## Postulate 1

*Abstract: Modern fundamental physics theories such as the Standard Model (SM) contain many assumptions. So where do all these assumptions come from? This is not real understanding. It is curve fitting. So why bother? This theory in contrast has only one* real *simple postulate:*
***Postulate 1*** *So there* is *reason to be excited:*
*the 1 in the postulate of* $1 \rightarrow 1 \cup 1 \equiv 1+1$ *natural numbers→rational numbers→ Cauchy sequence* $Z_N$ *of rational numbers*(same as eq.1a,1b)*→ real#1). But eq. 1a,1b also gives eigenvalue math(physics), the reason for the excitement. In that regard eq.1a is iteration* $z_{N+1}=z_Nz_N+C$ *and 1b is* $\delta C=0$ *(eq.1b). Note we solve 1a for noise C in* $\delta C=0$ *(eq.1b) and get* $\delta(z_{N+1}-z_Nz_N)=0$ *implying* $z_{N+1}$ *is finite since ∞−∞ cannot equal 0. Finite* $z_N$ *implies as* $C\rightarrow 0$ *eq.1a turns uniquely into z=zz+C (eq.1) and any initial rational* $z_1$ *between 1 and -1 gives rational* $Z_N=1-z_{N+1}$ *which is that Cauchy sequence* $Z_N$ *with limit 1 we required. So the existence of a Cauchy sequence of rational numbers with limit 1 implies eq.1a,1b (given* $C\rightarrow 0$ *and the eigenvalue equation.). Other possibilities do not contain the eigenvalue equation 2AIA since they do not imply equation2. Finally to get that exciting eigenvalue math plug eq.1 into eq.1b getting Special Relativity(SR) and a* unbroken *degeneracy Clifford algebra (sect.2). Equation1a explicitly defines the Mandelbrot set* $\{C_M\}$ *(since* $z_{N+1}$ *finite) with fractal* $(¼)^M$ *Mandelbulbs and* $(10^{40})^N$ *Xcosmology.* $C_M$ *turns SR into GR and* breaks *that 2D degeneracy into a* ***4D*** *Clifford algebra of Mandelbulbleptons(eq.9) and associated triplets and singlets (i.e., the SM Bosons, sect.4).*
*That* **4D** *implies we got not more and not less than the physical universe. Also given the fractalness, astronomers are observing from the inside of what particle physicists are studying from the outside, that ONE thing (eq.9) we postulated. So by knowing essentially nothing (i.e.,ONE) you know everything! We finally do understand.*

### Table of Contents $1\cup 1$



### Introduction

We postulate real 1. This is the only postulate since the 1 in the postulate of 1 generates the $1\cup 1\equiv 1+1$ list-define natural number algebra (appendix C) underpinning of rational numbers. **We define the real number 1 in the postulate of 1** from a Cauchy sequence of these rational numbers (Cantor) defined from iteration $\mathbf{z_{N+1}=z_Nz_N+C}$ **(eq.1a),** $\mathbf{\delta C=0}$ **(eq.1b).**
In that regard solve eq.1a for noise C and substitute it in $\delta C=0$ (eq.1b) and get $\delta(z_{N+1}-z_Nz_N)=0$ implying $z_N$ is finite since ∞−∞ cannot equal 0. Finite $z_N$ implies as $C\rightarrow 0$ eq.1a turns uniquely into **z=zz+C (eq.1)** and any initial rational $z_1$ between 1 and -1 gives rational $Z_N=1-z_{N+1}$ which is that Cauchy sequence $Z_N$ with limit 1 we required. So the existence of a Cauchy sequence of rational numbers with limit 1 implies eq.1a,1b (given $C\rightarrow 0$ and the eigenvalue equation.). Other possibilities do not contain the eigenvalue equation 2AIA since they do not imply equation2.

## Section 1 Rewrite equation 1 in z=1+δz form

(Define $z\equiv z'+\delta z$, $z'\equiv 1$, $\delta z\equiv C$) So first rewrite eq.1:

$$z'+\delta z=(z'+\delta z)(z'+\delta z)+C,$$

So $1+\delta z=(1+\delta z)(1+\delta z)+C$ and rearranging

$1+\delta z=1+2\delta z+\delta z\delta z+C$ and canceling

$$\delta z\delta z+\delta z+C=0 \quad (1.1)$$

Equation 1.1 is a quadratic equation with in-general complex 2D solution (eg., if large noise C)

$$\delta z=dr+idt \quad (1.2)$$

or $\delta z=dr-idt$ for all orthogonal (90°, ⊥) dr and dt and so arbitrary dx⊥dy (eg., $\delta z=dx+idy$) (1.3)
with speed coefficient c in cdt≡dt explicitly a constant here given variation only over t (1.4)
Equation 1.2 from 1.1 constitutes the derivation of space and time (in the context of eq. 2A).

## Section 2 Small C. Solve for z

Solve eq.1 for C, plug into eq.1b and factor the result to **solve for z.** By plugging the small C in equation 1 back into δC=0 (eq.1b) we get $0=\delta C=\delta(\delta z+\delta z\delta z)$ and we have

$$\delta(\delta z\delta z)=\delta[(dr+idt)(dr+idt)]=0 \quad (2)$$

the equivalent of eq. 1a,1b. Note to 'solve for z (=1+δz) we must solve for the (linear dr±dt) factors.

