**It's Broken, fix it**

**David Maker**

Key words, Mandelbrot set, Dirac equation, Metric

Abstract In that regard Dirac in 1928 made his equation(1) flat space(2). But space is not in general flat, there are forces.

So over the past 100 years people have had to try to make up for that mistake by adding ad hoc convoluted gauge force after gauge force until fundamental theoretical physics became a mass of confusion, a train wreck, a junk pile. So all they can do for ever and ever is to rearrange that junk pile with *zero actual progress* in this most fundamental of all sciences,.. forever. We died.

By the way note that Newpde(3) $\gamma^\mu \sqrt{(\kappa_{\mu\mu})}\partial\psi/\partial x_\mu=(\omega/c)\psi$ is NOT flat space (4) so it cures this problem (5).

**References**

(1) $\gamma^\mu\partial\psi/\partial x_\mu=(\omega/c)\psi$

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

$\kappa_{xx}=\kappa_{yy}=\kappa_{zz}=\kappa_{tt}=1$ is flat space, Minkowski, as in his Dirac equation(1).

(3) Newpde: $\gamma^\mu \sqrt{(\kappa_{\mu\mu})}\partial\psi/\partial x_\mu=(\omega/c)\psi$ for e,$\nu$. So we didn't just drop the $\kappa_{\mu\nu}$ (as is done in ref.1)

(4) Here $\kappa_{oo}=1-r_H/r=1/\kappa_{rr}$, $r_H=(2e^2)(10^{40\mathbf{N}})/(mc^2)$. The **N**=..**-1,0,1**,.. fractal scales (next page)

(5)This Newpde $\kappa_{ij}$ contains a Mandelbrot set(6) $e^2 10^{40\mathbf{N}}$ **N**th fractal scale source(fig1) term (from eq.13) that also successfully **unifies theoretical physics.** For example:

For **N**=-1 (i.e.,$e^2 X10^{-40}\equiv Gm_e^2$) $\kappa_{ij}$ is then by inspection(4) the Schwarzschild metric $g_{ij}$; so we just derived General Relativity and the gravity constant G from Quantum Mechanics in one lineWow

for **N=0** the higher order Taylor expansion(terms) of $\sqrt{\kappa_{ij}}$ gives the anomalous gyromagnetic ratio and Lamb shift *without* the renormalization and infinities (appendix D3): This is very important

So $\kappa_{uv}$ provides the general covariance of the Newpde. Eq. 4 even provides us space-time r,t.

For **N**=1 (so $r<r_C$) Newpde zitterbewegung expansion stage explains the universe expansion (For $r>r_C$ it's not observed, per Schrodinger's 1932 paper.).

For **N**=1 zitterbewegung harmonic coordinates and Minkowski metric submanifold (after long time expansion) gets the De Sitter ambient metric we observe (D16, 6.2).

For **N**=0 Newpde $r=r_H$ $2P_{3/2}$ state composite 3e is the baryons (sect.2, partII) and Newpde $r=r_H$ composite e,$\nu$ is the 4 Standard electroweak Model Bosons (4 eq.12 rotations→appendixA)

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

**Ultimate Occam's razor 1** (in contrast to what is unknown, C)

**I** Therefore* we just **Postulate 1** with the *simplest* algebraic definition of 1 z=zz (Thus z=**1,0**) and nontrivially most *simply* ***add*** **C** in z'=z'z'+C**.** Note the *simplest* are *unknown* constant Cs ($\delta$C=0) except for that single *known* C=0 since z=zz+0 was postulated so z=**1,0**$\in$\{z'\}. Thus:

