM) is also for #*(1,0) thereby allow Cantor to use his binary argument* at this fundamental level to prove an important property of the real numbers.
(8)Tensor Analysis, Sokolnikoff, John Wiley $\kappa_{\mu\nu}$ here is covariant given it's Schwarzchild limit
(9)The Principle of Relativity, A Einstein, Dover.The Minkowski metric gives Lorentz transform
(10)Quantum Mechanics, Merzbacher, John Wiley p.42 operators (eq.11)
(11) lemniscate circle sequence (Wolfram, Weisstein, Eric). Implies C^2 continuity for fig1 r axis
(12) Quantum Mechanics, Merzbacher 2nd edition pp.605-607 Dirac equation derivation
(13)Mandelbrot set fig1 generated by http://www.youtube.com/watch?v=0jGaio87u3A at r=-1/75

Appendix

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

In this fractal model we have a 100% chance of being in a ~10^{11}parsec wide cosmological (Newpde N=1) electron and this electron in turn has a 75% chance of being in a (cosmological, N=1) proton (as opposed to a free electron) given hydrogen is by far the most common element. That is because the proton in my $^2P_{3/2}$ at $r=r_H$ stable state solution to the Newpde is composed of 3 objects, two orbiting positrons and a central electron which we call objects A, B and C (bottom of fig2) on the cosmological N=1 fractal scale. We are in one of the two positrons, object A with object B being the central electron with these names then giving us our appendix labels (A,B,C,M). Appendix M is the ring math but with *one* axiom postulate0 replacing the many mainstream ring-field axioms so our axiom(0) by itself thereby implies both math and physics. giving us a "first principles" theory. Appendix M5 discusses the lemniscate continuity.

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

Appendix A

We are inside **Object A and its N=1 zitterbewegung oscillation is cosmology**

From Newpde (eg., eq.1.13 Bjorken and Drell (BD) 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 $\omega=mc^2/\hbar$ where m is from eq.B2, which is fractal here ($\omega=\omega_o 10^{-40N}$) in $r=r_o e^{i\omega t}$ with spin½. On our own fractal cosmological scale N=1 we are about halfway through the $r=r_o\cos\omega t=\text{rele}^{i\omega t}$ expansion stage (near $r\approx r_H=2GM/c^2$) in $dt'^2=(1-r_H/r)dt^2$ so distant clocks dt tick many more times than ours making the universe much older than that 13.7by explaining the high z stellar metalliticity, mature spirals and supermassive black holes and even net galactic spin since that is selfsimilar to Dirac equation BD eq.1.13 spin ½ as well. Thus the fractal Newpde completely explains cosmology.

Recall Hund rule $2S_{½}$ τ and $1S_{½}$ μ=ε and the ground state electron Δε in eq.13 fig in IIIa

$2S_{½}$ τ has the same principle quantum number N as *stable* $2P_{3/2}$ P at $r=r_H$. In any case the Mercuron state largest global normalization must be for this *stable* $\psi=e^{i\tau}\approx1$ (another more local still is normalizing out ε as in eq.A1.) So $\psi=e^{i(\tau+\mu+e)t}=e^{i(\mu+e)t}=e^{i(\varepsilon+\Delta\varepsilon)}$. So $R_{22}=e^{-\nu}[1+½\, r(\mu'-\nu')]-1\approx-\nu=-\varepsilon$ for small ε (in ≈-sinε) also explaining the negative sign on the sine function. Also $\psi\rightarrow\delta z=e^{\,i(\varepsilon+\Delta\varepsilon)}=dr$. So to get a metric coefficient dr^2 we must square $dr^2=dr_o^2e^{i(2\varepsilon+2\Delta\varepsilon)}=\kappa_{rr}dr'^2$ so that $e^{i(2\varepsilon+2\Delta\varepsilon)}=\kappa_{rr}$. (And we can further normalize out ε for even more local space time Δε perturbations by $e^{i2\Delta\varepsilon/(1-2\varepsilon)}=\kappa_{00}$ (A1)

So near the initial expansion time: $R_{ij}=0\rightarrow R_{ij}=-(1/2)\Delta(g_{ij})$ (A2)

(where Δ is the Laplace-Beltrami second derivative operator) is not =zero since it is this source mass. Thus the above fractal scale N=1 Laplace Beltrami source eq. A2 -sinωt≡-sinμ=-sinε here comes out of the **Newpde zitterbewegung** BD eq1.13 for the N=2 observer (fig1: observer

N>observable N-1). Recall also that earlier comment "for huge Nth fractal scale $|\delta z| >> 1$", eg fig1 "observer", must be on a large N=1 fractal scale to observe the N=0 eq5 flat space limit.

A1 Inertial global background Huge N=2 scale, as the observer of N=1 cosmology scale, sees Newpde zitterbewegung source (in fig1) negative square root in A14 ($\varepsilon \propto 1/\sqrt{(1-r_H/r)}$) **in** $R_{22}=-\sin\varepsilon \rightarrow \sinh\varepsilon$ inside the N=1 r_H with the manifold assumed rectilinear globally. By artificially going under horizon r_H, and changing $i\rightarrow 1$, N=2 he then sees what we (N=1) see $\sin\varepsilon\rightarrow\sinh\varepsilon$ thereby making N=1 cosmology an 'observable' in fig1. Serendipitously for $r<r_H$ then $R_{22}=-\sinh\varepsilon$ is also integrable, has a closed form solution (below A3A). So we require sine→sinh in $R_{22}=-\sinh\mu$ (A2A)

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

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

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

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

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

Equipartition of energy (= 3/2kT maximizing 3D entropy) in the Mercuron implies the τ and μ are the same energy $\tau=1=\mu$ there as in our multi deuteron equipartition model of a large nucleus (partII,sect.10.5). So in the r_{bb} Mercuron $\xi_1= \mu=\varepsilon=1$ and in the r_{M+1} present day μ=muon =.05946(X tauon mass). So integrating we get: $\ln(r_{M+1}/r_{bb})+2=[1/(e^{\mu}-1)-\ln[e^{\mu}-1]]2$ (A3C)

So $r_{bb}\approx$30million miles (≡approximate orbit radius of Mercury, hence the name "Mercuron" radius, just fits the10^{80} baryons each at $r=r_H$ for each proton so **baryogenesis *not* required**.)if $r_{M+1}\approx10^{11}$Ly, μ=muon mass= .06. Also note that the g factor=g= e/2m and w=gB=2πf with f the Larmor frequency which is what you use to measure the g factor(like in MRI). The anomalous gyromagnetic ratio gy=g-2. Note if the mass is decreasing then gy (and the g factor) goes up as well. The difference in gy between 2023 (FermiLab) and 1974 (CERN) is 116592059[22]-11659100[10] =1 part in 10^5 increase which translates to 1 part in 10^8 increase in g since g is about 2000X larger than gy. Note g is increasing corresponding to a decreasing mass m in g=e/2m, by about 1 part in 10^8 over 50 years so about 1 part in 10^{10} over 1 year in eq.A3C. Note 10^{10} years is the approximate time from (the big uptick) in eq.A3C, also coincidently being the mainstream nominal age of the universe.