### 2.1 Factoring Eq. 2 'solves for z'

$$\delta(\delta z\delta z)=\delta[(dr+idt)(dr+idt)]=\delta(dr^2+i(drdt+dtdr)-dt^2)=0 \quad (2)$$

The Imaginary part of eq.2 is from the (eq.2) generic $\delta(drdt+dtdr)=0$ (2B)
If the dr,dt are +integers (see sect.4.2) then drdt+dtdr=0 is a minimum. Alternatively if dr is negative then drdt+dtdr=0 is again a maximum for dr-dt solutions. So all dr,dt cases imply invariant $drdt+dtdr=0$ (2B1)
Note in general if dr≠dt then 2B1 holds. Next **factor** the real part of eq.2 to get
$\delta(dr^2-dt^2)=\delta[(dr+dt)(dr-dt)]=ds^2=[[\delta(dr+dt)](dr-dt)]+[(dr+dt)[\delta(dr-dt)]]=0.$ (2A)
dt and dr are the variables here so the natural unit coefficient 1=c in $dr^2-(1)^2dt^2=ds^2$ is invariant along with the $ds^2$ from eq.2A. . So we have derived the two postulates of special relativity, the invariance of ds and constancy of c in the Minkowski metric.. (The later sect.4 second solution $C_M$ just rotates $dr\rightarrow dr'\equiv dr-C_M$, $dt\rightarrow dt'\equiv dt+C_M$ making the form of 2A unchanged and giving GR). So after **factoring** eq.2A then eq.2A is satisfied by:

2AI $\delta(dr+dt)=0;\ \delta(dr-dt)=0.$ +e,-e two simultaneous objects, 2D⊕2D, 1∪1, eq.9
2A11A $\delta(dr+dt)=0,\ dr+dt=0$ pinned to the $dr^2=dt^2$ light cone. ν
2AIIB $\delta(dr-dt)=0,\ dr-dt=0$ " " (note also dichotomic with 2AI) anti ν
2AIII dr-dt=0, dr+dt=0 so dt=0,dr=0, no ds so eigenvalues=0, vacuum:the default **$C_M$=0 solution**
So if the variation(dx+dy)=0 i.e., δ(dx+dy)=0, then dx+dy=ds=invariant. So for invariant ds:
2AIA $dr^2+dt^2=ds^2$ (so $\delta z=dse^{i\theta}$) $ds^2$ is a min at 45° (so extremum $\delta z=dse^{i\theta/2}$) and drdt is a max since 2AI dr+dt is invariant.
2AIIA dr+dt=ds, dr+dt=0
2AIIB dr-dt=ds, dr-dt =0
2AI **dr+dt=ds, dr-dt=ds**; So there are *two* simultaneous 2AIs for every eq.1.1 for 2AI. So we must write eq.1.1 as an average in the case of eq.2AI. For our positive dr&dt need 1st and 4th quadrants (given 2AIA;45°) so $dr\approx dr_1\approx dr_2$, $dt\approx dt_1\approx -dt_2$. So for average eq.1.1 $\delta z=dr+idt\approx (dr_1+dr_2)/2+i(dt_1-(-dt_2))/2\equiv(dx_1+dx_2)_{2AI}+i(dx_3+dx_4)_{2AI})\equiv ds_{rt}+ids_{tr}$. So given eqs.1.2 and 2AI we have then the **2D *un*broken** degeneracy $\delta z=dr'+dt'=ds_{rt}+ds_{tr}\equiv(dx_1+dx_2+dx_3+dx_4)=ds$. (2C)
and the **dr+dt** solutions for δz and so **z**.

## Section 3 Eigenvalues of z formalism from equation 1b and 2AIA

Note also some invariant C exists from eq.1b (introduction). Note also C is a uncertainty so all numbers are finite precision here so can be multiplied by a large enough number (appendix A) to become integers so will then not require new axioms (postulates). Recall also from eq.1: zz=z-C = z+zδz=z-C. So $\delta zz=C$ (3.1)

Also eq.1 zz+C=z and from equation 2AIA rotation at $\theta_o=45°$ implies $\delta z=dse^{i45°+\Delta\theta°}$. In eq.3.1 δzz=C we then move the $e^{i45°}$ from the δz to z and then redefine z≈1(≡s') as z" so the equality

$\delta zz=C\equiv\delta z_M z''$ (3.2)

remains. So for this new z", $\delta z_M z''=C$. $\delta z_M$ is a constant in eq. 3.2 so z" rotates with noise C dichotomically in the complex plane as $z''\equiv 1e^{i(45°+\Delta\theta)}=1e^{i(\theta o+\Delta\theta)}$ (3.3)

From 2AIA $ds^2=dr^2+dt^2$ and so we have a circle: $dz=dse^{i\theta}$. θ=kr+wt.

dz'z'=C. So dsz'=C. Can multiply by both sides by ds and eq.2AIA implies $ds^2z'=Cds$ and the $ds^2$ are still diagonalized as $(dr^2+dt^2)dz'$ . Cross terms drdt let us say are not allowed or the invariance ds fails with this new eq.3.1 method. So $ds^3z'=C$ is not allowed. All we are allowed then is dsz'=C and $ds^2z'=C$ were s'≈ 1>ds given 2AIA. So we can substitute 1(cosθ)≡t, 1(sinθ)≡r>>dr into:

$$z''\equiv 1e^{i\theta}\equiv e^{i(\theta o+\Delta\theta)}\equiv s'e^{i((\cos\theta dt+\sin\theta dr)/s))+\theta o)}\equiv s'e^{i(\omega t+kr+\theta o)} \quad (3.4)$$

In the exponent of eq.3.4 1sinθ=r, k≡dr/s so ikz"=∂z"/∂r so

$$kz''=-i\partial z''/\partial r=(dr/s)z''=p_rz'' \quad (3.5)$$

defines our 'operator' and is the reason for factoring in sect.1. So for simultaneous 2AI+2AI coming out of our **eigenvalue generator** δC=0 (gave 2AI) and 2AIA (gave eq.3.5) we define the number 2 from **operator 2z"**≡ (1∪1)z"≡(2AI+2AI)z"≡((dr+dt)+(dr-dt)/s))z"≡-i2∂z"/∂r (3.6) =(integer)k)z" (or alternatively subtract to get (integer)ωz"). Also eq.3.6 implies $((dr+dt)^2/ds^2))z'' \equiv \partial^2z''/\partial r^2+\partial^2z''/\partial t^2)$ given 2B1 gets rid of the drdt cross terms. But $ds^3$ does not give integer eigenvalues needed for list-define math. So from eq.3.6 we obtain the eigenvalue of **z=0,1** (3.7 and 1+1. So eq.3.6 defines the finite +integer *list*(i.e.,1∪1≡1+1≡2)--*define*(i.e.,A+B=C) math *required for* the algebraic rules underpinning eq.1 *without* any added postulates (axioms). That Clifford algebra cross term generation (with $C_M<0$) requires we define larger numbers than 2 with this math and also implies a 130° dichotomic rotation, sect.4.3).

