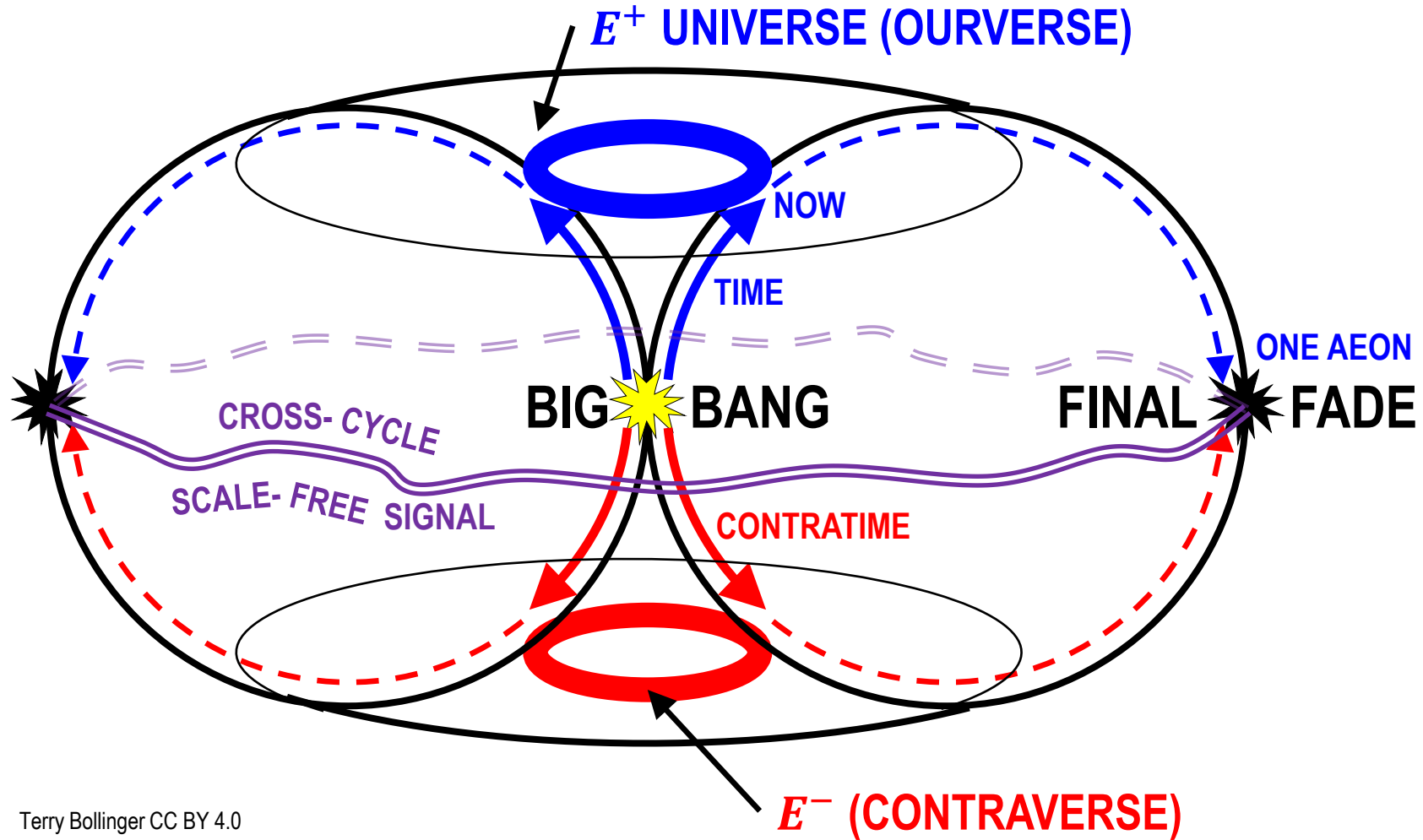


On Quantizing General Relativity: *An Overview*

Terry Bollinger
Apabistia Research
April 21, 2022

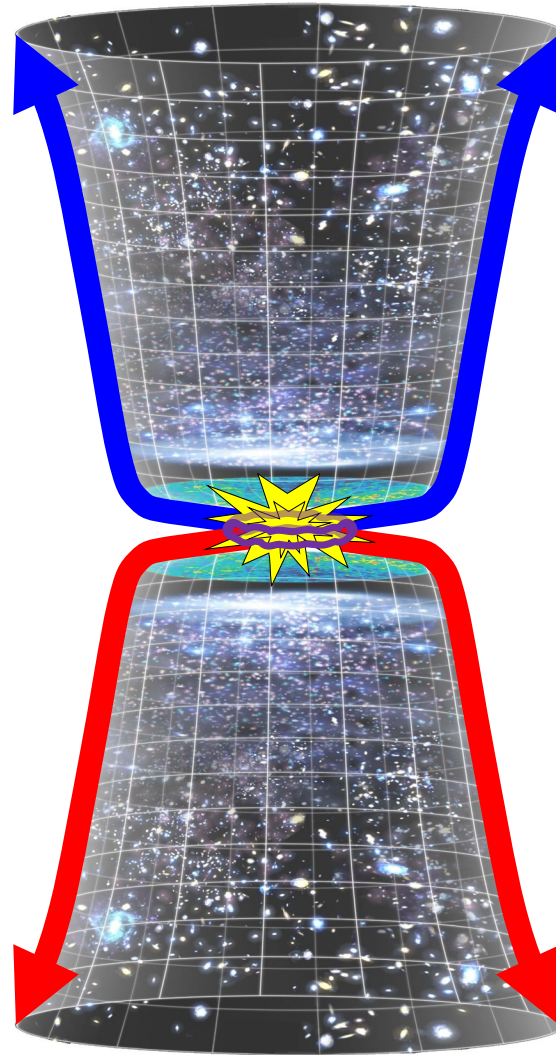
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The Dual Universe Interpretation of Conformal Cyclic Cosmology



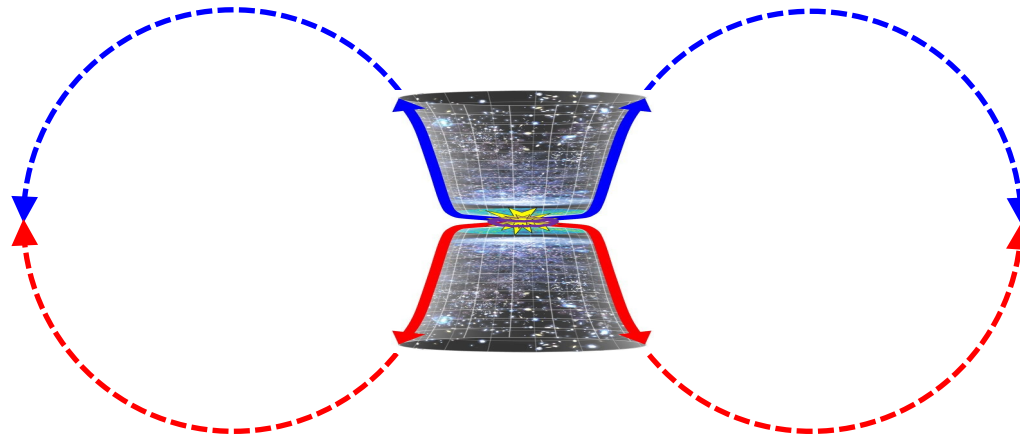
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Universe and Contraverse

