TITLE Unified Theory   **PROJECT** 4-D

Gravity Probe B recently confirmed 2 predictions of General Relativity:
1. Glodetic Effect: Earth warps local space
2. Frame-dragging Effect: Rotating Earth drags space around with it

These results indicate the Kaluza-Klein 4-D space solutions are very promising. (e.g. 5-D space-time)

This is developed as follows:

Position: $\vec{x} = a\hat{x} + b\hat{y} + c\hat{z} + d\hat{\omega}$

$\qquad$ or, simply

$\vec{x} = a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4$

$\qquad = \sum_{n=1} a_n x_n$

$\qquad\qquad$ or Einstein Notation

$\vec{x} = a_n x^n$, $n = 0, 1, 2, 3$

$\qquad = a_\mu x^\nu$

To match Kaluza, we constrain x_4 such that:

$$x_4 \in \mathbb{T}, \quad \mathbb{T} = \{z \in \mathbb{C} : |z| = 1\} \to \sqrt{Re(z)^2 + Im(z)^2} = 1$$

$$x_1, x_2, x_3 \in \mathbb{R}$$

Can further extend x_4 to include $\mathbb{C} \cup (\infty)$, the extended complex plane (Riemann sphere) to resolve some issues.

Infinity Theory: $\frac{1}{\infty} = 0\alpha \mapsto \begin{cases} \alpha = \frac{\frac{1}{\infty \cdot 0}}{\frac{1 \cdot \infty}{0}} \text{ iff } \end{cases}$ $\begin{cases} 1 \cdot \alpha \\ \infty \cdot \alpha \\ 0\alpha \end{cases} \begin{array}{l} \to 0 \cdot \infty = \frac{1}{\infty} \cdot \infty = 1 \\ \to \frac{1 \cdot \infty}{0} = \frac{1 \cdot \infty}{\frac{1}{\infty}} = 1 \cdot \infty^2 \\ \to \frac{1}{\infty} \cdot 0 = 0 \cdot 0 = 0 \end{array}$

$$\delta = \begin{cases} 1 \to i = j \\ 0 \to i \neq j \end{cases}$$

$$I = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1\alpha & 0\alpha & 0\alpha & 0\alpha \\ 0\alpha & 1\alpha & 0\alpha & 0\alpha \\ 0\alpha & 0\alpha & 1\alpha & 0\alpha \\ 0\alpha & 0\alpha & 0\alpha & 1\alpha \end{bmatrix} = \begin{bmatrix} a_1\alpha & a_2 \cdot 0\alpha & a_3 0\alpha & a_4 0\alpha \\ b_1 0\alpha & b_2\alpha & b_3\alpha & b_4 0\alpha \\ c_1 0\alpha & c_2 0\alpha & c_3\alpha & c_4 0\alpha \\ d_1 0\alpha & d_2 0\alpha & d_3 0\alpha & d_4\alpha \end{bmatrix}$$

$$= \begin{bmatrix} e_{11}\alpha & e_{12}0\alpha & e_{13}0\alpha & e_{14}0\alpha \\ e_{21}0\alpha & e_{22}\alpha & e_{23}0\alpha & e_{24}0\alpha \\ e_{31}0\alpha & e_{32}0\alpha & e_{33}\alpha & e_{34}0\alpha \\ e_{41}0\alpha & e_{42}0\alpha & e_{43}0\alpha & e_{44}\alpha \end{bmatrix} = e_{ij}\delta\alpha$$

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Note: According to M. Wilkins:
$$\begin{cases} Z \cdot \infty = \text{energy} \\ Z \cdot 0 = \text{space} \\ Z \cdot 1 = \text{matter} \end{cases}$$

We can implement infinity theory by multiplying by 1

$$\vec{x} = 1 \cdot \vec{x}$$
$$= \hat{e}_{ij}\, \delta\alpha \cdot \vec{x}$$

$$\boxed{a_i x_i = a_i \hat{e}_i = a_{ij}\hat{e}_{ij}\delta}$$

$$= \hat{e}_{ij}\,\delta\alpha \cdot a_n x^n$$

and we realize $n = i, i \rightarrow$
$$\begin{cases} a_1 x^1, & a_1 x^2, & a_3 x^3, & a_4 x^4 \\ a_2 x^1, & a_2 x^2, & a_2 x^3, & a_2 x^4 \\ a_3 x^1, & a_3 x^2, & a_3 x^3, & a_3 x^4 \\ a_4 x^1, & a_4 x^2, & a_4 x^4, & a_4 x^4 \end{cases}$$

$$\vec{x} = \hat{e}_{ij}\,\delta\alpha \cdot a_i x_i$$

and $x^{i} = \hat{e}_{ij}\delta \rightarrow \hat{e}_{ij}\delta \cdot \hat{e}_{ij}\delta = \hat{e}_{ij}\delta \cdot \hat{e}_{ij}\delta$
$$\hat{e}_{ij} \cdot \hat{e}_{ij} = \hat{e}_{ij}, \quad \delta \cdot \delta = \delta$$

$$\therefore \boxed{\vec{x} = a_{ij}\hat{e}_{ij}\,\delta\alpha}$$

Implementing Euler's equation: $e^{i\pi} + 1 = 0$
$$1 = -e^{i\pi}$$

$$\vec{x} \cdot 1 = \vec{x}(-e^{i\pi})$$
$$\vec{x} = \hat{x}_{ij}\,\alpha\delta(-e^{i\pi})$$

$$= -a_{ij}\hat{e}_{ij}\,\alpha\delta(\cos\pi + i\sin\pi)$$
$$= -a_{ij}\hat{e}_{ij}\,\alpha\delta(-1 + 0)$$
$$\boxed{\vec{x} = a_{ij}\hat{e}_{ij}\,\alpha\delta}$$