The integer k and ω integer changes KΔω are due to Frobenius series termination jumps in the eq.9 solutions (Ch.9) of finite countable N without resorting to ad hoc SHM. So ΔE ≡KΔω≡ħNΔω (rename Δω→ω) and thereby subdivide all of physical reality: $E_{universe}=\Sigma_i\hbar\omega_i$. Also 2AI 45° diagonal (large noise C so 'wide slit') is a *particle* eg.,2AI. On dr axis (small C, so 'narrow slit') the 2AIA *wave* equations dominate implying wave-particle duality. So given **eigenvalue generators** eq.2AIA, or equivalently eq.3.6 operator formalism and eq.9 (sect.3) we have derived quantum mechanics from first principles.

## Section 4. Large C

Instead of solving eq.1 and eq.1b ds=√2ds=dr±dt (eq.2AI, 2AII,2AIA) as in section 2 we solve the general case of eq.1a, 1b which thereby imply the Mandelbrot set $\{C_M\}$ on the -dr axis with $-dr=drdr+C_M$. On the next smaller ($10^{40}$X) fractal scale (our baseline subatomic $10^{-40}$ scale) drdr<<dr and so $-dr\approx C_M\equiv dr_C$ . (4.1a).

(For $(1/4)^n$ Mandlebulb scale size 1/64 (appendix C). (4.1b)

So to preserve the ds invariance √2ds =(dr-ε)+(dt+ε)≡dr'+dt' (4.1)

In general define $\varepsilon=\xi dr_C$ since 45°and so |dr|=|dt|. ξ is defined as the mass, ε the charge². See appendix C.

Here $dr_C=C\rightarrow\pm C_M$ (dichotomic 130° rotation in eq.1 with $C=C_M$=Fiegenbaum point 1.40115..) instead of 0 in eq.4.1 and we fill in the gaps with that C. the $\pm C_M$ rotation results in composites. The Kerr metric $(a/r)^2$ masses (eq.6.1.1 & 6.4.13) are also the Mandelbulb extrema (normalized $m_\tau$ in $C_M=1=m_\tau$ plus $m_\varepsilon+m_e$.. $\varepsilon=\xi dr_\varepsilon=(1)dr_C$.

## 4.2 Rotation of δz by $C_M$ Creates Curved Space Two Body Eigenvalue Physics

So from 2AIA at 45° and 2AI and eq.3.6 $\sqrt{2}ds=(dr-\varepsilon/2)+(dt+\varepsilon/2)\equiv dr'+dt'$ (4.1)

θ can then change by $\Delta\theta=(\varepsilon/2)/ds=(\xi dr)/(2ds)\equiv C_M/ds$ at θ=45°. Note ζ=0,ε=0 on light cone. Note also putting $C_M$ into eq.2AI dr+dt at 45° here **breaks those equation 2C** 2D **degeneracies** giving us our **4D**.

Define r≡dr and $\kappa_{rr}\equiv(dr/dr')^2=(dr/(dr-\varepsilon/2))^2=1/(1-r_H/r)+rn$ (4.2)

Putting the $\kappa_{\mu\nu}$s in eq.2A1A we obtain for both of these spherical symmetry $\kappa_{rr}$ metric coefficients: $ds^2=\kappa_{rr}dr'^2+\kappa_{oo}dt'^2$ (4.3)

Note from 2AIA drdt is invariant (at 45°) and so $dr'dt'=\sqrt{\kappa_{rr}}dr\sqrt{\kappa_{oo}}dt=drdt$ so $\kappa_{rr}=1/\kappa_{oo}$ (4.4)

i.e., the old Schwarzschild-rn result outside $r_H$. Use tensor dyadics to derive the other GR metrics

So we derived General Relativity *by* (the $C_M$=ε) **rotation** *of special relativity* (eqs 2A, 2AI).

Also from 2AIA and eq.4.1: $ds^2=dr'^2+dt'^2=dr^2+dt^2+dr\varepsilon/2-dt\varepsilon/2-\varepsilon^2/4$ (4.5)

For large dr (eg., Limacon in Mandlebrot set) baseline -1 then here $dr^2=+C_M-C_M$, $C_M\equiv E_1^2$ in eq.4.5.

2AII: From eq.2AII and equation 3.5 the neutrino is defined as the particle for which -dr'=dt (so can now be in 2nd quadrant dr', dt' can be negative) so drε/2-dtε/2 has to be zero and so ε has to be zero therefore $\varepsilon^2/4$ is 0 and so is pinned as in eq.2AII (*neutrino*).δz≡ψ. So $C_M$=ε=mdr =0 *and so the neutrino Is uncharged and also massless in this flat space.*

2A1: Recall eq.2AI electron is defined as the particle for which dr≈dt so drε/2-dtε/2 cancels so ε (=$C_M$) in eq.4.5 can be small but nonzero so that the δ(dr+dt)=0. Thus dr,dt in eq. 2AI are automatically both positive and so can be in the *first quadrant as positive integers*. 2A1 is *not* pinned to the diagonal so $\varepsilon^2/4$ (and so $C_M$) in eq.4.5 is not necessarily 0. So *the electronischarged*

If that $\pm C_M$ rotation covers 2AI or 2AII the charge on these objects (eg., charge on 2AII is 0) becomes the charge on the composite. This added intermediate white noise is not charged.