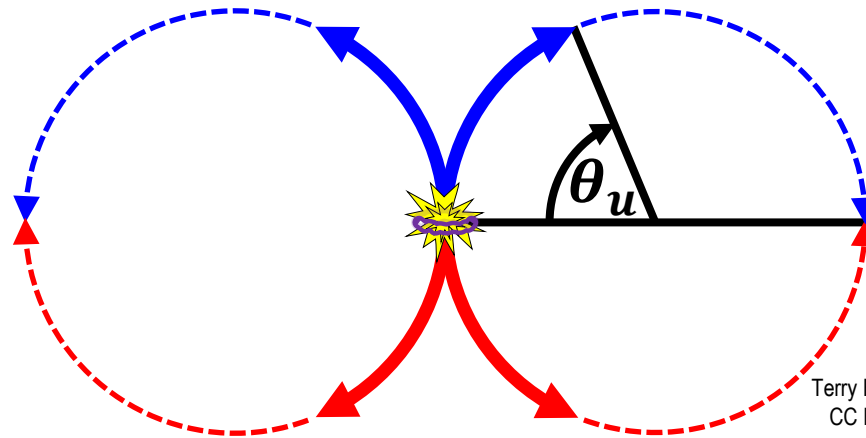


Normalizing Expansion to Angular Time

Scale-Expansion Coordinates

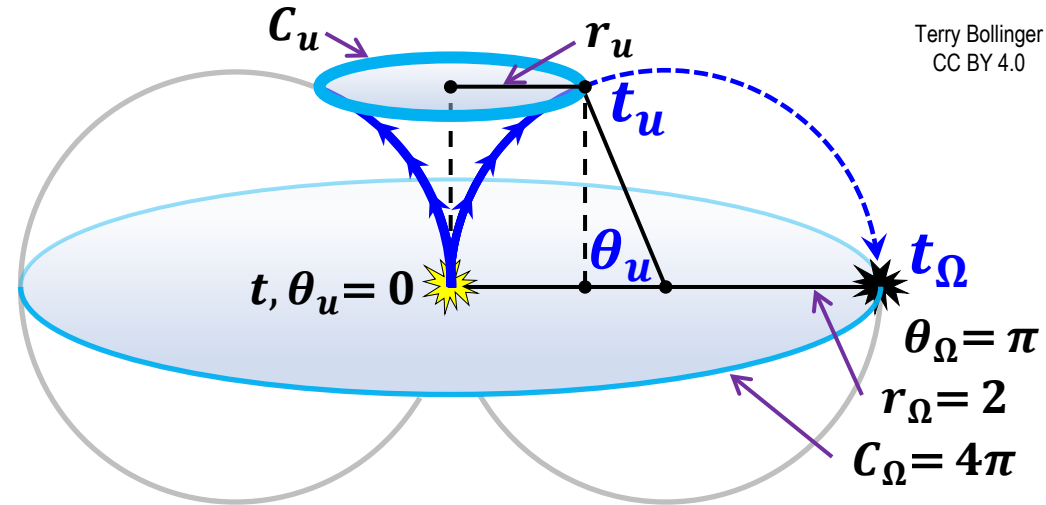


Normalized Angular-Time Coordinates



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Metrics for One Cycle

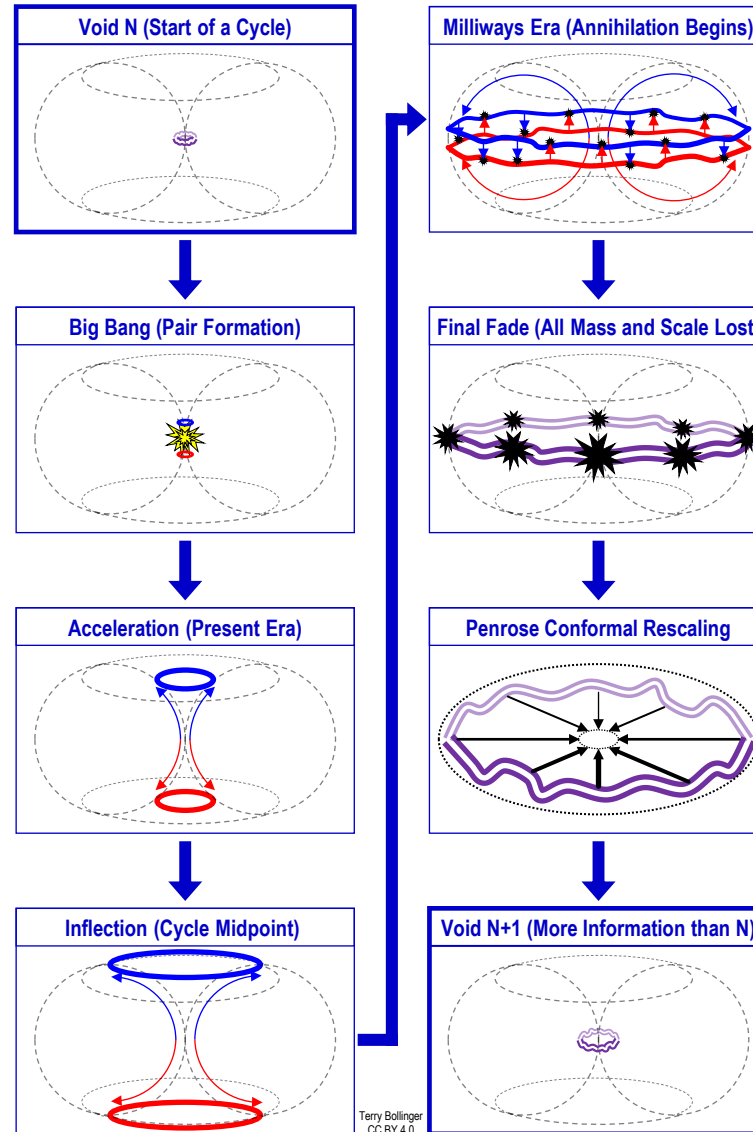


$$t_u = \frac{t}{t_\Omega} \quad \theta_u = \pi t_u = \frac{\pi t}{t_\Omega}$$

$$C_u = 2\pi r_u = 2\pi(1 - \cos \theta_u) = 2\pi \left(1 - \cos \frac{\pi t}{t_\Omega}\right) \\ = 2\pi(1 - \cos \pi t_u)$$

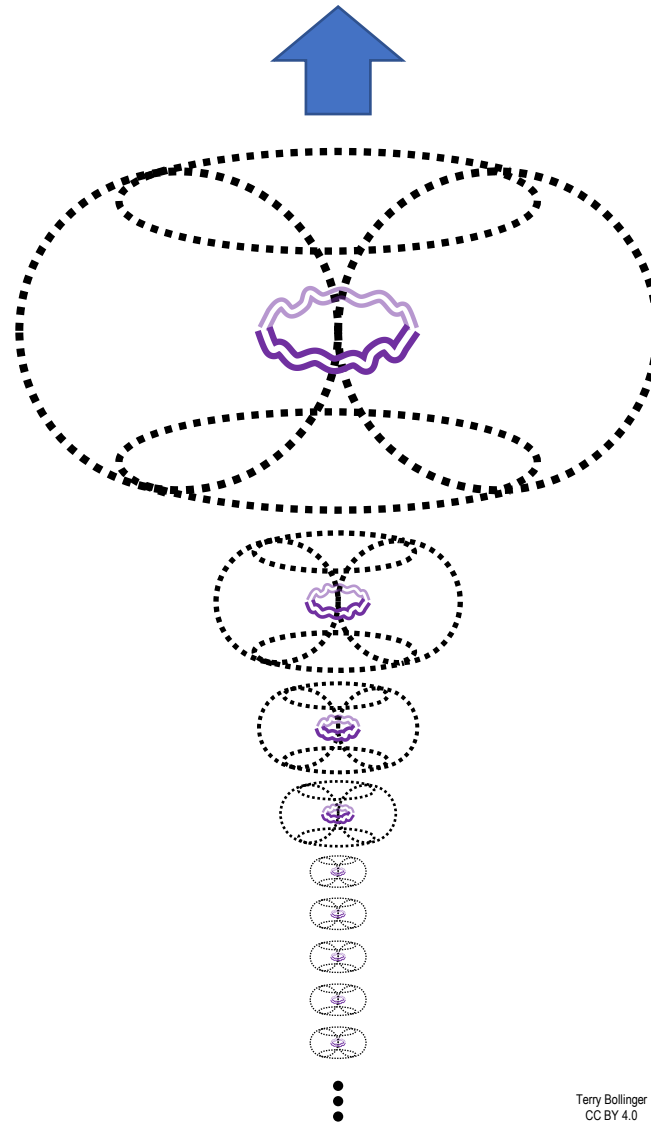
$$H_t = \frac{dC_u}{dt_u} = \frac{d(2\pi(1 - \cos \pi t_u))}{dt_u} = 2\pi^2 \sin \frac{\pi t}{t_\Omega}$$

One Full Cycle of a Dual CCC Universe



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Expansion of Cycle Size, Duration, and Complexity