Thus we have the particle masses ambient inertial metric (N=1 so N=-1 also) effects

Thus we generate from this eq A3C evolution of the universe the ratio of the mass of the muon μ to mass of the tauon τ (recall Hund's rule $2S_{½}$ τ and $1S_{½}$ μ from Newpde) as a function of time The equation B2 inertial frame dragging reduction gives the magnitude of mass $\mu=\varepsilon$

2S Ortho **side view** Lorentz contraction doubles the energy for $2S_{½}$ (from part II eq.7.1) so one $2S_{½}$ is the same mass as two $2P_{3/2}$ So

two $2P_{3/2}$ energy principle eigenvalue =one $2S_{1/2}$ energy principle eigenvalue

Must add $1S_{½}$ zpe to both sides: $2P_{3/2}+1S_{1/2}=2S_{1/2}+1S_{1/2}=SP^2$ in scalar Schrodinger equation.

So we have the mass of 2 protons=tauon+muon masses and the case 1 and case 2 cases of Ch.8. Also for the $2P_{3/2}$ state at $r=r_H$ the B flux quantization implies $2X917m_e=m_p$ (from part II eq.7.1) we thereby have the mass of the electron m_e, as well which in fact is the fundamental new pde mass here. These masses are the basis for constructing the heavier particle masses eg., m_p is fundamental in baryonic, mesonic multiplets from Newpde ch.8-9. The transverse "**top view**"(so shrunk by 1/917 Compton wavelength) muon and eq.9.22 zpe pion is fundamental to the heavy

CMS particles in appendix C5 to determining the heavy CMS detector particle masses and their other properties): predictions for future LHC discoveries!
Particle mass ε represents N=1 (inertial) background in our zitterbewegung and in g_{oo}, used later. Recall the Hund's rule $2S_{1/2}$ τ, $1S_{1/2}$ μ source of eq13a $r_H=e^2/\xi$, $\xi=\tau+\varepsilon+\Delta\varepsilon$ for required small C.

A2) Local N=0 fractal scale background

Recall from our leapfrog discussion(sectIIIb) fractal scale N=0 can at least locally contribute to the metric. So instead of having the global inertial(mass) source -sinε (sectA1) we put the curvature on the local manifold instead. The manifold itself carries the curvature so $R_{ij}=0$ throughout the Mercuron and outside locally.
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

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

(eq. A4-A7 from pp.303 Sokolnikof(8)): Equation A4 is a mere repetition of equation A6. We thus have only three equations on λ and μ to consider. From equations A4, A7 we deduce that λ'=-μ' so that radial λ=-μ+constant =-μ+C where C represents a possible ~constant ambient metric contribution which (allowing us to set sinhμ=0) could be imaginary in the case of the slowly oscillating ambient metric of nearby object B from B2. So $e^{-\mu+C}=e^{\lambda}$. Then A3-A7 can be written as: $e^{-C}e^{\mu}(1+r\mu')=1$. (A9)
Set $e^{\mu}=\gamma$. So $e^{-\lambda}=\gamma e^{-C}$ ε and Δε are time dependent. So integrating this first order equation (equation A9) we get: $\gamma=-2m/r+e^C\equiv e^{\mu}=g_{oo}$ and $e^{-\lambda}=(-2m/r+e^C)e^{-C}=1/g_{rr}$
or $e^{-\lambda}=1/\kappa_{rr}=1/(1-2m'/r)$, $2m/r+e^C=\kappa_{00}$ So from eq B4:

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

$m=e^2/\xi=\varepsilon^2/(\tau+\varepsilon+\Delta\varepsilon)=r_H$ from eq.13a,14 from object B equation eq.B2.

A3) $e^{i(-\varepsilon+\Delta\varepsilon)2}$ component term of eq A10 in the fractal scale bridging condition

These fields on the different fractal scales **are really all the same** field but seen from the different frames of reference motion created by the different fractal 10^{40N}X jump mass eq 1.13 BD contributions of the zitterbewegung frequency oscillation frames of reference of the Newpde. **Bridging these fractal N scales in fig1 is possible for a unified field** if both observers are in the same frame of reference at least along some coordinate direction such as a central force azimuth angle ϕ like in Saturn's rings or galaxy halos.). Thus, consistent with eq.16-19 (our GR derivation) we can have a N=1 fractal scale $\mathbf{g_{oo}=\kappa_{00}}$ in the halo $g_{oo}=1-2GM/(c^2r)=\kappa_{00}=$ rel $e^{i2\Delta\varepsilon/(1-2\varepsilon))}$ $=\cos(2\Delta\varepsilon/(1-2\varepsilon)$ (A10)) implying g_{oo} constants, a (metric) quantization. But a constant $=g_{oo}$ requires an external energy source to create a cylindrical geometry to make it an allowed GR dyadic tensor transformation distortion of a Schwarzschild metric which also is then necessarily a metric quantization jump just like the hydrogen atom quantization transition from a spherical to a 2P quantized state dumbbell geometry requires energy of some type. Therefore for this metric quantization to occur we require a grand canonical ensemble with nonzero chemical potential in a uniform space-time. $\text{rel}\,e^{i2\Delta\varepsilon/(1-2\varepsilon))}=\cos(2\Delta\varepsilon/(1-2\varepsilon))$ (A10a)

Recall for circular motion $GMm/r^2=mv^2/r$ so $GM/r=v^2$ therefore $g_{00}=1-2GM/(c^2r)=1-2(v/c)^2$

$g_{oo}=\kappa_{00}$ Bridging condition

Local (app.A) **Δε** pure state **normalization**: So from eq A1 and A10a: rel $e^{i2\Delta\varepsilon/(1-2\varepsilon))}$ $=\cos(2\Delta\varepsilon/(1-2\varepsilon))=1-(2\Delta\varepsilon/(1-2\varepsilon))^2/2+..$ so $g_{oo}=1-2GM/c^2r=1-2(v/c)^2=\text{Rel }\kappa_{00}=1-(2\Delta\varepsilon/(1-2\varepsilon))^2/2$ so $2\Delta\varepsilon/(1-2\varepsilon))/2=v/c$. So $c2\Delta\varepsilon/(1-2\varepsilon))/2=v=3X10^8(.00058)/((2).88)=$ 98km/sec≈**100km/sec**