**z=0**=z'=$z_o$ in the iteration of **eq.1** using $\delta$C=0 ***generates*** the (2D)Mandelbrot set C=$C_M$=end**

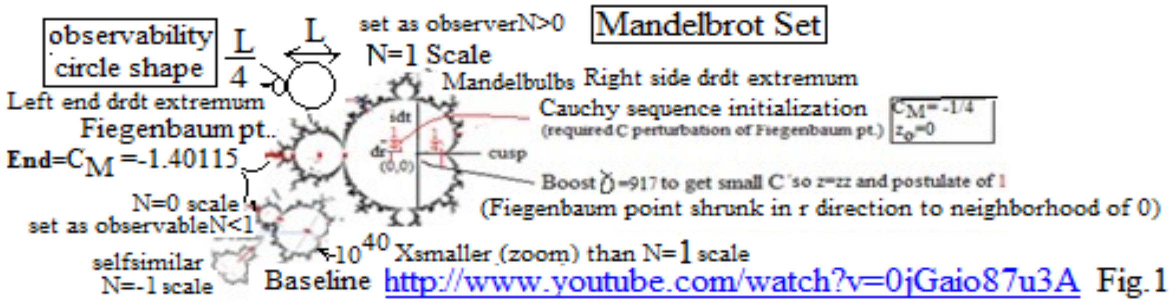
(Need iteration to get all the Cs because of the $\delta$C=0 (appendix), end=$10^{40N}$X fractal scales)

**z=1**, z'=1+$\delta$z substitution into **eq.1** using $\delta$C=0 (N>0 observer) gets eq5 so 2D Dirac eq.(e,$\nu$)

(Eq.5 gives the Minkowski (flat space) metric, Clifford algebra $\gamma^i$ and eq.11 ***in one step.***)

These two **z=1** and **z=0** steps together (using orthogonality) get the curved space 2D+2D=4D **Newpde** (3) and thus the 4D universe, no more and no less . So just **postulate** 1 !!!

(Newpde: $\gamma^\mu \sqrt{(\kappa_{\mu\mu})}\partial\psi/\partial x_\mu=(\omega/c)\psi$ , $\kappa_{oo}$=1-$r_H$/r=1/$\kappa_{rr}$, $r_H$=(2e$^2$)($10^{40N}$)/(mc$^2$). **N**=..**-1,0,1**,..fractal)



http://www.youtube.com/watch?v=0jGaio87u3A Fig.1

**Summary of z' plug in**

All I did here is to postulate 1 and also **proved it's observable:** Eq.11: $p_x\psi=-i\hbar\partial\psi/\partial x$ is the well known ***observables*** (p) definition, $\psi$ is from Newpde(3). C is merely some *required* **observer**! Note also eq.11 *real number* eigenvalue observability (eg.,.dr noise) derived from our right side –¼ initiated Cauchy sequence(7), Ch.2,=reals: our Mandelbrot set iteration sequence there!

Therefore N=0 **postulate** 1 can also be used in a list-define math to get the *real number* algebra (without all those many Rel#math axioms).Eg., 1$\cup$1$\equiv$1+1 (B2,Ch.2). So we get both the physics (See ref.5) AND (rel#)mathematics from ONE postulate1, everything! We finally figured it out!

**Compare and contrast**

The core of mainstream physics is the Standard electroweak Model (SM) that gives us important results like Maxwell's equations and weak interaction theory that explain electricity and magnetism and some radioactive decays respectively. Add to that QCD that explains the nuclear force (NF) and baryons. General Relativity (GR) gives us gravity and mechanics. But they are not fundamental since they contain *many assumptions* (Lagrangian densities, free parameters, many dimensions, gauge symmetries,..etc.,) of unknown origin.

**In contrast**

what if you found instead a mathematical theory with only one *simple assumption* (eg., '1', defined from z=zz since 1=1X1) using a *single* simple math step (eg., just add C to 1) top down that got a *generally covariant generalization of the Dirac equation that does not require gauges(*Newpde, next page) that in turn gave these same results (i.e.,SM particles, NF, GR,QM in ref.5 & real#)? You will then have a truly *fundamental* theory. .Just **postulate**1 & 1+C is the universe

Review:

Algebraic definition of 1 is z=zz so (z=**1**,**0**), add constant C (so $\delta C=0$) to get z'=z'z'+C (**eq.1**)

z=zz postulated so z=**1**,**0**$\in$ {z'}

## Appendix Details of those two z=0, z=1 steps (in above **proof of observability**

**But first solve equation 1 by itself** (to at least see that z' can be complex)

Thus plug z'=**1**+$\delta z$ into eq.1 and get $\delta z+\delta z\delta z=C$ (3)