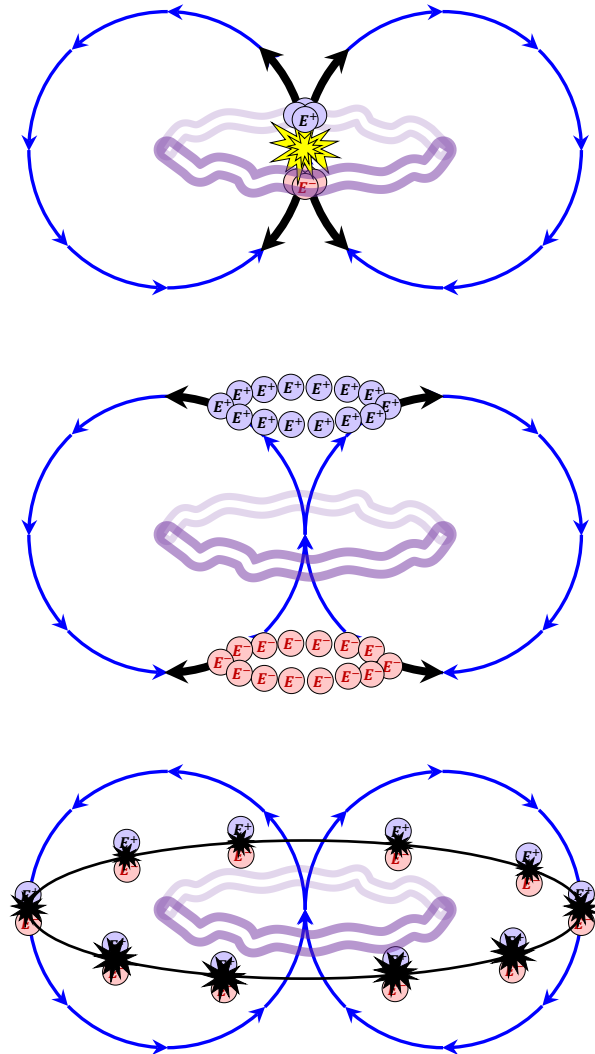


⋮

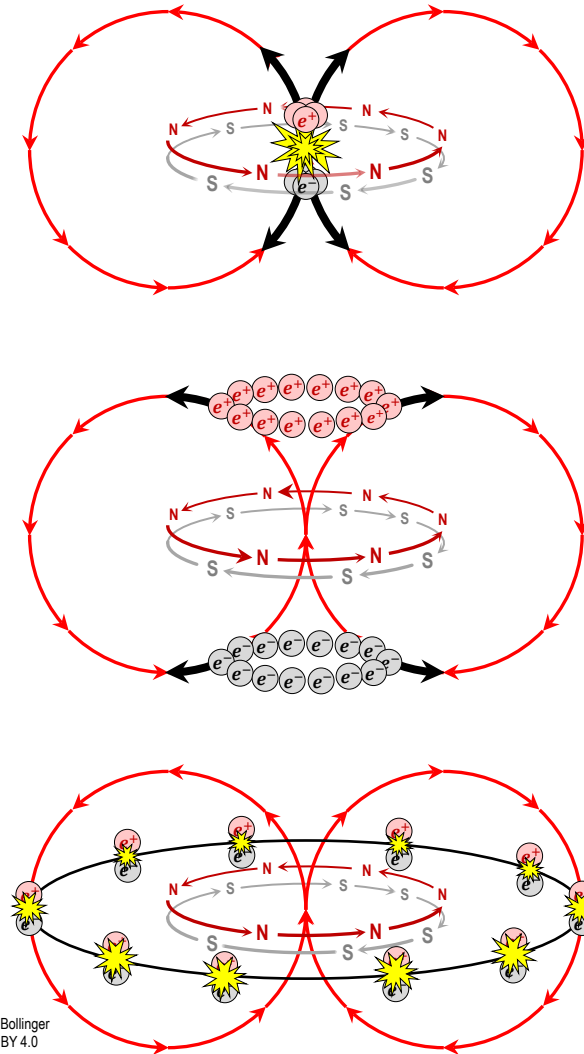
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Time as a Dipole Field

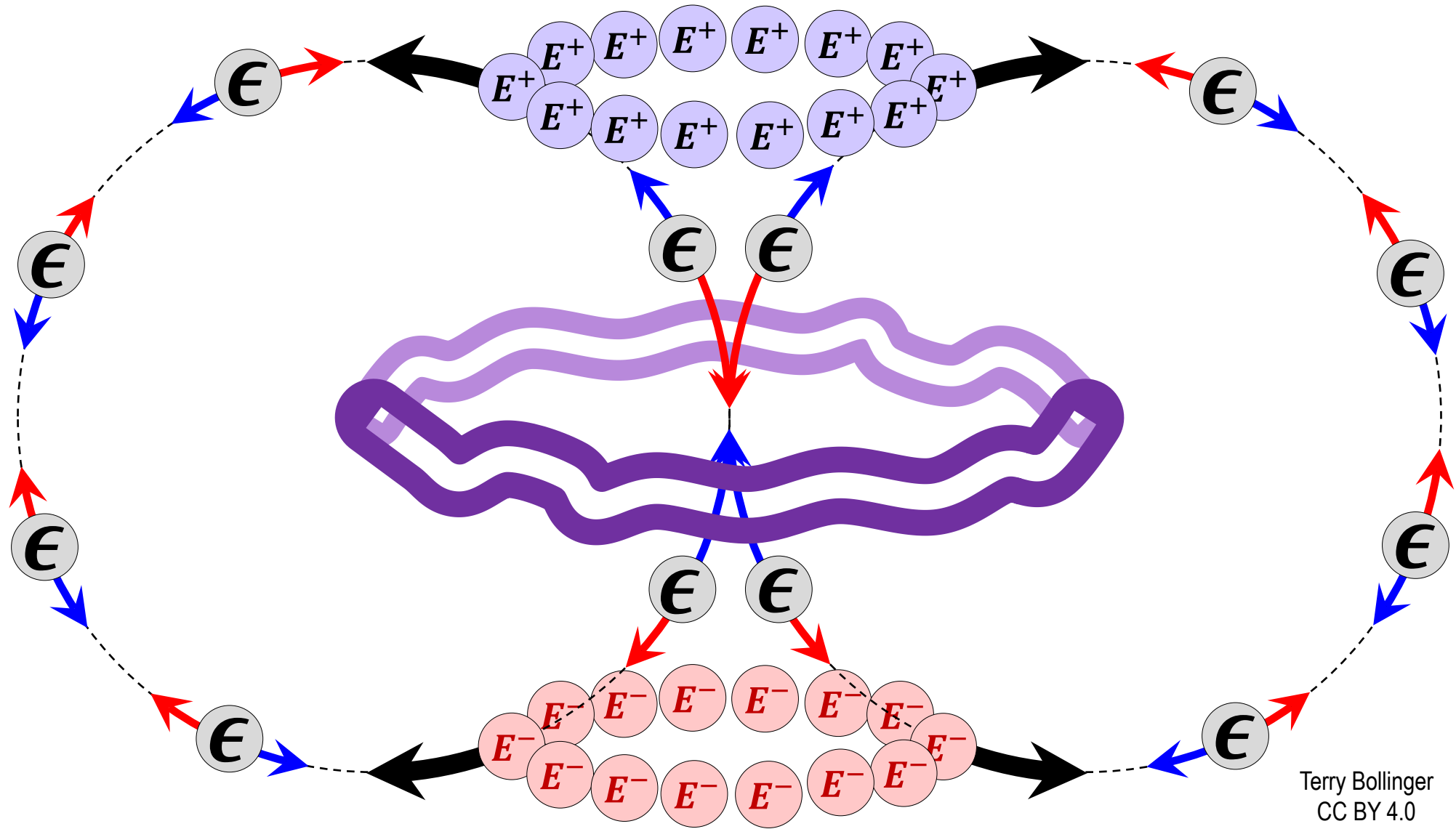
Time as a Dipole Field



An Electric Model of Dual CCC



The Ereboic Field in the 7+1 Upverse



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Tohu Charge Displacement Coordinates

Harari-Shupe-Seiberg Chromoelectric (Tohu) Charge Displacement Coordinates

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$$\begin{aligned} TTT &= T_1 + T_2 + T_3 \\ \overline{TTT} &= -T_1 - T_2 - T_3 \end{aligned}$$

$$T_1 = \bar{r} + \frac{1}{3}e = \text{charge}(\bar{d}_r)$$

$$T_2 = \bar{g} + \frac{1}{3}e = \text{charge}(\bar{d}_g)$$

$$T_3 = \bar{b} + \frac{1}{3}e = \text{charge}(\bar{d}_b)$$

$$-T_1 = \overline{T_1} = r - \frac{1}{3}e = \text{charge}(d_r)$$

$$-T_2 = \overline{T_2} = g - \frac{1}{3}e = \text{charge}(d_g)$$

$$-T_3 = \overline{T_3} = b - \frac{1}{3}e = \text{charge}(d_b)$$

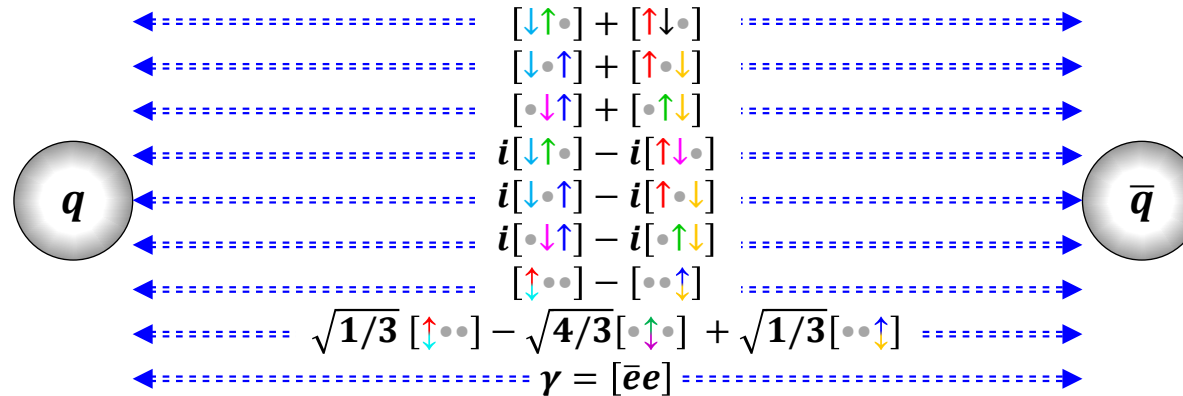
Placeholder: V ($=0$, *no* anti). Example: $TVT = T_1 + T_3 = \text{charge}(u_g)$

Tohu units are mutually orthogonal for *all* fermions: $(T_i \perp T_j)_{i \neq j}$