### 4.3 Eq.2AI Eigenvalues in equation 3.6 incorporating $C_M$

To remain within the set of eq.1 solutions set (allowing infinitesimal rotation within the noise) we note that the *2D* ***degeneracy*** *of eq.2C is* ***broken*** *by the solution2* ***rotation*** *(eq.4.1)* were we use ansatz $dx_\mu\rightarrow\gamma^\mu dx_\mu$ where $\gamma^\mu$ may be a 4X4 matrix and commutative ansatz $dx_\mu dx_\nu=dx_\nu dx_\mu$ so that $\gamma^\mu\gamma^\nu dx_\mu dx_\nu+\gamma^\nu\gamma^\mu dx_\nu dx_\mu=(\gamma^\mu\gamma^\nu+\gamma^\nu\gamma^\mu)dx_\mu dx_\nu$ (μ,ν=1,2,3,4; μ≠ν). So from eq.2AI and resulting eq.(2C) then $ds^2=(\gamma^1dx_1+\gamma^2dx_2+\gamma^3dx_3+\gamma^4dx_4)^2=(\gamma^1)^2dx_1^2+(\gamma^2)^2dx_2^2+(\gamma^3)^2dx_3^2+(\gamma^4)^2dx_4^2+\Sigma_{\mu\nu}(\gamma^\mu\gamma^\nu dx_\mu dx_\nu+\gamma^\nu\gamma^\mu dx_\nu dx_\mu)$. But $\gamma^\mu\gamma^\nu dx_\mu dx_\nu+\gamma^\nu\gamma^\mu dx_\nu dx_\mu=(\gamma^\mu\gamma^\nu+\gamma^\nu\gamma^\mu)dx_\mu dx_\nu$ implying $\boldsymbol{\gamma^\mu\gamma^\nu+\gamma^\nu\gamma^\mu}$ **=0 from 2B1** and also $(\gamma^\mu)^2=1$ from 2AIA. So the two 2AI results and 2B1 *imply the defining relation for a 4D* Clifford algebra: we have derived our 4Dimensons) with the time component defined to be $\gamma^4dx_4$. So with $\kappa_{\mu\nu}$ in eq.3.2 we have

$$ds=(\gamma^1\sqrt{\kappa_{11}}dx_1+\gamma^2\sqrt{\kappa_{22}}dx_2+\gamma^3\sqrt{\kappa_{33}}dx_3+\gamma^4\sqrt{\kappa_{44}}dx_4) \quad (4.6)$$

Eq.4.6 also implies we can convert the 2AI (dr+dt)z" and the 2AIA $(dr^2+dt^2)$z" to first and second derivatives of z" terms (z"≡ψ). For example using 4.6:

Eq.2AI $\rightarrow ds=(\gamma^1\sqrt{\kappa_{11}}dx_1+\gamma^2\sqrt{\kappa_{22}}dx_2+\gamma^3\sqrt{\kappa_{33}}dx_3+\gamma^4\sqrt{\kappa_{44}}dx_4)z''\rightarrow\gamma^\mu\sqrt{(\kappa_{\mu\mu})}\partial\psi/\partial x_\mu=(\omega/c)\psi$ (9)

(eq.9) which is our new pde, adds the $C_M$ to equation 3.5 (electron observables). It also becomes 2AII ($\nu$ pinned to the light cone where $C_M=r_H=\varepsilon=0$ (sect.4.1)). The 6 Clifford algebra cross term requirements imply many multiple lepton contributions giving us Boson fields around them. The two required simultaneous 2D eq.2AI in 4D eq.9 imply observer plus observed objects needed to have the 4D wavefunction $\psi$. So the wave function "collapses" to the observed one when it is observed (Copenhagen interpretation).

**Hamiltonian and its Energy E Eigenvalues**: The Hamiltonian is associated with the time derivative in eq.3.6 as it is in the old Dirac equation. So to find energy eigenvalues and the Hamiltonian we compare the old Dirac equation E with the new one, eq.9. From 104.10, 105.9, Sokolnikov, Tensor Analysis, 2nd Ed. Wiley we have $dt/ds=1/\kappa_{oo}$ with $\kappa_{oo}=1-r_H/r$. Also from the first term in equation 8.1 we can compare the location of the energy E term (and so Hamiltonian) in the ordinary Dirac equation with the new one equation 8.1 and find that $\mathbf{E}=(dt/ds)\sqrt{\kappa_{oo}}$ $=(1/\kappa_{oo})\sqrt{\kappa_{oo}}=\mathbf{1/\sqrt{\kappa_{oo}}}$

## 4.4 Eq. 2A1A Boson Eigenvalues $m_1+m_2$

Start by plugging eq.1 into eq.1b. Get 2AI,2AII. Include the $C_M$ of eq.1b. To preserve the ds invariance then $\sqrt{2}ds=(dr-C_M)+(dt+C_M)\equiv dr'+dt'$ in eq.4.1. We repeat the $m_1+m_2$ Pauli principle addition of sect.4.3. Here $C\rightarrow\pm C_M$ (dichotomic 130° rotation) instead of 0 in eq.4.1 and we fill in the gaps with that C. Here we added $\xi dr$ and $\varepsilon$ as sources since it is not on the light cone.