For real C<-¼ $\delta z = (-1\pm\sqrt{1+4C})/2$=dr+idt (4)

is complex. Fiegenbaum point $C_M$=C eq.3 $\delta z$ in fig.6

1st step:

**z=0**=$z_o$=z' To find all C substitute z' on left (eq.1) into right z'z' repeatedly and get iteratlion $z_{N+1}=z_N z_N$-C. Constraint $\delta C=0$ requires us to reject the Cs for which $-\delta C=\delta(z_{N+1}-z_N z_N)=\delta(\infty-\infty)\neq 0$ which gets the **Mandelbrot set** $C_M$=end**=Fiegenbaum pt. from $\delta C_r=0$. drdt$\neq$0, eq7 Also in distance units of 1 on the N=0 fractal scale, for observer N=1 scale lengths Rel$\delta z$>>1.

2nd step:

**z=1** in z'=**1**+$\delta z$ in eq.1 get eq.3 (rel$\delta z$>>1): $\delta(\delta z+\delta z\delta z)=\delta\delta z(1)+\delta\delta z(\delta z)+(\delta z)\delta\delta z\approx$
$\approx\delta(\delta z\delta z)=0$=(plug in eq.4)= $\delta$[(dr+idt)(dr+idt)]= $\delta$[(dr$^2$-dt$^2$) +i(drdt+dtdr)]=0 (5)

=(Minkowski metric(9))+i(Clifford algebra)

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

so ($\rightarrow\pm$**e**) dr+dt=ds, dr-dt=ds $\equiv ds_1$, for $(-dr-dt)^2=ds^2\rightarrow$ Ist and IVth quadrant in fig3 (7)

Also note the positive scalar drdt of eq.7 (so *not* eq.10 vacuum) implies the eq.5 *non* infinite extremum imaginary$\equiv$drdt+dtdr=0=$\gamma^i dr\gamma^j dt+\gamma^j dt\gamma^i dr=(\gamma^i\gamma^j+\gamma^j\gamma^i)$drdt so Clifford algebra

$(\gamma^i\gamma^j+\gamma^j\gamma^i)=0,\ i\neq j.$ (7a)

($\rightarrow$light cone ***ν***) dr+dt=ds, dr=-dt, for $(-dr-dt)^2=ds^2\rightarrow$ III quadrant (8)

" " dr-dt=ds, dr=dt, for $(-dr-dt)^2=ds^2\rightarrow$ II quadrant (9)

($\rightarrow$vacuum,z=1) dr=dt, dr=-dt so dt=0=dr (So eigenvalues of dt, dr=0 in eq.11) (10)

We square eqs.7,8,9 $ds_1^2$=(dr+dt)(dr+dt)=(-dr-dt)(-dr-dt) =[dr$^2$+dt$^2$] +(drdt+dtdr) $\equiv ds^2+ds_3=ds_1^2$. Since $ds_3$ (is max or min) and $ds_1^2$ (from eq.7,8,9) are invariant then so is **Circle** $ds^2=dr^2+dt^2=ds_1^2-ds_3$. also implying the rest of the Cifford algebra $\gamma^i\gamma^i=1$ in eq.7a, no sum on 'i' and also the lemniscate formulation(fig.7). Note this separate ds is a minimum at 45° given the eq.7 constraints and so Circle$\equiv\delta z=dse^{i\theta}=dse^{i(\Delta\theta+\theta_o)}=dse^{i((\cos\theta dr+\sin\theta dt)/(ds)+\theta o)}$, $\theta_o$=45°.($\delta z$ in fig.6). We define k$\equiv$dr/ds, $\omega\equiv$dt/ds, sin$\theta\equiv$r, cos$\theta\equiv$t. $dse^{i45°}\equiv ds'$. Take ordinary derivative dr (since flat space) of 'Circle' $\frac{\partial\left(dse'^{i\left(\frac{rdr}{ds}+\frac{tdt}{ds}\right)}\right)}{\partial r}=i\frac{dr}{ds}\delta z$ 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).