The 9, 3, and 1 Views of Internal Pion Forces

The Nine Standard Model Force Particles in Pions

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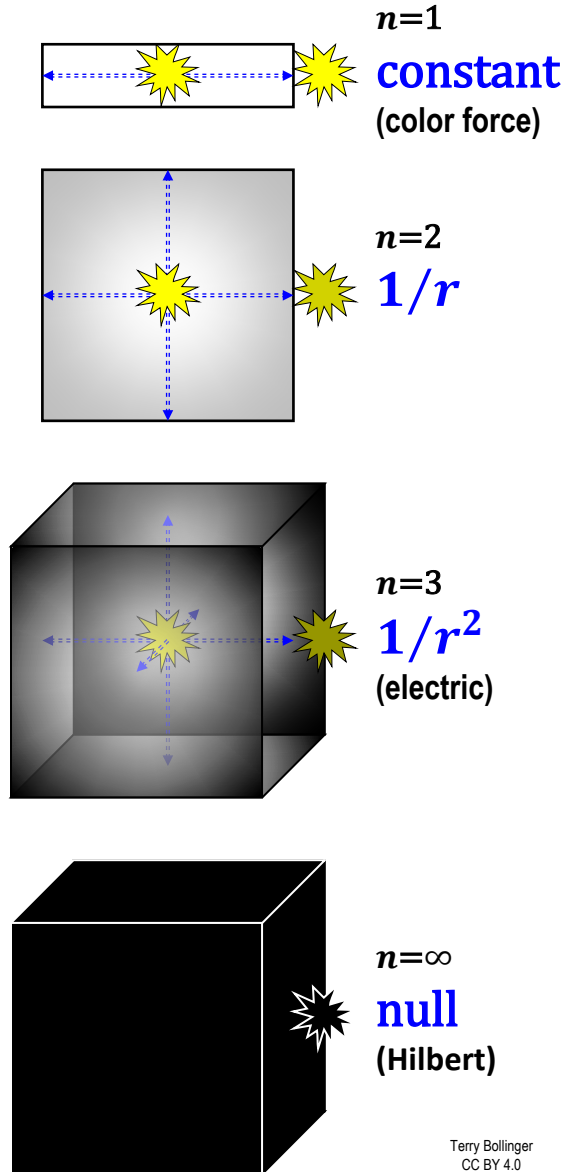
The Three Tohu Force Particles in Pions



The Single Imposition Force Particle in Pions



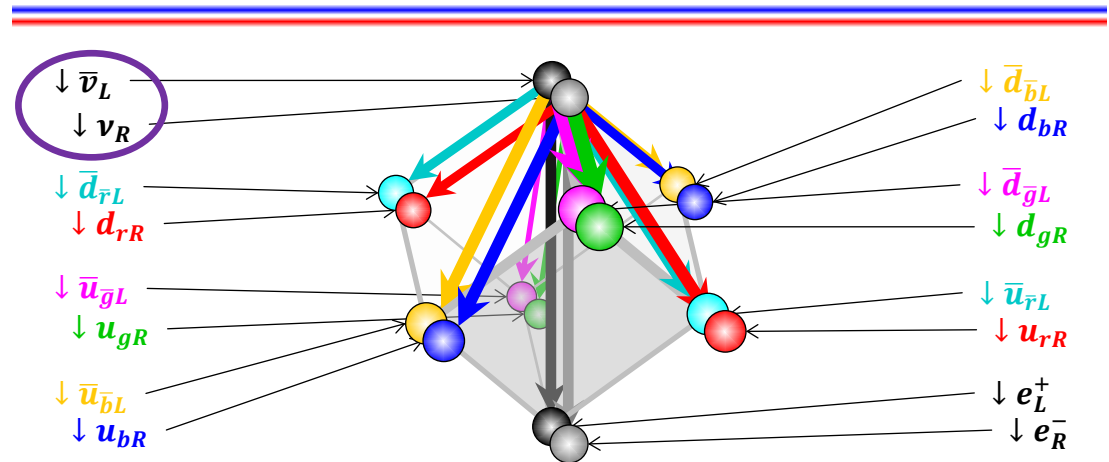
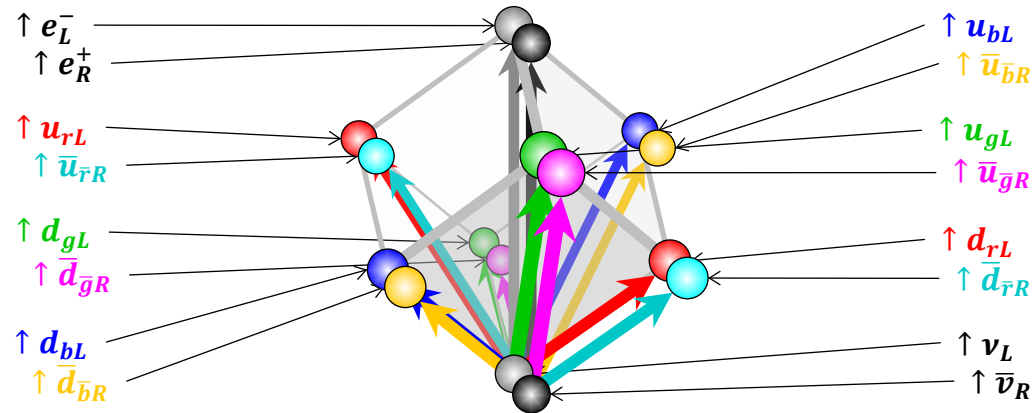
The Infinite Darkness of Hilbert Space



E+ and E- Fermion Groups

E^+ Fermion Group (Weak-Aware)

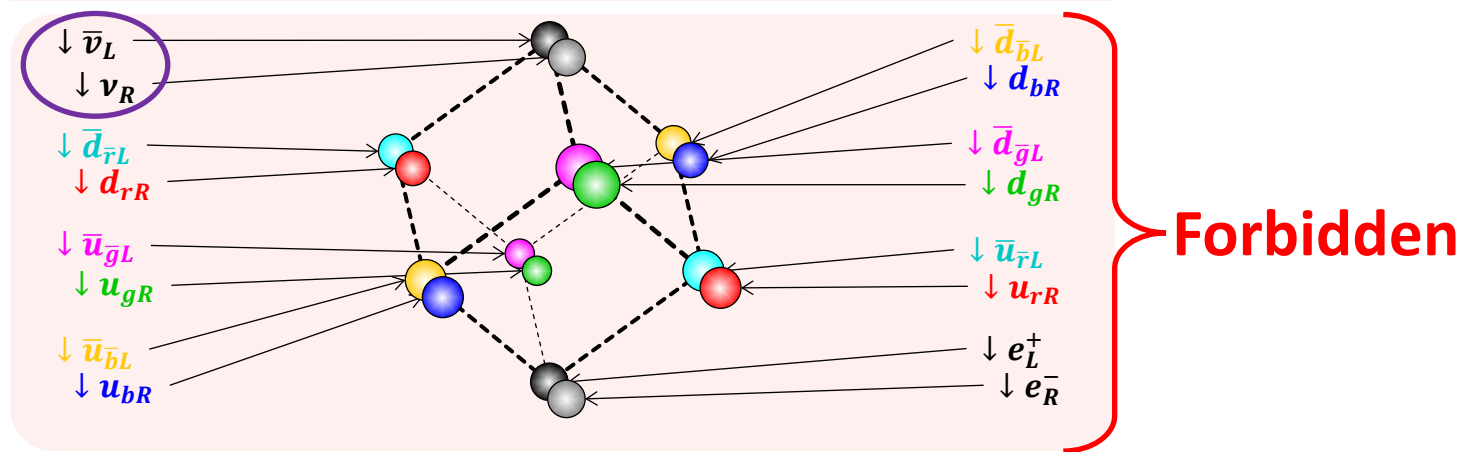
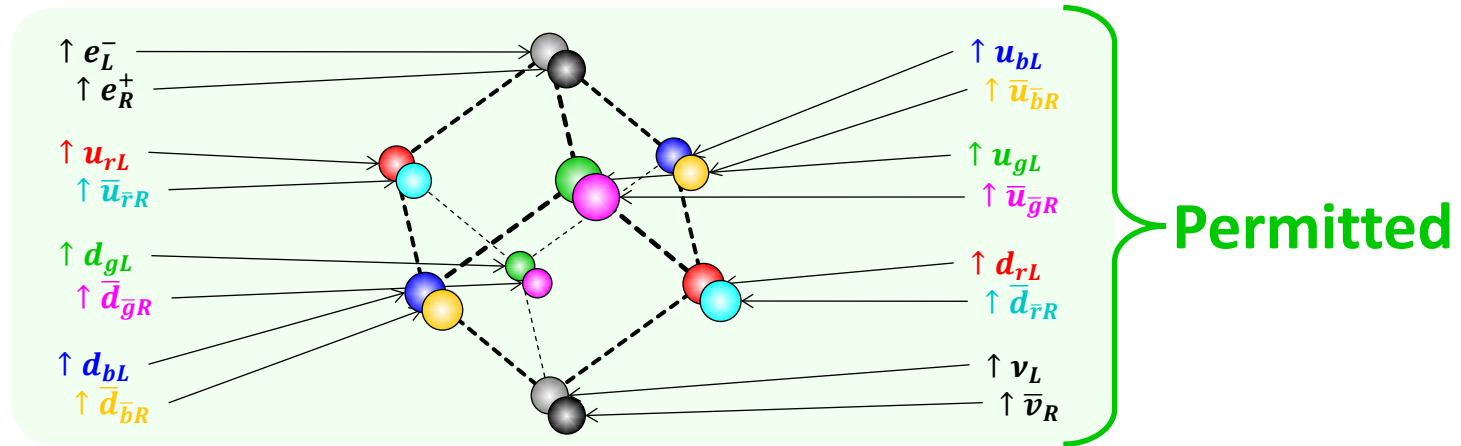
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E^- Fermion Group (Weak-Blind)