So we have large $C_M$ dichotomic 130° rotation to the next Reimann surface of 2AIA $(dr^2+dt^2)z''$ from some initial angle $\theta$. Eq.1a solutions imply complex 2D plane Stern Gerlach dichotomic rotations using noise $z''\propto C$ (4.2) using Pauli matrices $\sigma_i$ algebra, which maps one-to-one to the quaternionA algebra. From sect.4.2, eq.4.11 we start at some initial angle $\theta$ and rotate by 130° the noise rotations are: $C=z''=[e_L,\nu_L]^T\equiv z'(\uparrow)+z'(\downarrow)\equiv\psi(\uparrow)+\psi(\downarrow)$ has a eq.4.5 infinitesimal unitary generator $z''\equiv U=1-(i/2)\varepsilon n*\sigma)$, $n\equiv\theta/\varepsilon$ in $ds^2=U^tU$. But in the limit $n\rightarrow\infty$ we find, using elementary calculus, the result $\exp(-(i/2)\theta*\sigma)=z''.(dr+dt)z''$in eq.4.11 can then be replaced by $(dr^2+dt^2+..)z''=(dr^2+dt^2+..)e^{\text{quaternionA}}$Bosons because of eq.2AIA. Rotate: z":

2AB: 2A1IA+2AIIB Dichotomic variables→Pauli matrix rotations→$z'=e^{\text{quaternion A}}$→Maxwell $\gamma$ =Noise C blob. See Appendix A for the derivation of the eq.2AIA 2nd derivatives of $e^{\text{quaternion A}}$.

2AC: 2AI+2AI Dichotomic variables→Pauli matrix rotations→$z''=e^{\text{quaternion A}}$→KG Mesons.

2AD: 2A1+2A1+2A1at $r=r_H\equiv C_M$ (also stable but at high energy, including Z,W.)

2AE: 2AI+2A1+2AII Dichotomic variables→Pauli matrix rotations→$z''=e^{\text{quaternionA}}$, Proca Z,W Ch.8,9 on baryon strong force with Nth fractal scale $r_H=2e^2/m_ec^2$. $\pm C_M$ rotation. Equation 2AE is a current loop implying that the Paschen Back effect with B flux quantization $\Phi=Nh/2e$ gives very high particle mass-energy eigenvalues. So we solved the hierarchy problem. Frobenius series solution from eq.9 gave lower hadron energies. All are singlet or triplet noise C blobs(2). See davidmaker.com, part II.

We have thereby found the **eq.2A1A Boson eigenvalue solutions**.

**Summary: Solved eq.1 for z. Then we found the eigenvalues of z** (eg., 2AI)

Note in equation 9 the $\kappa_{oo}=1-r_H/r$. Given the $10^{40}XC_M$ fractalness in the $C_M=r_H$ of equation 9 "Astronomers are observing from the inside of what particle physicists are studying from the outside, **ONE** object, the new pde (2AI) electron", the same 'ONE' we postulated. Think about that as you look up at the star filled sky some night! Also postulating 1 gives no more and no less than the physical world. That makes this theory remarkably comprehensive (all of theoretical physics and rel# math) and the origin of this theory remarkably simple: "one".

So given the fractal self-similarity, by essentially knowing nothing (i.e., ONE) *you know everything!* We finally do understand.

**References**

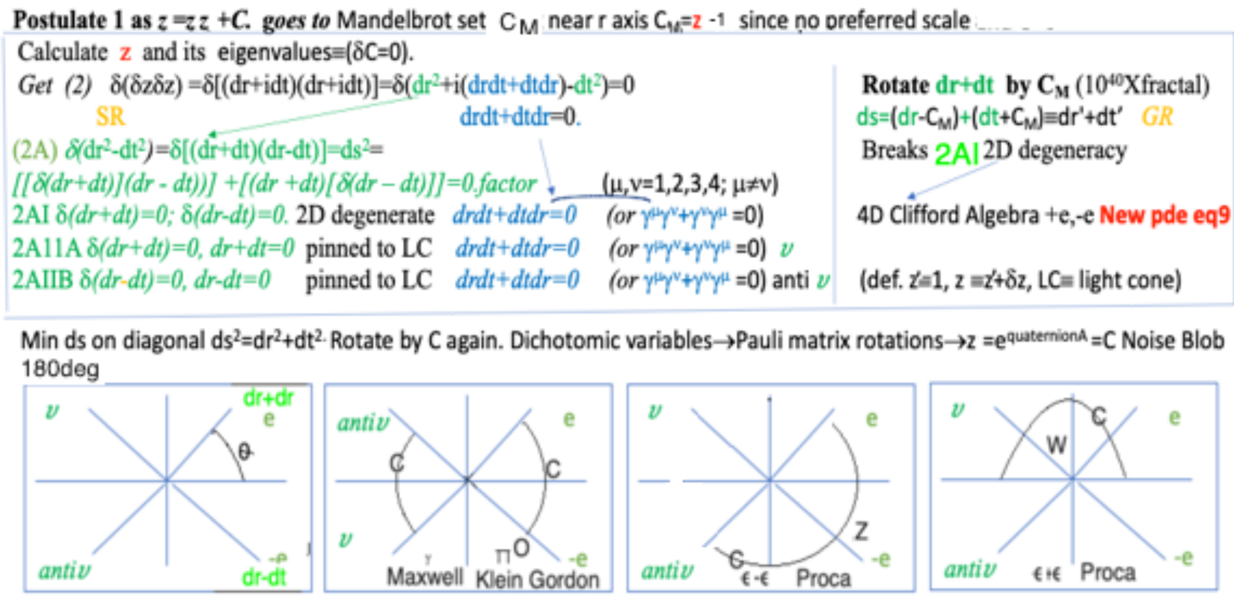
1)E.Schrodinger, Sitzber.Preuss.Akad.Wiss.Physik-Math.,24,418 (1930) At>Compton wavelength there is no zitterbewegung, just a probability density blob. So instead of deriving Schrodinger's blob from the Dirac equation we derive the Dirac equation (and the rest of physics) from the most general stable blob, our averaged data and SD≡$\Delta z=\delta z$ region (section 2).
2) Konstantin Batygin. Monthly Notices of the Royal Astronomical Society, Volume 475, Issue 4, 21 April 2018. He found that cosmological Schrodinger equation metric quantization actually exists in the (observational) data.
(3) davidmaker.com

**Appendix A 2AB** $(dr^2+dt^2+..)e^{\text{quaternion } A}$ **Derivation From Sect.4.3 and operator in eq.4.6 180° rotation from 90°**