(<F>*= ∫(Fψ)*ψdτ=∫ψ*Fψdτ =<F> Hermitian) from right side real number Cauchy seq.starting at –¼ iteration case of the Mandelbrot set iteration(7), Ch.2,sect.2, with small C limit making *real eigenvalues* (eg.,noise) likely. The observables dr$\rightarrow$k$\rightarrow p_r$ condition gotten from eq.11 **operator formalism(**10) thereby converting eq.7-9 into Dirac eq. pdes( 4XCircle solution in left side fig.1 also implies observability). Cancel that $e^{i45°}$coefficient (45°=π/4) then multiply both sides of eq.11 by ħ and define $\delta z\equiv\psi$, p$\equiv$ħk. Eq.11 becomes the familiar

$$p_r\psi=-i\hbar\frac{\partial\psi}{\partial r}\ (11)$$

Repeat eq.3 for τ, μ respective $\delta z$ lobes in fig.6 so they each have their own neutrino *ν*.

**end $\delta C = \left(\frac{\partial C}{\partial r}\right)_t dr + \left(\frac{\partial C}{\partial t}\right)_r idt = 0$. For those 4X *circles* (so eq.11 *observables) in* fig1 N=0: eq.3 gives C ≈δz'=$dse^{i\theta}$. Furthermore if θ=0, $dse^{i\theta}$≡ds=dC (=dr) we additionally have the required *Real* eigenvalues for dr/ds observable in eq.11a. making $\left(\frac{\partial C}{\partial r}\right)_t dr = 0$ *only* at the Fiegenbaum point=$f^\alpha$=(-1.40115.,i0)=$C_M$≡end since there ∂r≈dr≈0 and ∂C/∂r=constant (for these 4X circles). Note if a circle (or many circles) is rotated (U), translated (D), shrunk (S) equally in both dimensions (i.e., $(\partial x^j/\partial x'^k)f^j = f^k \equiv \begin{bmatrix} f_{1N} \\ f_{2N} \end{bmatrix} = S_N \begin{bmatrix} U_{11} & U_{12} \\ U_{21} & U_{22} \end{bmatrix} \begin{bmatrix} f \\ 0 \end{bmatrix} + \begin{bmatrix} D_{1N} \\ D_{2N} \end{bmatrix}$) it is still a circle, eq.11 still holds, so *it's still an observable* as seen in the N fractal scale zoom. Thus you can pick out from that zoom these fig.1 Mandelbrot set 4Xdiameter circles as the only o**bservables** geometry in all that clutter so we get for that 'end' point: $S_N C_M = 10^{40N} C_M$ in the eq.13.

## z=1,z=0 steps together (on Circle with small C boost)

**Postulate1** *also* implies a small C in eq.1 which thereby implies a (Minkowski metric Lorentz contraction(9)) 1/γ boosted frame of reference in the eq.3 $C=C_M/\gamma \equiv C_M/\xi_1=\delta z'=\Delta$ for next small smaller fractal scale $N_{ob}<0$ so δz'<<1 (composite 3e: sect.2 and PartII). Also recall $\delta ds^2=0$ in eq.5. For N=0 eq.5 (which is true only for N>0) and so eq.7 is not quite true (and δz in eq.11 perturbed). But δC=δds=0 (since imaginary extremum =0) is still true so we must have an angle perturbation of big N=1 dr,dt for $\theta_o$=45°on above **ds Circle** and so a slightly modified eq.7

$$(dr-\delta z')+(dt+\delta z')\equiv dr'+dt'=ds \qquad (12)$$

**N=1,N=0 extremum rotations**

Since (eq.12) dr,dt is the (eq.11) observer $N_{observer}>0$ scale then δz' defines the $N_{ob}$ =0 object. Also the r,t axis' are the max extremum for $ds^2$, and the $ds^2$ at 45° is the min extremum $ds^2$ so Δθ=θmodulo45° is pinned to an axis' so extreme Δθ≈±45°=δz'. So in eq.12 the 4 rotations 45°+45°=90° define 4 Bosons (appendix A), and 45°-45°=0 eq.7-9 defines leptons. Again, for $N_{ob}<0$, you also have other (smaller) fractal scale extreme δz'(eg.,tiny Fiegenbaum pts so N=1 dr=r, for N=0) so metric coefficient $\kappa_{rr}\equiv(dr/dr')^2= (dr/(dr-(C_M/\xi_1)))^2= 1/(1-r_H/r)^2 =A_1/(1-r_H/r) +A_2/(1-r_H/r)^2$. The partial fractions $A_I$ can be split off from RN and so $\kappa_{rr}\approx1/[1-((C_M/\xi_1)r))]$ (13)