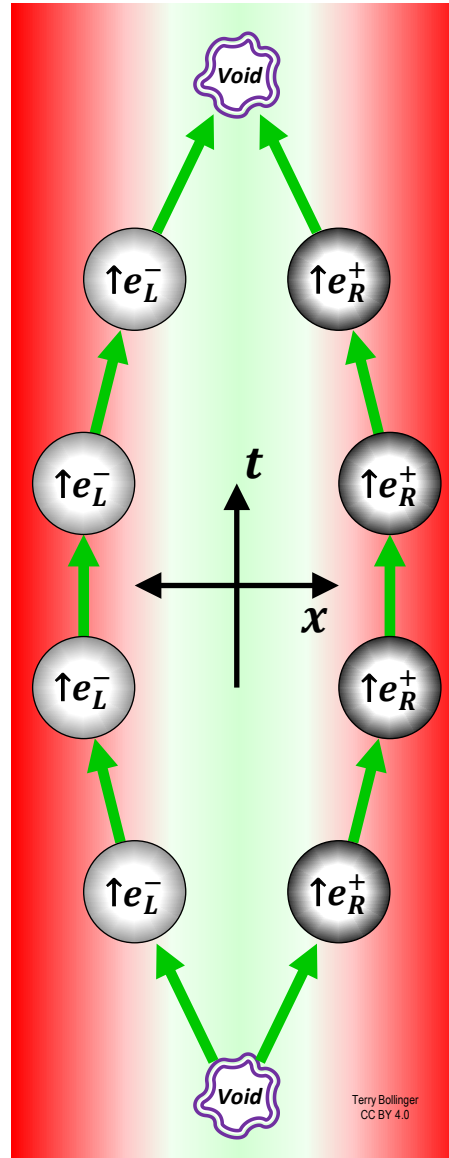
Permitted (E+) and Forbidden (E-) Space Pairs

E^+ Space Pairs



E^- Space Pairs

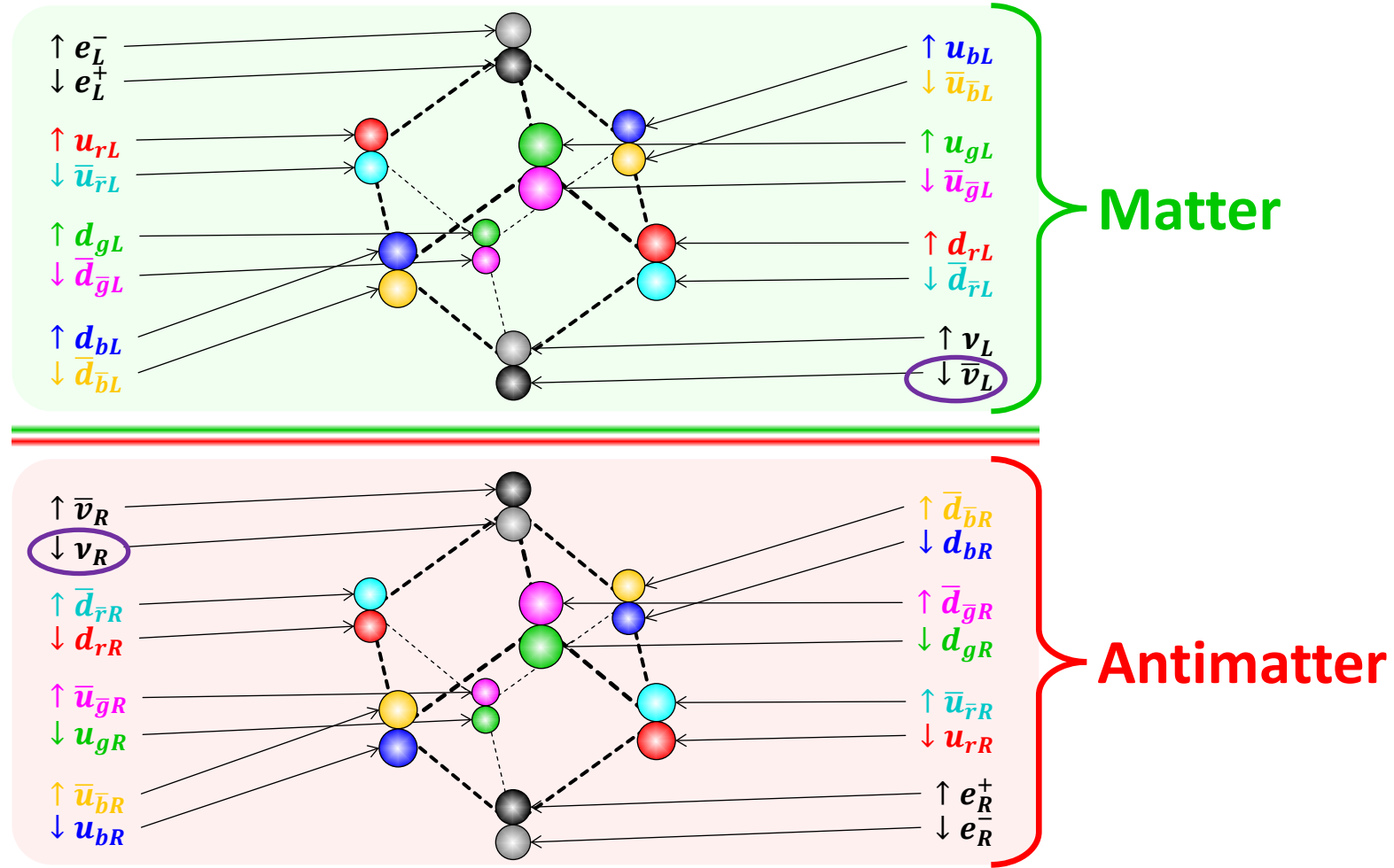
Space-Pair Creation and Annihilation



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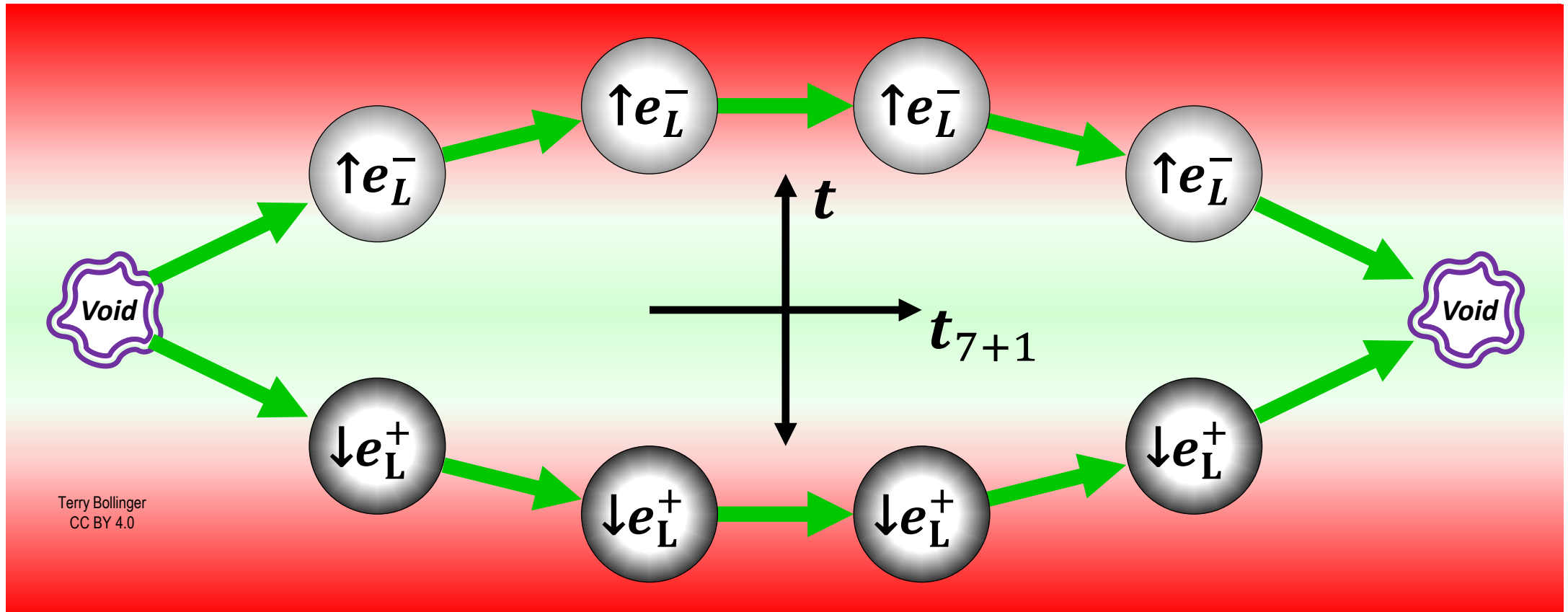
Time Pairs for Matter and Antimatter