ε normalization (app.A, include mixed state ≈Δεε): $g_{oo}=1-2GM/(c^2r)=\text{Rel}\kappa_{oo}=\text{rel}(e^{i[2\Delta\varepsilon+\varepsilon]})=\cos[2\Delta\varepsilon+\varepsilon]=1-[\Delta\varepsilon+\varepsilon]^2/2=1-[(2\Delta\varepsilon+\varepsilon)^2/(\Delta\varepsilon+\varepsilon)]^2/2=1-[(2\Delta\varepsilon^2+\varepsilon^2+2\varepsilon\Delta\varepsilon)/(2\Delta\varepsilon+\varepsilon)]^2$. The $2\Delta\varepsilon^2$ is just the above first Taylor expansion term so just take the mixed state cross term $[\varepsilon2\Delta\varepsilon/(\varepsilon+2\Delta\varepsilon))]=c[2\Delta\varepsilon/(1+\Delta\varepsilon/\varepsilon))]/2=c[2\Delta\varepsilon+\Delta\varepsilon^2/\varepsilon+...2\Delta\varepsilon^{N+1}/\varepsilon^N+.]/2=\Sigma v_N$. Note each term in this expansion is itself a (mixed state) operator $v_N=[2\Delta\varepsilon^{N+1}/(2\varepsilon^N)]c$ A11

As it is in eq.C1 below $(\Delta\varepsilon)^m$ is the operator in $\Delta\varepsilon^m\psi=-\frac{i^m\partial^m}{\partial t^m}\psi_{N=1}=H^m\psi_{N=1}$ so each term in this A11 expansion is an independent QM operator so with independent speed=v eigenvalues relative to COM. From eq. A11 for example **v=m100^{N}km/sec**. m=2,N=1 here (Local arm). In part III we list hundreds of examples of A11 partIII fig4 metric quantization: (sun: 1, 2km/sec, galaxy halos m100km/sec without dark atter.). Given enough energy there is 100 antinodes across the Mercuron.

From equation A11 rebound explosion will be (~100 antinodes =D across the Mercuron) on r_{bb},: see partIII, even so implying a Rayleigh Taylor instability so web like explosion remnants in both such as in M1 and Mercuron circumferencial 320(=πD) giving(in fig4) the initial radius (now at~400MLY) of those 'BAO' cbr web like structures at reionization. On average single galaxys dominate a 4MyLY wide region 100Xsmaller, the next metric quantization down. Globulars next(100X smaller) and stellar neighborhoods next (100Xsmaller) and planets (100Xsmaller), then moons (100Xsmaller) ,etc. So in fig4 A11 gets all the rest! Even supernova rings at high enough resolution (eg beads split at least at 1987a) are ~100 antinodes

r_H=2m component term of eq.A10 (with 13a, eq14, eq.B4) Lamb shift

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

$$\left[\left(\frac{dt}{ds}\sqrt{\kappa_{00}}m_p\right)+m_p\right]F-\hbar c\left(\sqrt{\kappa_{rr}}\frac{d}{dr}+\frac{j+\frac{3}{2}}{r}\right)f=0 \qquad \text{A12}$$

$$\left[\left(\frac{dt}{ds}\sqrt{\kappa_{00}}m_p\right)-m_p\right]f+\hbar c\left(\sqrt{\kappa_{rr}}\frac{d}{dr}-\frac{j-1/2}{r}\right)F=0. \qquad \text{A13}$$

Comparing the flat space-time Dirac equation to the left side terms of equations A12 and A13:

$$(dt/ds)\sqrt{\kappa_{oo}}=(1/\kappa_{00})\sqrt{\kappa_{oo}}=(1/\sqrt{\kappa_{oo}})=\text{Energy}=E \qquad \text{A14}$$

We used the e^C in equation A14 in the above section with r_H from eq14. Note for electron motion around the 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) $PE_e=½e^2/r$. A14a

Write the hydrogen energy and pull out the electron contribution A14a. So in eq.A13 the A10 2m term for free electron equations 13a, 14 $r_H=(1+1+.5)e^2/(m_\tau+m_\mu+m_e)/2=2.5e^2/(2m_pc^2)$ (A15)

Variation δ(ψ*ψ)=0 At $r=n^2a_o$

Next note for the variation in ψ*ψ is equal to zero at maximum ψ*ψ 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. From eq.13a $\xi=\tau+\varepsilon+\Delta\varepsilon=2P$, Total Newpde energy= $\xi/\sqrt{\kappa_{00}}$,(A14); $r_H=e^2/\xi$, $\kappa_{00}=1-r_H/r$. electron energy= $(\tau+\varepsilon+\Delta\varepsilon)/\sqrt{\kappa_{00}}-(\tau+\varepsilon+PE_\kappa+PE_\varepsilon+\Delta\varepsilon)$. Also recall eq 13a, 14: $\xi_1=m_Lc^2=(m_\tau+m_\mu+m_e)c^2=2m_pc^2$ normalizes $½ke^2$ (Thus divide τ+μ by 2 and then multiply the whole line by 2(from eqA10 2m numerator term) to normalize the $m_e/2$ result to get m_ec^2 plus whatever is left over)ε=0 since no muon ε here.): Total Newpde energy= $\xi/\sqrt{\kappa_{00}}$) then from A14, A15: m_e electron Newpde energy in H atom 2S state $=(\tau+\varepsilon+\Delta\varepsilon)/\sqrt{\kappa_{00}}-(\tau+\varepsilon+PE_\kappa+PE_\varepsilon+\Delta\varepsilon)$ =(Taylor expansion)=$E_e=$

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

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

$$=\frac{2m_ec^2}{2}+2\frac{e^2}{4r}-2\frac{3}{8}\left(\frac{2.5}{rm_Lc^2}\right)^2m_Lc^2=m_ec^2+\frac{e^2}{2r}-2\frac{3}{8}\left(\frac{2.5e^2}{rm_Lc^2}\right)^2m_Lc^2 \qquad \text{A16}$$

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. A17

The other 1050Mhz comes from the zitterbewegung cloud.

Note also we have also derived the potential energy of the electron here from first principles in A16

Note: Need infinities if instead using **flat space Dirac 1928 equation**. For flat space $\partial g_{ik}/\partial x^j=\mathbf{0}$ as a limit. Then must take field $g^{km}=1/0=\infty$ to get finite Christoffel symbol $\Gamma^m_{ij}\equiv(g^{km}/2)(\partial g_{ik}/\partial x^j+\partial g_{jk}/\partial x^i-\partial g_{ij}/\partial x^k)=(1/\mathbf{0})(\mathbf{0})$=*un*defined but still implying *non*zero acceleration on the left side of the geodesic equation: $\frac{d^2x^\mu}{ds^2}=-\Gamma^\mu_{\nu\lambda}\frac{dx^\nu}{ds}\frac{dx^\lambda}{ds}$**.** Christofell symbol≡ $\Gamma^\mu_{\nu\lambda}$. So we need infinite fields for flat space. Thus QED requires (many such) infinities. But we have in general curved space $g_{ij}=\kappa_{ij}$ in the New pde so do not require that anything be infinite and yet we still obtain for the third order Taylor expansion term of $\sqrt{\kappa_{\mu\nu}}$ the Lamb shift and anomalous gyromagnetic ratio correction (see below sections B2).