($C_M$ defined to be $e^2$ charge, $\gamma\equiv\xi_1$ mass). So: $ds^2=\kappa_{rr}dr'^2+\kappa_{oo}dt'^2$ (14)

From eq.7a $dr'dt'=\sqrt{\kappa_{rr}}dr'\sqrt{\kappa_{oo}}dt'=drdt$ so $\kappa_{rr}=1/\kappa_{oo}$ (15)

We can then do a rotational dyadic coordinate transformation of $\kappa_{\mu\nu}$ to get the Kerr metric which is all we need for our GR applications(9). So from eqs.4,5,14,15 we found the relation between $x_i,x_j$ pairs: $\left(\sum_{i=1}^{2}\gamma^i\sqrt{\kappa_{ii}}dx_i\right)^2 = \sum_{i=1}^{2}\kappa_{ii}d^2x_i$ (14a). So given this added 2D Δ perturbation we get curved space 2D⊗2D=4D *independent* $x_1,x_2 \to x_1,x_2,x_3,x_4$. Also assuming orthogonality $dr^2\equiv dx_1^2+dx_2^2+dx_3^2$ (as r→∞ in eq.13,15) the right side of eq.14a therefore has the 2 in the sum replaced by a 4 implying the left side then has to be in eq.14a for the 2D form to be a special case (of any 2 $x_ix_j$) inB2: Imposing orthogonality thereby creates 6 pairs of eqs.4&5. So eq.14a becomes: $(\gamma^x\sqrt{\kappa_{xx}}dx+\gamma^y\sqrt{\kappa_{yy}}dy+\gamma^z\sqrt{\kappa_{zz}}dz+\gamma^t\sqrt{\kappa_{tt}}idt)^2=\kappa_{xx}dx^2+\kappa_{yy}dy^2+\kappa_{zz}dz^2-\kappa_{tt}dt^2=ds^2$. Multiplying the bracketed term by 1/ds & unknown **δz≡ψ** so eq 11 implies 4D **Newpde:**

$\gamma^\mu(\sqrt{\kappa_{\mu\mu}})\partial\psi/\partial x_\mu=(\omega/c)\psi$ for e,*ν*, $\kappa_{oo}=1-r_H/r=1/\kappa_{rr}$ $r_H=e^2X10^{40N}/m$ **N**(=. -1,0,1., (16)

$=C_M/\gamma$ (from sect.2) $C_M$=Fiegenbaum point. So: **postulate1→Newpde.** syllogism

*Need small C boost for z=zz so postulate1 It is created by Newpde $r=r_H$ $2P_{3/2}$ stable state P,sect2

The 4 eq.12 Newpde e,*ν* rotations at $r=r_H$ are the 4 $W^+,\gamma,W^-,Z_o$ SM Bosons (appendixA).

So Penrose's intuition(6) was right on! There *is* physics in the Mandelbrot set, all of it.

**2 N=0 Small C boost circle observables.** Note that real component of eq.5 is Minkowski metric implying possible Lorentz transformation Fitzgerald contraction C/γ boosted C frames of reference. From eq.3 for N=0:C≈δz and C→C/γ=$C_M$/γ≡$C_M$/ξ. So from eq.3 for N=0 in eq.12 $C_M$/ξ=δz (eq.17)

($C_M$/ξ=δzδz for N=1) . So δ$C_M$=0=δδzξ+δξδz=0 (N=0). If **z=0** then δz'=−1 is big for N=0. In δ$C_M$=0=δδzξ+δξδz=0 for ξ small then δξ has to be small and so ξ is stable, electron $ξ_o$=Δε=ε. for **z=1** then δz is small on N=0 thus δξ and ξ are both big so unstable and large mass For N=0 observable ξ=$10^{40N}$ξ: the subatomic observable cosmos. The Laplace Beltrami method (D4) , N>1 applies to observation of the huge $r_H$ cosmological objects. (N=1 is what it is).