Left-Handed Time Pairs

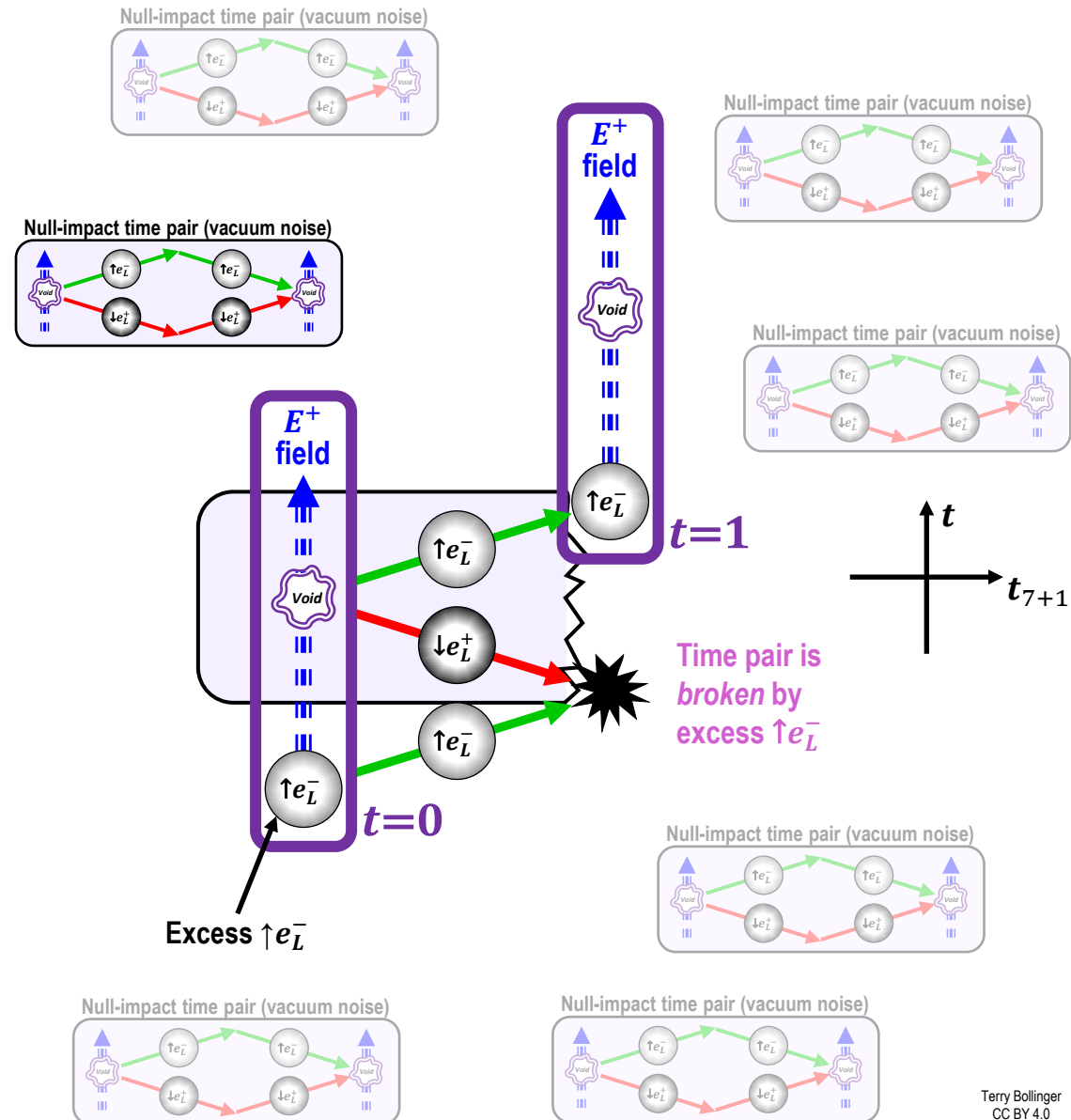


Right-Handed Time Pairs

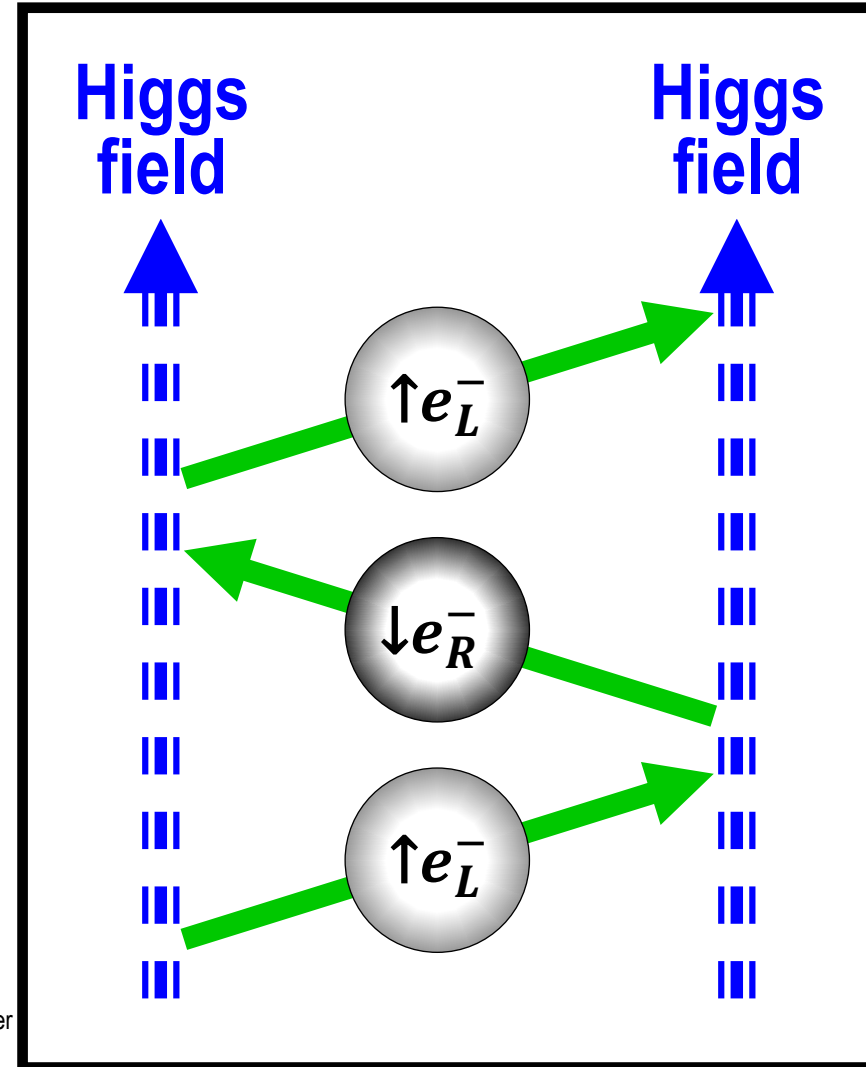
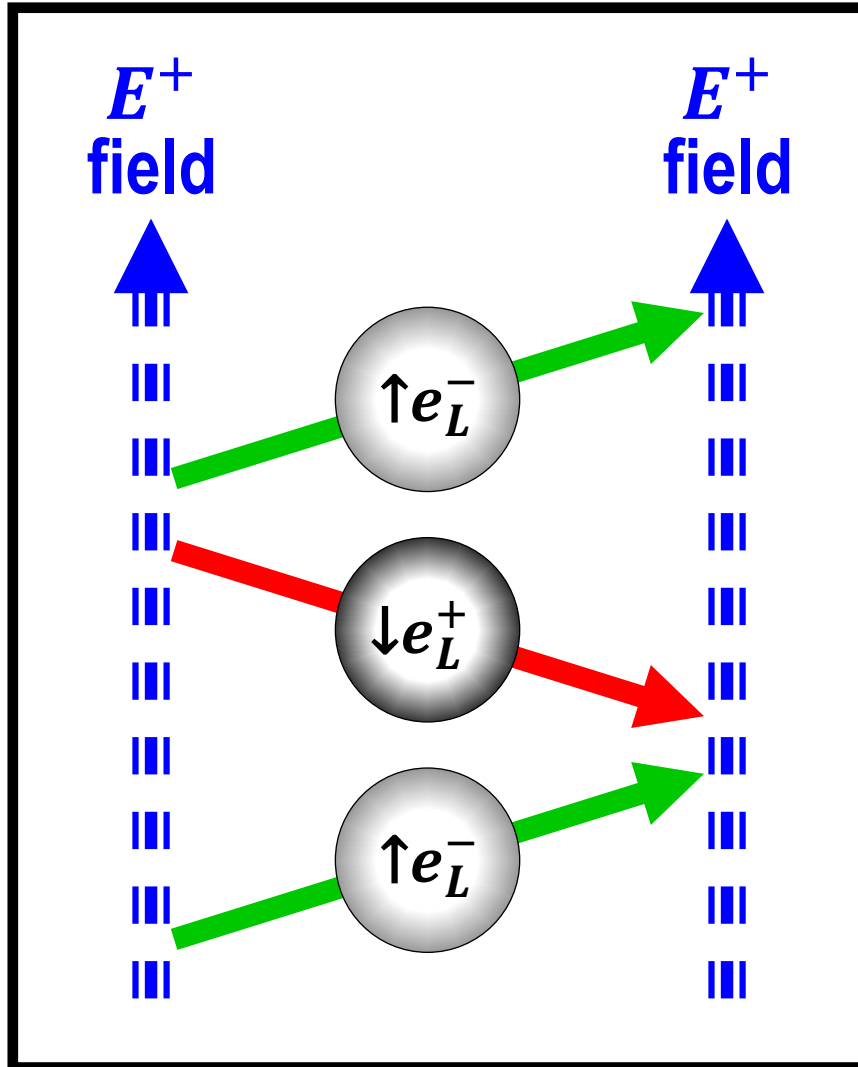
Time-Pair Creation and Annihilation