AppendixB

B1 Nearby Object B reduces N=1 Kerr metric frame dragging (so *almost* complete Schwarzschild in our comoving frame) thereby providing the inertial component magnitudes of the κ_{00} and κ_{rr} terms in A10 in the Newpde

Our new (Dirac) pde has spin S=½ and so the self similar fractal ambient N=1 scale Kerr metric

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

where $\rho^2(r,\theta)\equiv r^2+a^2\cos^2\theta$; $\Delta(r)\equiv r^2-2mr+a^2$, $r^{\wedge 2}\equiv r^2+a^2\cos^2\theta$, $r'^2\equiv r^2+a^2$. Slightly inside r_H still a<<r, $\left(\frac{(r^\wedge)^2}{(r')^2-2mr}\right)dr^2+\left(1-\frac{2mr}{(r^\wedge)^2}\right)dt^2+..=\left(\frac{1}{\frac{(r')^2}{(r^\wedge)^2}-\frac{2mr}{(r^\wedge)^2}}\right)dr^2+\left(1-\frac{2mr}{(r^\wedge)^2}\right)dt^2.$

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

$\frac{a^4}{r^4}cos^2\theta - \frac{a^2}{r^2}cos^2\theta + \frac{a^2}{r^2} + .. \approx 1 + \frac{a^2}{r^2}(1 - cos^2\theta) + . = 1 + \frac{a^2}{r^2}sin^2\theta + .. \equiv 1 + \left(\frac{a}{r}\right)^2 u^2 =$
$\left(\text{our } N = 1 \text{ mass} = \frac{C_M}{\delta z \delta z} \text{and the zitterbewegung}\right) = 1 + 2(\varepsilon + \Delta\varepsilon) + ..$ (B2)

in $\kappa_{rr} = e^{(-\varepsilon+\Delta\varepsilon)2} + 2m/r$ (B3)

Note in B1 those ambient metric **perturbation rotations** (dθdt T violation so (given CPT) thereby **CP violation,** dt/ds makes it COM energy dependent) due to cosmological object B caused drop in inertial frame dragging observed inside object A. We are in a rotating Schwarzschild metric (aka a Kerr metric) and so being close to the r_H horizon we notice (mostly) only the Schwarzschild metric(to 1 part in 100,000). But near μ=1 (near the tiny Mercuron radius), far away from the big r_H horizon, the inertial frame is *not* dragged as much due to the nearness of object B as the Webb space telescope discovered (eg., 2/3 galaxies spin clockwise and they formed far away from r_H near where the Mercuron was.).

But to have our $\kappa_{00}=1/\kappa_{rr}$ eq.19 near flat condition and Dirac eq. requirement, so 4D (with eq5 as the limit)of section IIa fig3 we must equate 1/(eq B3) to A10: $\kappa_{00}=e^C-2m/r=e^{i(-\varepsilon+\Delta\varepsilon)2}-2m/r$

If ε normalized out this is from eq.A1: $\sqrt{\kappa_{rr}} = 1/\sqrt{(1+2\Delta\varepsilon/(1+\varepsilon))}$ B4

The $2m/\rho^2$ in B1 just sets the eq.14 value of that otherwise unknown 2m in eq.A10.

B2 Applications eg., use ε normalized eq B4 $\sqrt{\kappa_{rr}} = 1/\sqrt{(1+2\Delta\varepsilon/(1+\varepsilon))}$

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 B6 with κ_{rr} from B4. 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+Δgy) B7

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

Thus solve eq. B6 with Eq.13a,14 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 B4:

[√(1+2X.0002826)](3/2 + ½)= 3/2 + ½(1+Δgy). 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=$\pi^{\pm}$) partII case 1

Composite 3e CASE 1: Plus $+r_H$, therefore is the proton + charge component. Eq.19: $1/\kappa_{rr} = 1+r_H/r_H + \varepsilon'' = 2+\varepsilon''$. ε" =.08 (eq.9.22). Thus from eq.B6 $\sqrt{2+\varepsilon''}$(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 B5 and case 1 eq.19 $1/\kappa_{rr} = 1 - r_H/r_H + \varepsilon"$

$\sqrt{\varepsilon"}$ (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.

Appendix C Object C added perturbation of δz in eq.16 (gives us the well known electroweak model (SM), eg appendix C7)

Review of eq16

min of $\delta ds^2=0$ given eq.7 constraint dr+dt=ds (with θ measured from the horizontal 'dr' axis) implies the graphical representation (note 45°) in fig4 and fig5 below. For the N=0 tiny observable C=δz>>δzδz from eq.3 so |δz|>>1/4 over many orders of magnitude that even the highest energy cosmic rays(eg ~10^{22}ev) don't bridge so that $\delta ds^2=0$ still holds. Also recall from section 1that the required N=0 tiny C≈δz' must automatically be a δz' perturbation of the observer N=1 eq.7 as in **δ**z'+δz= $(dx_1+idx_2)+(dx_3+idx_4)$≡ dr+idt. But given this δz≈dr≈dt constant ds at 45° we must add and subtract δz' (dr-δz')+(dt+δz')≡dr'+dt'=ds (16)

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

So large rotation angle δδz/ds in eq.5 can then be those large axis' ds extreme thus rotation through the ±45° min ds and so two possible 45° rotations so through a total of two quadrants for ±δz' in eq.16 (a single δz just gives e,*ν* eq.7-9 back). Typical rotation from axis to axis (SM) is through two diagonals thus constituting a *derivative of a derivative* giving us Bosonic field theory (eg C7). Object C is a much smaller perturbation (C7) of object A but its higher ranked tensor more than mere transverse motion Lorentz transformations, using the entire 4X4 Lorentz transformation matrix. QM Hamiltonian operator(object B's simple transverse Lorentz transformation acts like a scalar operator, merely multiplying by 1/γ) still makes 3 of these Bosons (W^-,W^+,Z_o) make nontrivial physical contributions to the Fermi G. So there are the object A,B leptonic components of the Hamiltonian that give e,*ν* and 2*ν*=γ and these new object C Bosonic components of the Hamiltonian that give the W and Z.

