CASSIOPEIA'S ToE

8

QED
(Quantum Electro Dynamics)

ELECTRON (again)
In the wormhole view, an electron produces a "consistent" but dynamic arrangement of wormholes in its home field as well as crossover wormholes to two other Fields. One of these crossover wormholes connects to a space quantum in the Gravity Field and the other connects to the Electroweak Field. These crossover wormholes are the gateways for the particle to participate in Interactions involving Gravity and E-W Interactions.

The space quantum at the end of the E-W connection then has an extension, which separates the Electromagnetic Field and the Higgs-Weak Field. This extension breaks the Weak connection for the primary wormhole. So now, the Electron's two primary wormholes are to the Gravity Field and what is now the Electromagnetic Field (EM). The Higgs-Weak Field is an extension beyond the EM Field with another crossover wormhole. This arrangement is dynamic in that it is not localized. We will represent it as popping in and out of existence across the range defined by its wave function.

Inside the EM Field, the Gravity Field and the Weak-Higgs Field, the virtual bosons radiate out in the pattern required by the interaction patterns. In their simplest form they are radial field lines. And each line is a gauge boson wormhole.

Back to the crossover wormholes, these wormholes represent the excitations of the fermion field – in this case, the electron field. It has properties… a one-way direction, a charge, and a spin characteristic. This is where CPT transformations affect the characteristics of the wormhole and therefore of the particle.

Every gauge boson wormhole has a one-way direction, a charge, and a spin. In the photon, gluon, graviton, all 3 are wrapped up in one wormhole, so reversing Parity, Charge, or Time reverses all three and it looks like they are individually conserved – this is CPT conservation.

CPT
Specifically, a Parity transformation flips the "handedness" of the spin of the wormhole; a Time reversal transformation flips the direction of the wormhole; and Charge Conjugation transformation flips both the "handedness" and the direction.

So for uncomplicated wormhole arrangements, it is easy to see that CPT transformations return us to the original configuration and everything should be universally invariant under a CPT transformation.

But in the Weak-Higgs wormhole extensions, there are multiple possibilities. The spin of the EM wormhole (photon) can be either aligned or opposite the Weak-Higgs direction, this gives rise to the Weak Force interaction only with negative, left-handed fermions or positive, right-handed fermions. With the extension to the Weak-Higgs Field considered, Changing Parity (or C or T) changes both the EM wormhole AND the W-H wormhole, and that is not a conserved transformation. But making all three CPT transformations, gets us back to the original configuration… (need to make this easy to visualize.)

All electrically charged fermions are super-positions of left and right chiral states. And since EM, Gravity, and Strong interactions couple equally to both chiral states, these Interactions are invariant under Parity Transformations.

(how do we represent superpositions of states in the wormhole view???)

In the wormhole view, then, for Weak wormholes (need to handle this for each of the different W and Z bosons… Get the picture straight, though. These transformations happen to the FERMION, and not directly to the Boson field. Only After the transformation to the fermion do we examine the new boson field

For the Z...
Parity flips the spin direction and the wormhole no longer couples Weakly
Charge Conjugation does nothing
Time Reversal reverses the direction of the wormholes and restores