**N=1 small C boost so postulate observable1** (e) Recall the Mandelbrot set in small C boost $C_M$=ξC sect.2. From eq.3 δz+δzδz=C or observer N=1 δzδz=C. The 68.7° is from eq3 quadratic equation at the Fiegenbaum point. with the limacon e intersection also being at least an approximate eq,11 circle. 45° from minimum $ds^2$. μ then is not a constant in time because of eq.12 angle New pde zitterbewegung contribution to the δz chord perturbation of the 45°. The observer limacon is the electron e, the 45° intersection chord with that Mandelbulb is μ ( fig6 below.). The 68.74° tiny Mandelbulb is the tauon. But what if we constructed instead from the limacon 'e' composite 3e $2P_{3/2}$ state at r=$r_H$ requiring a mass constraint of $2m_p$ ≥ mass of the respective Hund rule free particle $2S_{1/2}$ (≡ the tauon τ) plus $1S_{1/2}$ (≡ muon μ) states? The reduced mass is then the proton that then also generates the γ boost on the $m_e$ s that gives us that small C and the **postulate**1 (observable e).

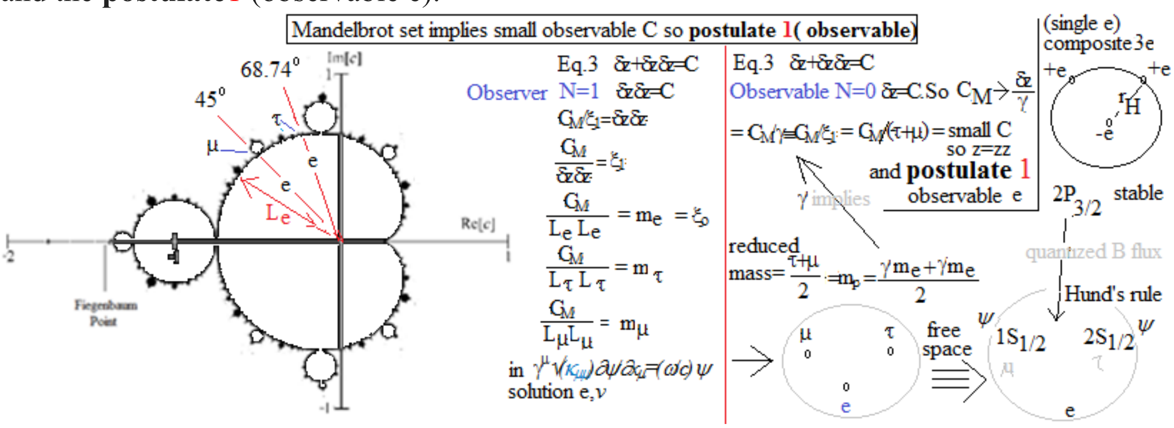



Fig.6 **Conclusion**

So we really did just **postulate 1**

* **Ultimate Occam's Razor** UOR**{postulated,unpostulated}** (i.e.,{simple,unknown simple}) thereby comprehensivly covering all possibilities of UOR. UOR here means *ultimate* simplicity, the *simplest* idea imaginable. So for example z=zz is *simpler* than z=zzzz. Therefore 1 (In this UOR context uniquely algebraically defined by z=zz) is this ultimate Occam's razor **postulate** since 0 (also z=zz) postulates literally *nothing*. Recall the algebraic definition of postulate **1** as 1=1X1 with (since 0=0X0 ialso in z=zz), 0X1=0,1=1+0 here defining the set {**1**,1+0} contrasted with that UOR set {**postulated,unpostulated}≡{1,**1+C} since 1C=C is trivial and 1+C is not. UOR is most *simply* algebraically defined as {simple, unknown simple}) ≡ {postulate1; postulate1+unknownC} ≡ {z=zz; z'=z'z'+C,z∈{z'}} if unknown constant C (so δC=0). It is called "{simple,unknown simple}" because C could be 0 in z'=z'z'+C as well.