These rotations are

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

Note in fig.3 dr/dt is also a rotation and so has an eq.11 rotation operator observable θ. Thus from equation 11 for (θ) angle rotations $\theta\delta z \equiv (dr/ds)\delta z = -i\partial(\delta z)/\partial r$ for the first 45°rotation. So we got through one Newpde derivative for each 45° rotation. For the next 45° rotation in fig.4 it is then a second derivative $\theta\theta\delta z' = e^{i\theta p}e^{i\theta'}\delta z = e^{i(\theta p+\theta)}\delta z = (dr/ds)((dr/ds)dr') = -i\partial(-i\partial(dr'))/\partial r)\partial r = -\partial^2(dr')/\partial r^2$ large angle rotation in figure 3 and eq.A11. 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)

Recall also sect.2 min of $\delta ds^2=0$ given eq.7 constraint dr+dt=ds (with θ measured from the horizontal 'dr' axis) with it's graphical representation (of 45°) then in fig4 and fig5 below.

So after two consecutive 45° rotations we are the axis again where the wave is, not at diagonal 45° where the lepton e and *ν* are.

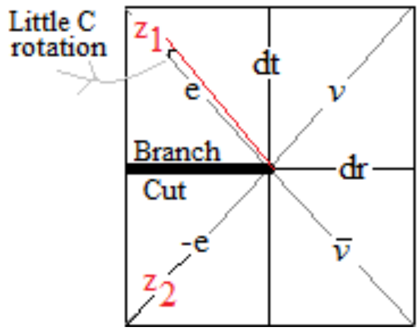


fig.4. for **45°-45°** So two body (e,ν) singlet ΔS=**½-½** =0 component so pairing interaction 4axis (sect.4.5).Also ortho ΔS=½+½=1 making 2 body (at $r=r_H$) S=1 Bosons and so a field theory. Note we also get these Laplacians characteristic of the Boson field equations by those 45°+45° rotations so 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 16

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

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

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

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

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

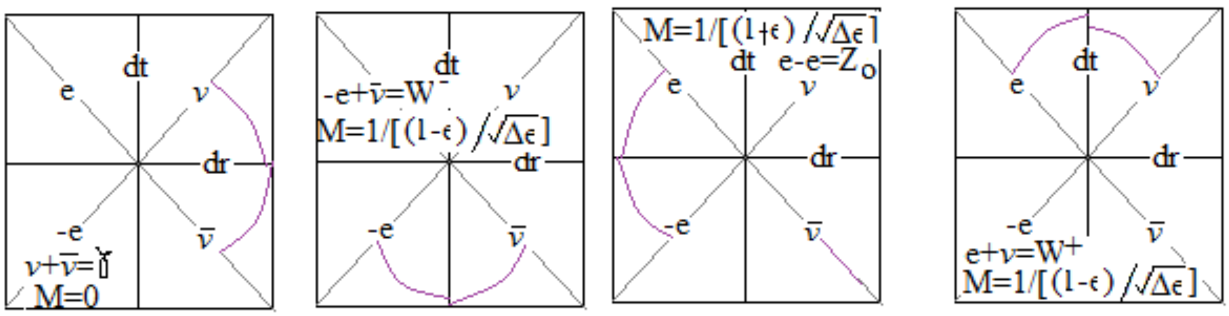


Fig5

Fig.4 applies to eq.9 **45°+45°**=90° case: **Bosons.**

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

C4 Quadrants IV$\rightarrow$I rotation eq.C2 $(dr^2+dt^2+..)e^{\text{quaternion A}}$ =rotated through C_M in eq.16. example C_M in eq.C1 is a 90° CCW rotation from 45° through ν and anti ν

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

Pretending we have a only two i,j quaternions but still use the quaternion rules we first do the r derivative: From eq. C1 $dr^2\delta z=(\partial^2/\partial r^2)(\exp(iA_r+jA_o))=(\partial/\partial r[(i\partial A_r\partial r+\partial A_o/\partial r)(\exp(iA_r+jA_o)]$ $=\partial/\partial r[(\partial/\partial r)iA_r+(\partial/\partial r)jA_o)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+$ $(i\partial^2 Ar/\partial r^2+j\partial^2 A_o/\partial r^2)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r][i\partial A_r/\partial r+j\partial/\partial r(A_o)]\exp(iA_r+jA_o)$ (A3)

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

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

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

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

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)

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

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

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

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

Geodesics for eq. C7

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

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

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

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

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

$g''_{\alpha\alpha}\equiv g'_{\alpha\alpha}/2$ for large and near constant v, see eq. 14 also. In the weak field $g^{ii}\approx 1$. Note e=0 for the photon so it is not deflected by these geodesics whereas a gravity field does deflect them. The photon moves in a straight line through a electric or magnetic field. Also use the total differential $\dfrac{\partial g_{11}}{\partial x^\alpha}dx^\alpha = dg_{11}$ so that using the chain rule gives us:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

917(ε/(1+ε))= Z_0, 80 Gev Proca spin1

917(ε/(1-ε))= W±, 91 Gev;   "   "

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

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

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

Outside r_H

Pion Shrink: 917π Klein Gordon spin 0

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

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

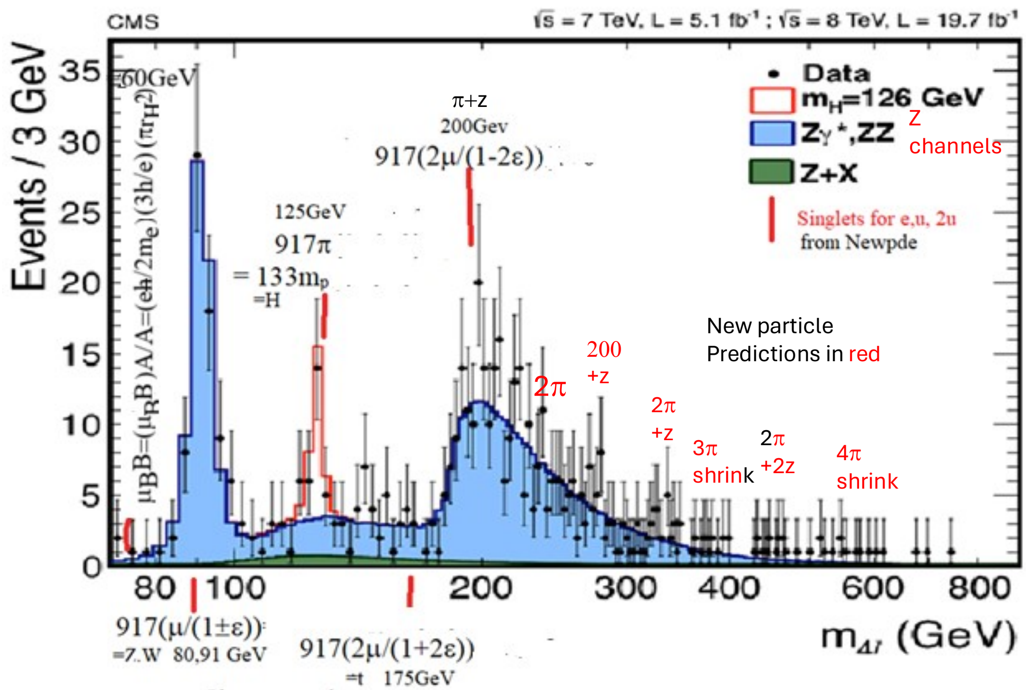


fig6

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

Ist→IInd quadrant rotation is the W+ at **$r=r_H$**. Do similar math to C2-C7 math and get instead a Proca equation The limit ε→1=τ (D13) in ξ_1 at $r=r_H$ since Hund's rule implies $\mu=\varepsilon=1S_{½} \leq 2S_{½}=\tau=1$. 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. Recall that Δε=.00058. If contracted to $r=r_H$ by this singlet state contraction then for the two ±leptons (10^{-18}m). From eq.B10: 2μγ(1/(1±ε))=2μ917(1/(1±ε))=