Time as Destabilized Time Pairs



E+ Field and the Higgs Field



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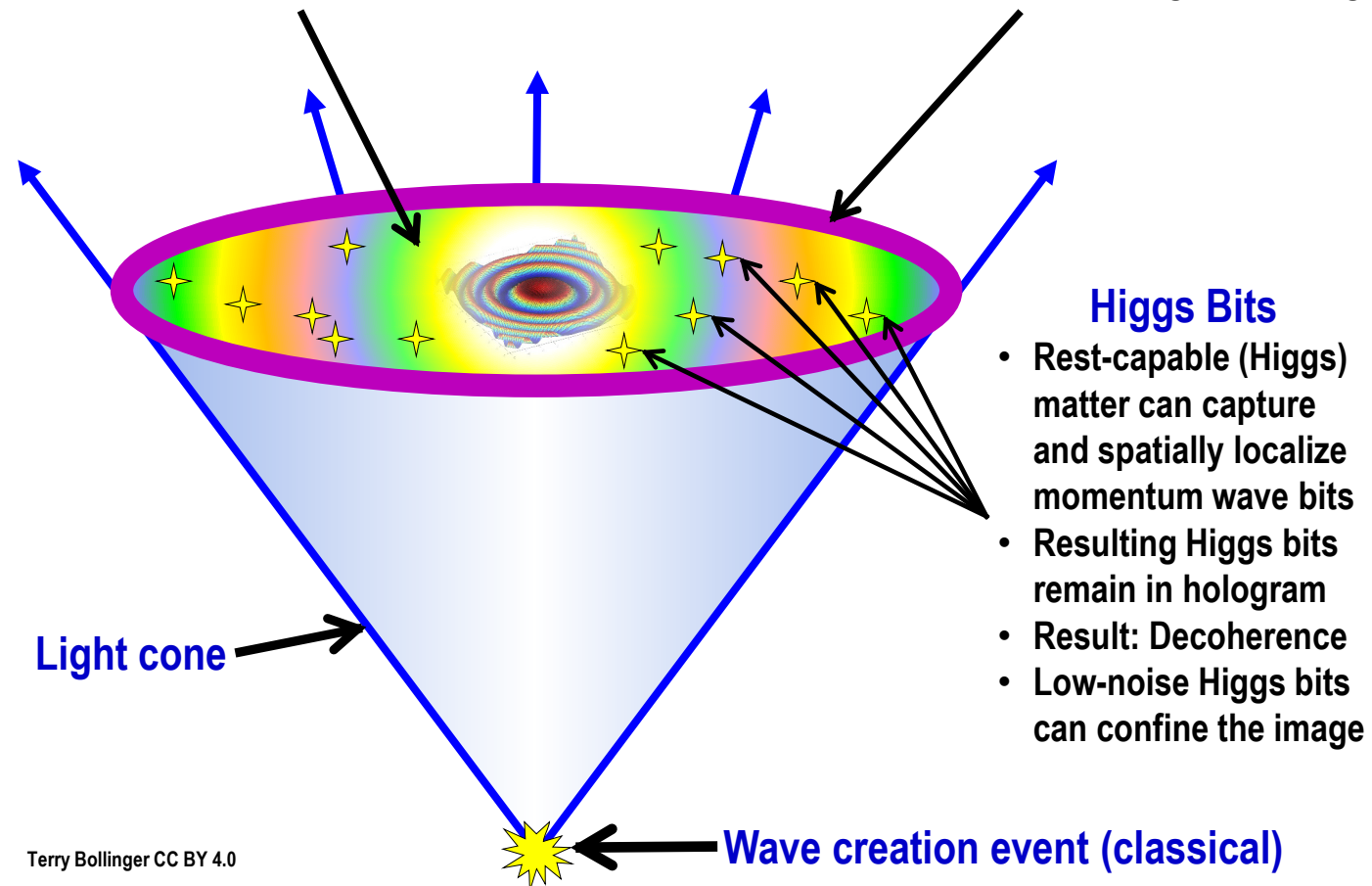
Holographic Information Waves

Schrödinger Image

- A dynamic *information hologram*
- Existence is defined by *external data*
- Hologram confines quantum numbers
- Image projected via momentum space

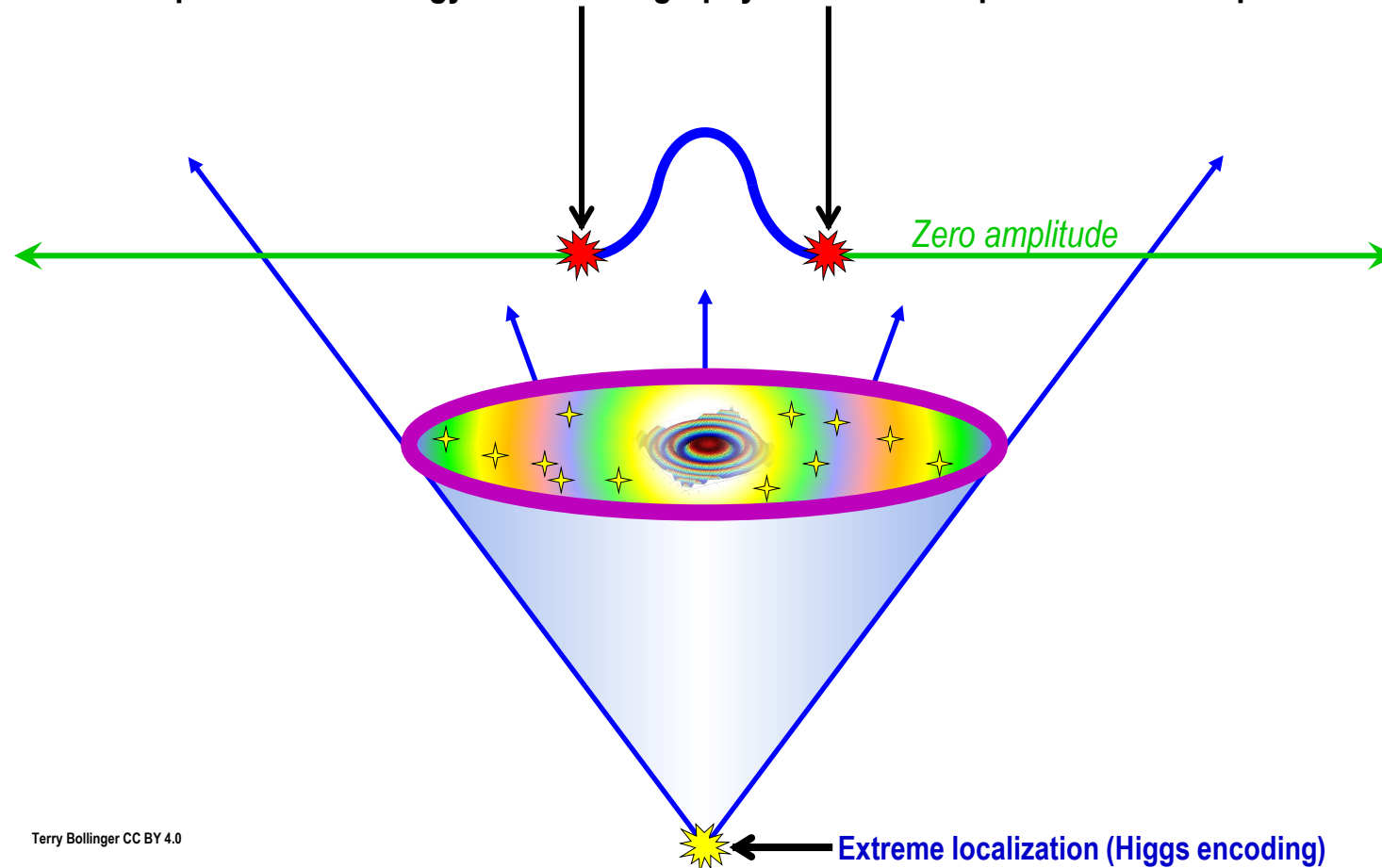
Holographic Information Wave

- Classical data expands at up to speed of light
- Composed mainly of phonons and photons
- This data encodes *all* knowledge on the wave
- Fourier transform provides holographic image