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Determinant of $\vec{x} \cdot 1$:

$$\vec{x} = \begin{Bmatrix} \hat{x}_1 & 0 & 0 & 0 \\ 0 & \hat{x}_2 & 0 & 0 \\ 0 & 0 & \hat{x}_3 & 0 \\ 0 & 0 & 0 & \hat{x}_4 \end{Bmatrix}, \quad 1 = \begin{Bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{Bmatrix}$$

$$= \begin{Bmatrix} \hat{x}_{11} & \hat{x}_{12} & \hat{x}_{13} & \hat{x}_{14} \\ \hat{x}_{21} & \hat{x}_{22} & \hat{x}_{23} & \hat{x}_{24} \\ \hat{x}_{31} & \hat{x}_{32} & \hat{x}_{33} & \hat{x}_{34} \\ \hat{x}_{41} & \hat{x}_{42} & \hat{x}_{43} & \hat{x}_{44} \end{Bmatrix}, \quad 1 = \begin{Bmatrix} \hat{x}_{11}\alpha & \hat{x}_{12}0\alpha & \hat{x}_{13}0\alpha & \hat{x}_{14}0\alpha \\ \hat{x}_{21}0\alpha & \hat{x}_{22}\alpha & \hat{x}_{23}0\alpha & \hat{x}_{24}0\alpha \\ \hat{x}_{31}0\alpha & \hat{x}_{32}0\alpha & \hat{x}_{33}\alpha & \hat{x}_{34}0\alpha \\ \hat{x}_{41}0\alpha & \hat{x}_{42}0\alpha & \hat{x}_{43}0\alpha & \hat{x}_{44}\alpha \end{Bmatrix}$$

$$\vec{x}\cdot 1 = (\hat{x}_{11}\hat{x}_{11}\alpha + \hat{x}_{12}\hat{x}_{21}0\alpha + \hat{x}_{13}\hat{x}_{31}0\alpha + \hat{x}_{14}\hat{x}_{41}0\alpha)\quad(\hat{x}_{11}\hat{x}_{12}0\alpha + \hat{x}_{12}\hat{x}_{22}\alpha + \cdots)$$

$$\underset{1=i\cdot i}{\smile}\quad\underset{1=j\cdot j}{\smile}\quad\underset{1=k\cdot k}{\smile}\qquad\qquad\underset{0=i\cdot j}{\smile}\quad\underset{0}{\smile}$$

$$= (1\alpha + 0\alpha + 0\alpha + 0\alpha)\cdots\qquad\qquad (0)$$
$$\underbrace{}_{3\cdot 0\alpha}$$

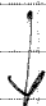$$= (1\alpha + 0\alpha)\,(0)\quad(0)\cdots$$

$$= \hat{x}_{ij}\,\alpha\,\delta\,(1+0)$$
$$= \hat{x}_{ij}\,\alpha\delta$$

New Notes:

 My assumptions of 5-D space-time have been proving correct. I decided to coin the term "A new kind of Physics" in the spirit of Wolfram. This term refers to using intuition and thought experiments the same way Einstein did when he discovered relativity. It is proving to be invaluable.

 My first discovery is that the complex plane does exist and may explain away most of the ridiculous theories coming from quantum theories. I believe this is why Kaluza-Klein didn't work until it was extended as shown on p. 47. Look at the Schrödinger wave equation and you can see it in the use of i.

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My next discovery was that <u>time is conserved</u>. This may have implications for dark energy/mass.

While messing with a new theory I derived the Heisenberg uncertainty principle from Einstein's theory.

$$E = hf$$

$$\Delta E = h\Delta f$$

$$\frac{\Delta E}{\Delta f} = h \rightarrow \frac{1}{\Delta f} = \Delta t$$

$$\Delta E \frac{1}{\Delta f} = h$$

$$\boxed{\Delta E \Delta t = h}$$

I do believe this is one of the most powerful statements. It says the energy and time are constant. Since we know that it is the frequency that shifts (at relativistic speeds) for a photon, and this is due to the length-contraction of space; and we also could say it is the ~~mass~~ momentum that increases in the case of a particle (at relativistic speeds), and this is also due to the length-contraction of space and the particle gains kinetic energy in the form of velocity, but the mass is the same; so we can safely say the ΔE is really just a ΔX
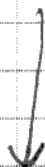
$$\boxed{\Delta X_\mu^v \, \Delta t = h} \qquad \Delta X_\mu^v = \Delta(a_\mu X^v) = \Delta(a_n X^n)$$

This can now be modified to incorporate relativistic time, perhaps

$$\Delta t = T - t_0$$

and we can use this as a basis to integrate relativity with quantization.

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