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

to Ist quadrant rotation Proca equation showed us. $Z_0 or\ W=85\frac{1}{1\pm\varepsilon}$negative ε means charged. Positive ε is neutral as shown in case1 and case 2 of ch.8 partII..

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

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

The fractal implications are that we are inside a cosmological positron inside a proton $2P_{3/2}$ state 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 $(a/r)^2=m_ec^2$ (B2) result used in eq.A4. 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 $\iiint_0^{r_H}\psi_1\psi_2\psi_3\psi_4 dV=2G\iiint_0^{r_H}\psi_1\psi_2\frac{1}{V^{1/2}}\frac{1}{V^{1/2}}V$
$\equiv\iiint_0^{r_H}\psi_1\psi_2 G\equiv\iiint_0^{r_H}\psi_1\psi_2(2m_ec^2)dV_{rH}=\iiint_0^{V_{rH}}\psi_1(2m_ec^2)\psi_2 dV_{r_H}$ (A8)

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

$$\Sigma((\gamma^\mu\sqrt{\kappa_{\mu\mu}}dx_\mu)-i\kappa)(\gamma^\nu\sqrt{\kappa_{\nu\nu}}dx_\nu+i\kappa)\chi=\Sigma((\gamma^\mu\sqrt{\kappa_{\mu\mu}}dx_\mu)-i\kappa)\psi \text{ so } \tfrac{1}{2}(1\pm\gamma^5)\psi=\chi. \quad (C9)$$

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+iγ^5)= k(.225+i$\gamma^5$0.974) =k(cos13°+iγ^5sin13°) **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 B2 m_ec^2 =Δε is the energy gap for object B vibrational stable eigenstates of composite 3e (vibrational perturbation r is the only variable in Frobenius solution, partII Ch.8,9,10) proton. Object B puts out (from our frame of reference) a simple transverse Lorentz transformation from the LOS, a scalar effect really. In contrast object C is not moving transverse so uses the entire Lorentz transformation matrix, is a more complicated tensor effect, so not necessarily just a repeated E&M. Observor in objectA. Δm_ec^2 gap=object C scissors eigenstates. is what we see at object A but Δm_ec^2 gets boosted by γ by rotation into the object B direction.(to compare with the object B m_ec^2 gap).

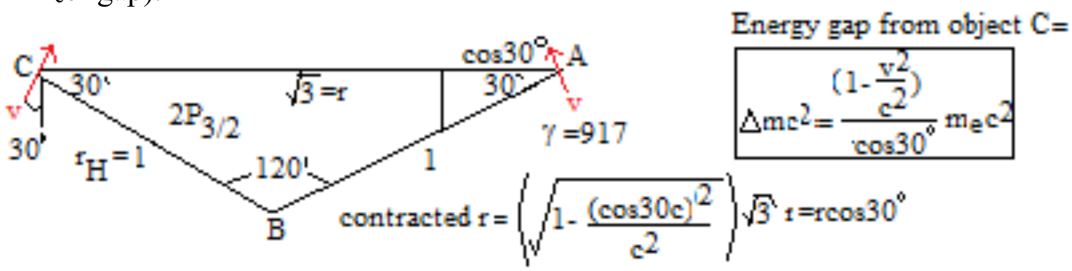


fig7

From fig 7 $r^2=1^2+1^2+2(1)(1)\cos 120°=3$, so r=√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/γ=1/γ so for Fitzgerald contracted x=1 for AB (fig7). We can start at t=0 with the usual Lorentz transformation for the time component.

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

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

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

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

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

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

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

$\frac{k\gamma\Delta m_e c^2}{k m_e c^2} = \frac{\gamma\beta\left(\frac{x}{\gamma}\right)}{\gamma\beta r_{CA}} = \frac{1\beta 1}{\gamma\beta cos30°} = \frac{1}{\gamma cos30°}$ so

$$\Delta m_e c^2 = \frac{\beta m_e c^2}{\beta cos30°°\gamma^2} = \frac{\left(1-\frac{v^2}{c^2}\right)m_e c^2}{cos30°} \qquad (C10)$$

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 $\Delta E= (m_e c^2/((cos30°)917^2) = m_e c^2/728000$. So the energy gap caused by object C is $\Delta E=(m_e c^2/((cos30°)917^2) = m_e c^2/728000$. The weak interaction thereby provides the ΔE perturbation (∫ψ*ΔEψdV) inside of r_H creating those Frobenius series (partII) r≠0 states, for example in the unstable equilibrium $2P_{1/2}$ electrons m_e. so in the context of those e,ν rotations giving W and Z_o.. The G can be written for E&M decay as $(2mc^2)XVr_H= 2mc^2 [(4/3)\pi r_H^3]$. But object C Hamiltonian is a higher ranked tensor then (uniform scalar object Bs) so because this added object C rotational motion is eq.A9 Fermi 4 point it is entirely different than a mere 'weak' E&M. So for weak decay from equation A8 it is $G_F= (2m_e c^2/728,000)Vr_H=$**$G_F$** $=1.4X10^{-62}$ J-m^3 =.9X10^{-4} MeV-F^3 **the strength of the Fermi 4pt weak interaction constant** which is the coupling constant for the Fermi 4 point weak interaction integral. Note $2m_e c^2/729,000=1.19X10^{-19}$J. So $\Delta E=1.19X10^{-19}/1.6X10^{-19}=.7$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 (∫ψ*ΔHψdV) 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 (C8 and our direction of motion here) whereas that Kerr metric $(a/r)^2$ term (B2) in general is isotropic and homogenous and so only effects the electron mass.