A is the 4 potential. From 3.4 we find after taking logs of both sides that $A_o=1/A_r$ (A1)
Pretending we have a only two i,j quaternions but still use the quaternion rules we first do the r derivative: $dr^2\delta z =(\partial^2/\partial r^2)(\exp(iA_r+jA_o))=(\partial/\partial r[(i\partial A_r\partial r+\partial A_o/\partial r)(\exp(iA_r+jA_o)]$
$=\partial/\partial r[(\partial/\partial r)iA_r+(\partial/\partial r)jA_o)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+$
$(i\partial^2 Ar/\partial r^2 +j\partial^2 A_o/\partial r^2)(\exp(iA_r+jA_o)+[i\partial A_r/\partial r+j\partial A_o/\partial r][i\partial A_r/\partial r+j\partial/\partial r(A_o)] \exp(iA_r+jA_o)$ (A2)
Then do the time derivative second derivative $\partial^2/\partial t^2(\exp(iA_r+jA_o) =(\partial/\partial t[(i\partial A_r\partial t+\partial A_o/\partial t)$
$(\exp(iA_r+jA_o)]=\partial/\partial t[(\partial/\partial t)iA_r+(\partial/\partial t)jA_o)(\exp(iA_r+jA_o)+$
$[i\partial A_r/\partial r+j\partial A_o/\partial t]\partial/\partial r(iA_r+jA_o)(\exp(iA_r+jA_o)+(i\partial^2 A_r/\partial t^2 +j\partial^2 A_o/\partial t^2)(\exp(iA_r+jA_o)$
$+[i\partial A_r/\partial t+j\partial A_o/\partial t][i\partial A_r/\partial t+j\partial/\partial t(A_o)]\exp(iA_r+jA_o)$ (A3)
Adding eq. A2 to eq. A3 to obtain the total D'Alambertian A2+A3=
$[i\partial^2 A_r/\partial r^2+i\partial^2 A_r/\partial t^2]+ [j\partial^2 A_o/\partial r^2+j\partial^2 A_o/\partial t^2]+ii(\partial Ar/\partial r)^2+ ij(\partial A_r/\partial r)(\partial A_o/\partial r)$
$+ji(\partial A_o/\partial r)(\partial A_r/\partial r)+jj(\partial A_o/\partial r)^2 ++ii(\partial Ar/\partial t)^2+ij(\partial A_r/\partial t)(\partial A_o/\partial t)+ji(\partial A_o/\partial t)(\partial A_r/\partial t)+jj(\partial A_o/\partial t)^2$ .
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 A1 and A3 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: $\partial A_r/\partial r + \partial A_o/\partial t=0$ (A4 )
$i[\partial^2 A_r/\partial r^2+i\partial^2 A_r/\partial t^2]=0$, $j[\partial^2 A_o/\partial r^2+i\partial^2 A_o/\partial t^2]=0$ or $\partial^2 A_\mu/\partial r^2+\partial^2 A_\mu/\partial t^2+..=1$ (A5)
A3 and A4 are Maxwell's equations (Lorentz gauge formulation) in free space, if $\mu$=1,2,3,4.

$$\square^2 A_\mu=1, \square\bullet A_\mu=0 \qquad \text{(A6)}$$

.




**$m_e$ Source Term at $r=r_H$ Inside Angle C**

For δz=-1(middle of Mandelbrot set) adding noise C causes a counterclockwise rotation as we see from the $\delta z=\frac{-1\pm\sqrt{1-4C}}{2}$. Analogously from **2AC** we get with the eq.4.1 doublet ε±ε the Proca equ (3*) neutrino and electron Δ ε* at $r=r_H$ extremum in E. As in sect.6.13 in $\kappa_{00}$ we normalize out the muon ε. So we are left with the electron Δε: $\kappa_{00}=1-[\Delta\varepsilon/(1\pm2\varepsilon)]+[r_H(1+((\varepsilon\pm\varepsilon)/2))/r]$ from the two above rightmost (Proca) diagrams. So extremum in E Source = $E_{ZW}=\frac{1}{\sqrt{\kappa_{00}}}=\frac{1}{\sqrt{1-\frac{\Delta\varepsilon}{1\pm2\varepsilon}-\frac{r_{He}}{r}(1+(\varepsilon\mp\varepsilon)/2)}}\approx\frac{1}{(1\pm\varepsilon)\sqrt{\Delta\varepsilon}}, at\ r=r_{H_e}$ + is for Z and – is for W. So W (right fig.) is a single electron Δε+ν perturbation at $r=r_H=\lambda$ (Since two body $m_e$.): So $H=H_o+m_ec^2$ inside $V_w$. $E_w=2hf=2hc/\lambda$, $(4\pi/3)\lambda^3=V_w$. For the two leptons $\frac{1}{V^{1/2}}=\psi_e=\psi_3, \frac{1}{V^{1/2}}=\psi_\nu=\psi_4$ . Fermi 4pt= $2G\iiint_0^{r_W}\psi_1\psi_2\psi_3\psi_4\,dV=2G\iiint_0^{r_W}\psi_1\psi_2\frac{1}{V^{1/2}}\frac{1}{V^{1/2}}V=2\iiint_0^{r_W}\psi_1\psi_2G\equiv$ $\iiint_0^{V_W}\psi_1\psi_2(2m_ec^2)dV_w=\iiint_0^{V_W}\psi_1(2m_ec^2)\psi_2dV_w$. (A3)

What is Fermi G? $2m_ec^2(V_W)=.9X10^{-4}Mev\text{-}F^3=G_F$ **the strength of the weak interaction**.

**Derivation of the Standard Model But With No Free Parameters**

Since we have now derived $M_W$, $M_Z$, and their associated Proca equations , and Mandlebulb $m_\mu$,$m_\tau$,$m_e$, etc., Dirac equation, $G_F$, $ke^2$, Bu, Maxwell's equations, etc. we can now write down the usual Lagrangian density that implies these results. In this formulation $M_z=M_W/\cos\theta_W$, so you find the Weinberg angle $\theta_W$, $g\sin\theta_W=e$, $g'\cos\theta_W=e$; solve for g and g', etc., We will have thereby derived the standard model from first principles (i.e.,postulate1) and so it no longer contains free parameters!