C8 NONhomogeneous and NONisotropic Space-Time

Recall 2D N=1 and that 2D N=0 (perturbation) orientations are not creatable so we have 2D+2D=4D degrees of freedom. But this is all still embedded in the same complex (2D) plane. So this theory is still complex 2D Z then. Recall the $\kappa_{\mu\nu} = g_{\mu\nu}$ metrics (and so R_{ij} and R) were generated in section 1.
In that regard for 2D for a homogenous and isotropic g_{ij} we have identically $R_{\mu\mu}-½g_{\mu\mu}R= 0$ ≡source $=G_{oo}$ since in 2D $R_{\mu\mu}=½g_{\mu\mu}R$ identically (Weinberg, pp.394) with μ=0, 1... Note the 0 (=E_{total} the energy density source) and we have thereby proven the existence of a net zero energy density vacuum. Thus our 2D **theory implies the vacuum is really a vacuum!** It is then the result of the fractal and 2D nature of space time!
A ultrarelativistic electron is essentially a transverse wave 2D object (eg., the $2P_{1/2}$ electron in the neutron). In a isotropic homogenous space time $G_{oo}=0$. Also from sect.2 eqs. 7 and 8 (9) occupy the same complex 2D plane. So eqs. 7 and 8 is $G_{oo}=E_e+\sigma\bullet p_r=0$ so $E_e=-\sigma\bullet p_r$
So given the negative sign in the above relation the **neutrino chirality is left handed.**
But if the space time is not isotropic and homogenous then G_{oo} is not zero and so the **neutrino gains mass** (These two ν masses cancel out in the IV→I rotation of C4 γ)

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

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

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

Appendix M (for underlying math)

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

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

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

Recall from section 1 that adding the N=0 fractal scale 2D δz perturbation to N=1 eq.7 2D gives curved space 4D. So $(dx_1+idx_2)+(dx_3+idx_4)\equiv dr+idt$ given (eqs5,7a) $dr^2-dt^2=(\gamma^r dr+i\gamma^t dt)^2$ *if* $dr^2\equiv dx^2+dy^2+dz^2$ (3D orthogonality) so that $\gamma^r dr\equiv\gamma^x dx+\gamma^y dy+\gamma^z dz$, $\gamma^j\gamma^i+\gamma^j\gamma^i=0$, $i\neq j$,$(\gamma^i)^2=1$, rewritten (with curved space $\kappa_{\mu\nu}$ eq.14-17)

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

But there are alternatives to this 3D orthogonalization method. For example satisfying this 4D Clifford algebra and complex orthogonalization requirement is a special case of any 2 x_ix_j in eq.3 (directly from postulate1): Imposing orthogonality thereby creates 6 pairs of eqs.3&5. So each particle carries around it's own dr+idt complex coordinates with them on their world lines. Alternatively this 2D dr+idt is a 'hologram' 'illuminated' by a modulated $dr^2+dt^2=ds^2$ 'circle' wave (as 2nd derivative wave equation operators from eq.11 circle) since 4Degrees of freedom are imbedded on a 2D (dr,dt) surface here, with observed coherent superposition output as eq.16 solutions. A more direct way is to simply write the 4Degrees of freedom on the 2D surface as $dr+idt=(dr_1+idt_1)+(dr_2+idt_2)=(dr_1,\omega dt_2),(dr_2,idt_2)=(x,y,z,idt)$ where $\omega dt\equiv dz$ is the z direction spin½ component ω (angular velocity) axial vector of the Newpde lepton (eqs.7-9); which we get anyway from lepton equation Newpde. Also see M5.

M3) One simple **Math axiom,** postulate(**0**), replaces the hundreds of usual math axioms:
All math is done in ***One line*** **instead of hundreds of lines**
simply by *defining* symbols as number lists (instead of axioms), thereby *making the symbols and numbers the same thing* allowing you to then discard the axiom part. The surprising result is that

the long list of ring and field axioms are thereby replaced by one simple **axiom** postulateo. In the Mercuron (section sect appendixA, IIIb and appendix A1) N**e** is one to one with E=Nhf countability N from Wien's law. Note that even the proton is 3**e** (See partII). The eq.11 real eigenvalue numbers N of electrons e are the numbers in those "lists" in appendix M4 below.

M4) Origin of math: postulate0: z=zz+C implies real0. (C is a constant)

But in order to use postulate 0 we must define its components: z=zz, C, 0, "real" and z=zz+C.
. Thus use the **"list number-define symbol" method *defining***

1) Define Addition: = and + sign merely renames numbers: Thus rename 1+1 as 2, also called addition.

List all numbers such as 1+1=2 *defining symbol* a+b=c. Addition needed for adding+ C.

Subtraction (eg $\delta C=0\equiv C+(-C)$)is another type of addition as is multiplication:2X2≡(1+1)+(1+1)

2)Define Multiplication (addition with parenthesis) Needed for zz.

Defining multiplicative properties of parenthesis' with "list number-define symbol" method.

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

List all *numbers* such as 0X(1X0)=(0X1)X0 and 1+(1+1) =(1+1)+1] *defining symbols* aX(bXc)=(aXb)Xc and a+(b+c)=(a+b)+c multiplicative and additive **associativity** respectively. So we can now use these two laws as well. Use multiplication to define division(ab=c so c/a≡b).

3)Define z=zz+C: "**List 1=1X1** and 1=1+0 **defines z=zz+C** " (eq1). (C Constant so $\delta C=0$) given that this list implies a hybrid list (so made by *combining* 1=1X1 with 1=1+0):

1=1X1: 1=1X(**1+0**) = 1X1+1X0 so 1X0=0 which we then plug (consecutively) into 1=1X1:1=(**1+0**)X(**1+0**) =1X1+1X0+0X1+0X0 using the distributive law we defined earlier. So since 1X0=0=0X1 then 0X0=0 with this hybrid list so z=zz does provide the multiplicative properties of 0 since our hybrid method additionally gave us 1X0=0, 0X0=0, completing our multiplicative properties of zero.

4)Define subtraction (use *List* 0-0=0,1-1=0 *defines* symbol $C_1-C_2=\delta C=0$ (in postulate0) introducing the negative sign and **subtraction.** Thereby renaming 1+1≡2=C, thus giving large C_i thereby *defining* symbol $C_1-C_2\equiv\delta C=0$ for large C as well applies even for a decimal because C can then always still be an integer in some unit system for some scaling (eg., decimal 1.1km =1100m integer.)

5) Real 0

This resulting huge hybrid list coming out of that simple eq1 containing the multiplicative properties of 0 implies the (amazing opportunity here of succinctly) deriving ring-field math (*without* its many axioms) from the mere postulate of **0**:

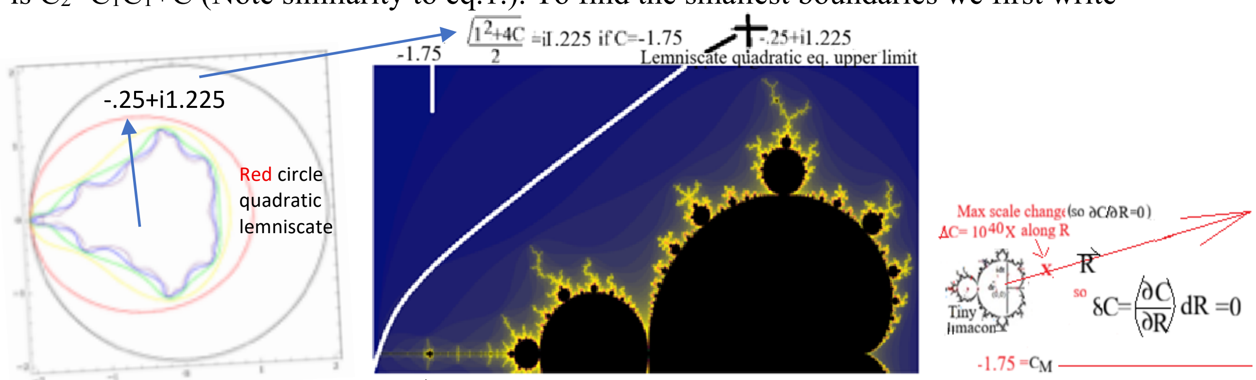
Axiom: z=zz+C implies real0 (C is constant so $\delta C=0$)

(Recall z=zz+C *defined* by that simple list 1=1X1, 1=1+0 needed to get the multiplicative properties of 0) by also *defining* a real number as the (well known) "limit of a Cauchy *sequence* of rational numbers. This *sequence* thereby generates the eq1 *iteration* $z_{N+1}-z_Nz_N=C=$ **-¼**,-3/16, -55/256 ,..**0** at one of the two required C solutions, C=**-¼** (since only (-1.75, -**¼**) solve $\delta C=0$**)** to $\delta C=0$ thereby proving that 0 is a real number using our single axiom on this tiny set C containing only these two points. Note C does not exactly equal -¼ in the eq4 inequality C<-¼ thereby causing that dr→0 limit in eq11. So Real numbers larger than 0 come from the eq.11 Newton quotient limit real eigenvalues of operators dr/ds on the Newpde eigenfunctions. Therefore "z=zz+C implies real0" *with* $\delta C=0$ implies "z=zz+C implies realC (M1)

Note also our postulate of 0 with that eq1 also defines the important mathematical concepts of "Completeness" (min(zz-z)>0) (1/16-(-¼)=5/16) for the domain of (-1.75,- ¼) and "choice" (since the single choice function is z=zz+C) which are then NOT postulates(axioms) anymore.

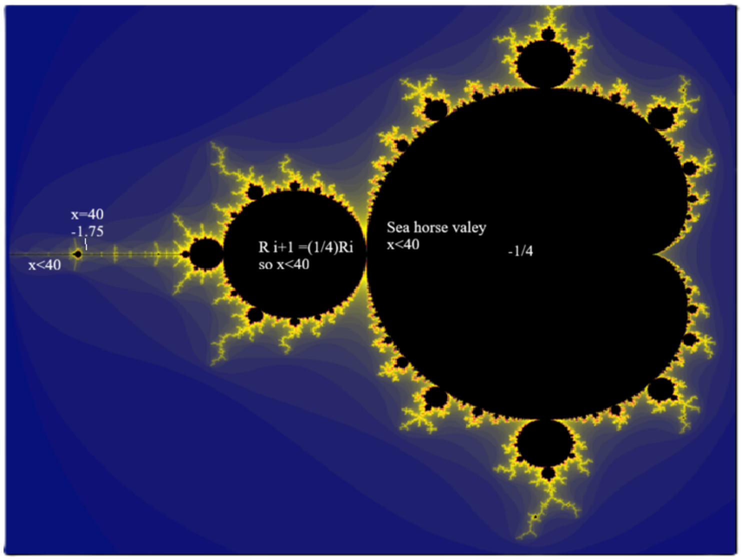
M5 Lemniscates required in dr,dt zoom: http://www.youtube.com/watch?v=0jGaio87u3A
The fig1 Lemniscate (as a function of adding continuous circles left fig8) is continuous(13) (horizontal snowman like figure) only along dr. So these δz fields of real numbers allow us to define the general case of ε, δ arbitrarily small(and not just snippets) in the limit definition of the Newton quotient derivative=$\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}=\frac{df(x)}{dx}$ so we can write $\delta C\equiv\left(\frac{\partial C}{\partial r}\right)dr=0$ thus **implying the requirement that C really is a constant** (ie ∂C/∂R=0) as the postulate demands. So to define δC=0 we *must* pull *only* the lemniscates (that look like those reclining snowmen of fig1) out of the zoom thereby **causing this zoom process to give us mathematically rigorous results!** By zooming at C_M=-1.75 we **observe** fractal 10^{40N}X scale jumps allowing lemniscate rotation (back to that N=1 orientation) and so not effecting that continuity of this lemniscate structure. So one 10^{40}X zoom is enough.

To find **the -1.75 lower boundary from these lemniscate iterations** reverse engineer on N=1 the lemniscates down to the second circle iteration where the 2^{nd}circle C_n is not $0=C_o$ creating our fundamental lemniscate quadratic equation border containing point (-.25, i1.225) on that 1^{st} extremum upper boundary. We must use that quadratic equation for that boundary because it is just as fundamental as eqs.1 & 3 are and so also has its own solutions like they do. We could have even postulated this circle equation instead of equation 1. Recall the lemniscate iteration(11) sequence is $C_{N+1}=C_NC_N+C$. $C=C_1=dr^2+dt^2$, $C_0=0$. So that quadratic circle equation is $C_2=C_1C_1+C$ (Note similarity to eq.1.). To find the smallest boundaries we first write



. lemniscate sequence ↑tiny limacon -¼ real extreme 2^{nd} extreme at X fig8

So extreme (-1.75,-¼) solve realδC=0. So we can only zoom at those two points. For example for the 2^{nd} extreme (for ∂C/∂R=0) at X=-1.75 zoom along some lemniscate radial R direction near dr axis (tiny limacon) filament http://www.youtube.com/watch?v=0jGaio87u3A (right fig8) to get the extreme maxima $10^{40N}XC_M$ scaling. In contrast the zoom at –¼ gets the useless continuum. Alternatively to the above analytical solution, we note by inspection of the real axis of the Mandelbrot set (http)that the extremum x=40 (in $C=C_M10^{40N}$) really is at r=-1.75 below:



$\delta C=(\partial C/\partial R)dR=0=d(C_M 10^{xN})$. $C=C_M$ is the postulated constant C. Along the real dr line $x<40$ except at $R=-1.75$, $x=40$. So lower bund $R=-1.75$, upper bound $R=-1/4$ fig9