## Appendix B Mathematical Considerations

### $1^{st}$ type of Fractalness $(10^{40})^N$ Mandelbrot Set Repeat Of The Universe

Go to the Utube HTTP with the 275 in the title to explore the Mandelbrot set. The splits are in 3 directions from the orbs. There appear to be about 2.5 splits going by each second (given my PC baud rate) and the next Mandelbrot set comes up in about 62 seconds. So $3^{2.7X62}=10^N$ so 172log3=N=82. So there are $10^{82}$ splits.

So there are about $10^{82}$splits per initial split. But each of these Mandelbrot set Fiegenbaum points is a $r_H$ in eq.9. So for each larger electron there are **$10^{82}$ constituent electrons**. At the bifurcation point, which is also the Fiegenbaum point, the curve is a straight line and so $\delta C_M=0$. Also the scale difference between Mandelbrot sets as seen in the zoom is about **$10^{40}$, the scale change** between the classical electron radius and $10^{11}$ly giving us our fractal universe.

So that $\delta z = \frac{-1\pm\sqrt{1-4C}}{2}$. is real for noise C<¼ creating our noise. So ¼=(3/2)kT/($m_pc^2$). So T is 20MK. So here we have *derived the average temperature of the universe* (stellar average). The universe doesn't look like the Mandelbrot set but is a solution to equation 9 for $r<r_C$: electron. There are some consequences of the N+1th fractal scale observer and the value of dr in $-dr=drdr+C_M$ eq.1.1.

## $2^{nd}$ type of Fractalness, the $(¼)^N$ Radius Mandlebulbs

Note from eq.1.1 that $\frac{-1\pm\sqrt{1-4C}}{2}=\delta z$. So that δz is real for noise C<1/4 creating our noise Mandlebulbs in 1.25+Mandelbulb noise diameters $=1.25+(2\sum_{n=2}^{\infty}\left(\frac{1}{4}\right)^n)$=1.4167.. where 1.25 is the invariant part. 1.4167-1.40115=1/64.3 so we must subtract 1/64.3 to terminate at the Fiegenbaum point $C_M$. so that the termination index is n=3, the 1/64 term. Given the ±noise, the negative part of the ± is half the noise Mandelbulb "diameter" and so subtracts from the invariant part 1.25 by the noise level: so 1.25-¼-(1/16) is really the invariant. But that (1/64) must be subtracted as well to get the Fiegenbaum point. So (1.25-¼-(1/16)-[(1/64)/(1-ε/2)]=.92141..
We next must take into account the big and small baselines fractal objects.

**Large baseline** $10^{40}$X $-\delta z=\delta z\delta z+C$, $\delta z\delta z>>\delta z$. so **$C_M\approx(\delta z)^2$**. squared Cosmological
In between observer, us. Macroscopic.
**Small baseline**. $-\delta z=\delta z\delta z+C$, $\delta z>>\delta z\delta z$ so **$C_M\approx\delta z$.** linear Subatomic
$C_M$=1, ¼, 1/16, 1/64, 1/256,1/1024, 1/4096 ,.. with $1/4096=(1/64)^2$ Mandelbulbs.
From the postulate these *normalized* $C_M$ s have to be the same so for *both* the large and small baselines we take the 1≈.921 and the 1/64 squared(=1/4096) from the linear $C_M$=1, ¼, 1/16, 1/64, 1/256,1/1036, 1/4096,.. list . So $C_{MS}=1^2$, $(1/64)^2=dr_{C.}=C_{ML}=C_{MS}\cap C_{ML}$ is what we observe. Thus given the 45° and from sect.4 definition of mass ξ (note also $\varepsilon\propto e^2$): $\varepsilon=\xi dr_c=\xi C_M$ .
$\varepsilon/\xi=drc=C_M=e^2/.921^2$ and $\varepsilon/\xi=dr_c=C_M=e^2/((1/64)(1-\varepsilon))^2$.
Anyway, so we must square $C_M$ as mentioned above to get $E_2=.92141^2=.8490$. Also $(1/64)^2$=.00024414.., So [1777/.8490].00024414=**.511Mev,** [1777/.8490]X.8490=**1777**=$m_\tau$ which then picks up that charge normalization as well .510998950=actual $m_e$.

To generate hadron 2P state physics put three $S_{½}$ states ($\xi=(1/64)^2$=ground state =3 2P 2AI) into a rotating system to get flux quantization $\Phi=BA=2.067X10^{-15}$Webbers. See end of part II. Note in the normalized Kerr metric $(a/r)^2$ $S_{½}$ state $\kappa_{oo}=1-m_\varepsilon-m_e-e^2/[(m_\tau+m_\varepsilon+m_e)r]$ in section 6.3 explaining why S states are point particles $((m_\tau+m_\varepsilon+m_e)>>m_e.)$ since the radius is Fitzgerald contracted by the γ in $\gamma m_e$.
There is also a variable radius noise term here $¼^2(.85)\approx m_\mu=\varepsilon$ in sect. 7.1.

These three noise $(¼)^N$ circles with 2AIA complex variable mapping through the branch cut must form 2D Reimann surfaces of these new smaller and smaller Mandelbrot sets with each individual 2AI,2AII occupying each such complex plane: hence we have derived the 3 lepton families.
Notice here we found from the Mandelbrot set (eq.1a,1b) the
**size of the universe** $10^{40}$Xclassical electron radius, **fractal universe**.

**Number of particles in the universe** $10^{82}$
The **temperature of the universe**. 20MK (interior of stars)
For $C\to 0$ we get eq.2AI,2AII eq.9 **particle physics**(sect.1-4) including **the Lepton masses**&families. Eq.2AIA yields the operator formalism of QM
From fractal eq.9 the **oscillation of the universe**.
**Relativity** (eq. 2A rotated by $C_M$).
Note that eq.1a,1b came out of the postulate of 1 (sect.1).

## Appendix C Origin Of Mathematics

### Single Postulate Of 1

eq.3.6 defines the finite +integer *list*(i.e.,$1\cup 1\equiv 1+1\equiv 2$)--*define*(i.e.,A+B=C) math *required for* the algebraic rules underpinning eq.**1** ***without* any added postulates** (axioms). Also *list* 2*1=2, 1*1=1 *defines* A*B=C. Division and **rational numbers** defined from B=C/A.
We repeat with the list 3*1=3, etc., with the Clifford algebra terms satisfaction keeping this going all the way up to $10^{82}$ and start over given the above fractal result given the $r_H$ horizons of eq.4.2.
Note the noise C guarantees limited precision so we can multiply any number in our list with the above integer $10^{82}$ to obtain the integers in eq.3.6 which gives us quantization of the Boson fields

### Real Numbers Defined from Our Rational Numbers

Real numbers are the core of mathematics (Try balancing your checkbook or measuring a length without them!) and physics. 1 is a real number. The key thing is that we are postulating 1, not 1 and a bunch of other stuff.

There are several equivalent ways of defining the real numbers.
One way is through Dedekind cuts. Another method is to define a number as a "real" number by defining a *Cauchy sequence of rational numbers* (Cantor's method) for which it is a limit.
For example it is easy to define $\pi$ as a real number. You can use the Cauchy sequence $4(-1)^N/(2N+1)$ resulting in the series sum $4(1-1/3+1/5-1/7+...)=\pi$.
Note this is a sequence of *rational* numbers adding up to an *irrational* number sum ('summability' in the parlance of 'real analysis'). The union of the set of irrational and rational numbers is the "real " numbers by the way. Note this real number definition *required* that Cauchy sequence of rational numbers.
In contrast the rational number sequence defined by the iteration $z_{N+1}=z_N z_N+C$ (eq.1a); $\delta C=0$ (eq.1b); $N\to\infty$, noise $C\to 0$ defines 1 (and not $\pi$) as a real number. Solve for C in eq.1a and plug that into eq.1b and get $\delta(z_{N+1}-z_N z_N)=0$. Note the variation of $\infty-\infty$ cannot be zero so $z_{N+1}$ has to be a *finite* number making eq.1a, 1b the definition of the Mandelbrot set. So the resulting series has to be summable. Thus given $C\to 0$ and $N\to\infty$ we *cannot* start the sequence with a number that ends up with a divergent sequence.
So we start with a C in $C\to 0$ with $z_o$ between -1 and 1 and with C extremely small the $\delta z_{N+1}$ is always a whole number and so rational. So the first number in the sequence is very slightly smaller $\delta z_{N+1}\approx 1$ but is still finite decimal (up to $10^{82}$. See above.) and so rational (eg.,1234/1000=1.234). Plug $\delta z_{N+1}$ back in for $\delta z_N$ ($\delta z_{N+1}=\delta z_N\delta z_N+C$) and repeat until finally $\delta z_\infty=0$. During each such iteration define $z_N=|1-\delta z_N|$ which is the $z_N$ th term in our Cauchy sequence of rational numbers whose limit is 1. Note also that the Mandelbrot set iteration therefore indexes the associated Cauchy sequence. We have thereby found that the eq.1a, eq.1b

Mandelbrot set can be used to define the real number 1!). We have also thereby generated equation 1 $z=zz+C$ in the limit $C\rightarrow 0$. (Since 1=1X1+0).

**Set Theory**

Note we have also *defined set theory* and also arithmetic in operator equation 3.6 with simultaneous eq.(2AI+2AI) and its $1\cup 1\equiv 1+1$ eigenvalues. In that regard note also on this fundamental 'set theoretical' level (i.e.,1U1), zero behaves like the null set ∅ and we all know the null set is an element of every set *anyway*. So we really **have just postulated 1** with the 0 merely coming along for the ride.

With that 'uniqueness' there are no other equations besides 1a, 1b (at least not ones that give us 1,0 since requiring that Cauchy sequence of rational numbers limit of 1 severely restricts our choices) that do this. Everybody knows 1 is a real number so it obeys eq.1a, 1b.

Postulate 1

So get all of physics from eq. 1a,1b.

Use the 1 in the postulate of 1 to define the list-define algebra $1\cup 1\equiv 1+1$ underpinnings of eq.1a

**Elementary Math Is Theory: Gaussian Elimination**

**So Solve Two Equations (eq.1,eq.2) For Two Unknowns. Even Babies Can Do It**

Baby math example

1) $x=x^2+y$

2) $2y=2$

Solve for x and y

**1st solution. Solve for y**

Plug eq.1 y into eq.2.

**2nd solution. Solve for x**

Get $x=(1\pm\sqrt{(1-4)})/2$

Postulate 1 (In other words postulate 1 as a real number since it is.).

1) $z_{N+1}=z_N z_N+C$ eq.1a (postulate of **1**). For $C\rightarrow 0$, **$z=zz+C$ (eq.1)**

2) $\delta C=0$

Solve for z and C.

**1st solution. Solve for z.** Define $z\equiv 1+\delta z$.

Solve for C in eq.1, plug into eq.2 and get

$\delta(\delta z\delta z)=0$ resulting in eq.2A,2B

Factor, get z **component** 2A1, $dr+dt=ds\sqrt{2}$=invariant

2AII, 2AIA. **Get** z (as $\delta z$ in $z\equiv 1+\delta z$)

**2nd solution Solve for C**

eq.1a,1b imply Mandelbrot set $C_{M.}=C$ (2nd solution)

Rotate by $C_M$ in $(dr-C_M)+(dt+C_M)=ds\sqrt{2}$ as

**2AIA rotation at 45° to get actual eigenvalues of z**