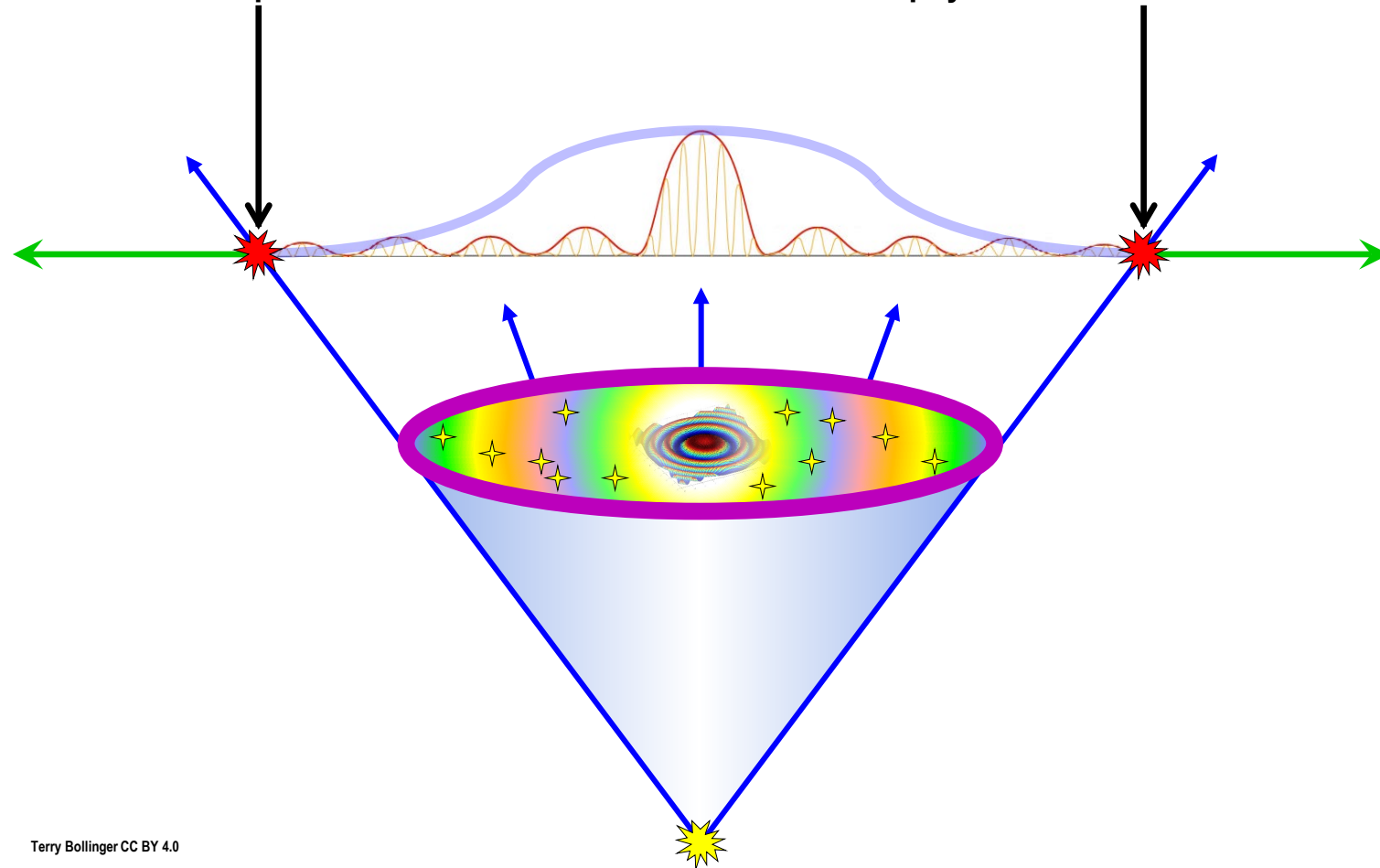
Holography and Bump Functions Don't Mix Well

- Bump functions (distributions) capture the idea of wave function *localization*
- Notably, Dirac delta functions are the mathematical limits of bump functions
- Bump functions splice functions to guarantee C^∞ smoothness, but at a cost
- Bump-splice boundaries require *infinite* (f/∞) Fourier spectrum (momentum)
- Not possible for energy-limited holography based on real particles in real space



Light Cones Are Natural Quantum-Wave Boundaries

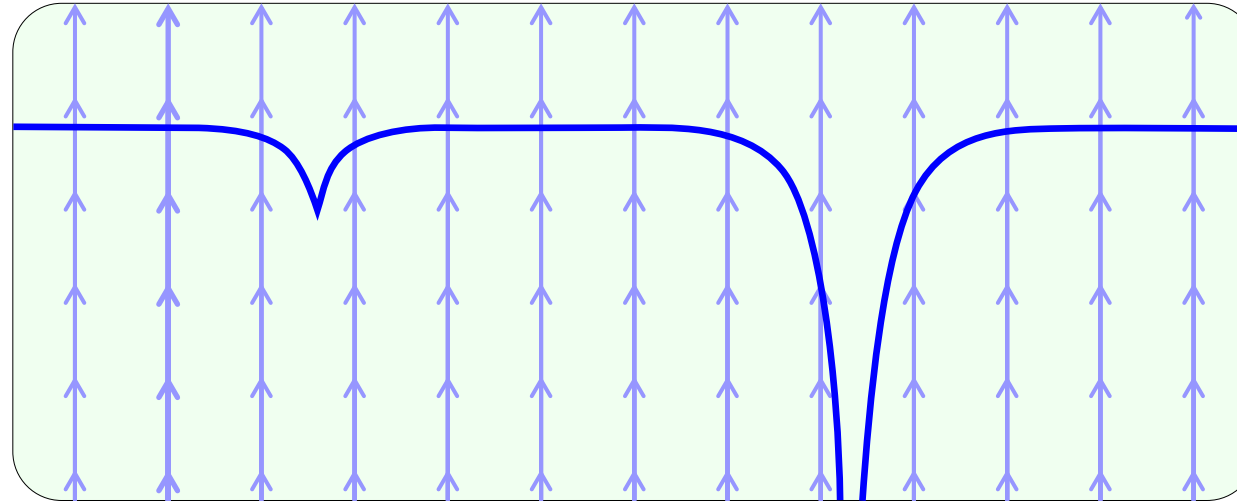
- An alternative: Shift the infinite-momentum bump boundaries out to the light cone
- The resulting boundary spectrum then matches with the SR momentum spectrum
- An interesting implication: Light cones are fundamentally *quantum* phenomena
- A second implication: Dirac delta functions are the *least* physical of distributions



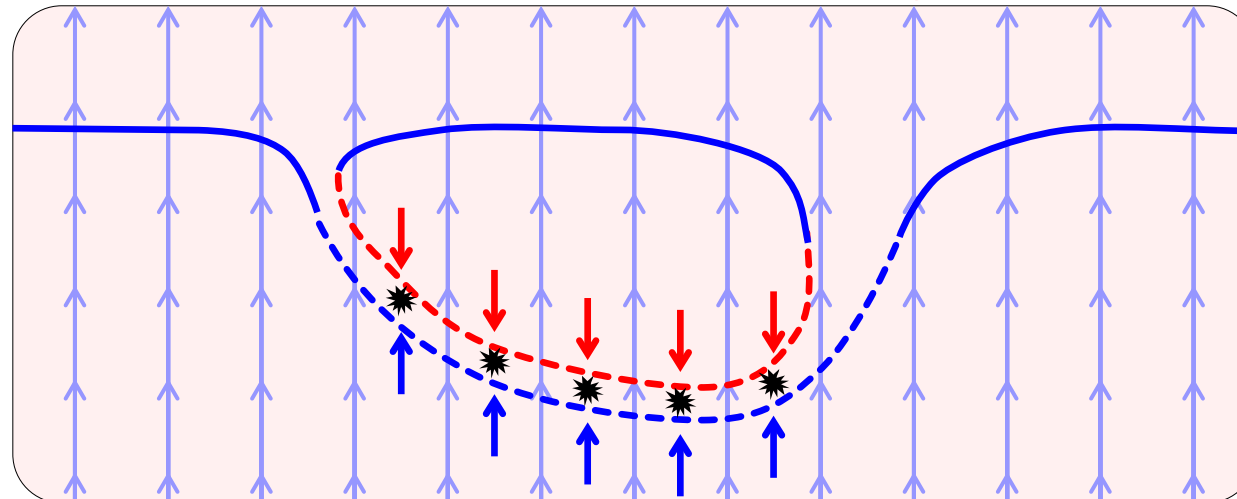
Ereboic Field Constraints on Exotic GR Solutions

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Permitted: Black Hole Cosmologies



Forbidden: Wormhole Cosmologies



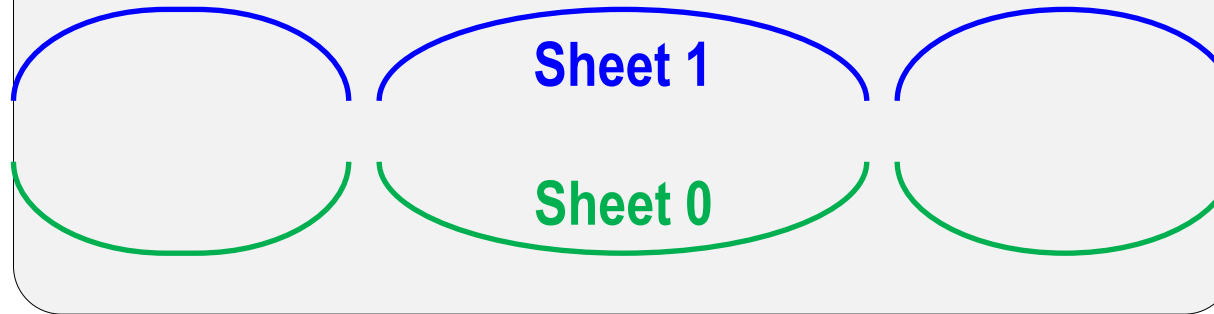
Reinterpreting Riemannian Manifolds

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Isotropically Parallel Manifolds

Issue (1): Infinite (C^∞) smoothness implies infinite precision, even at quantum scales

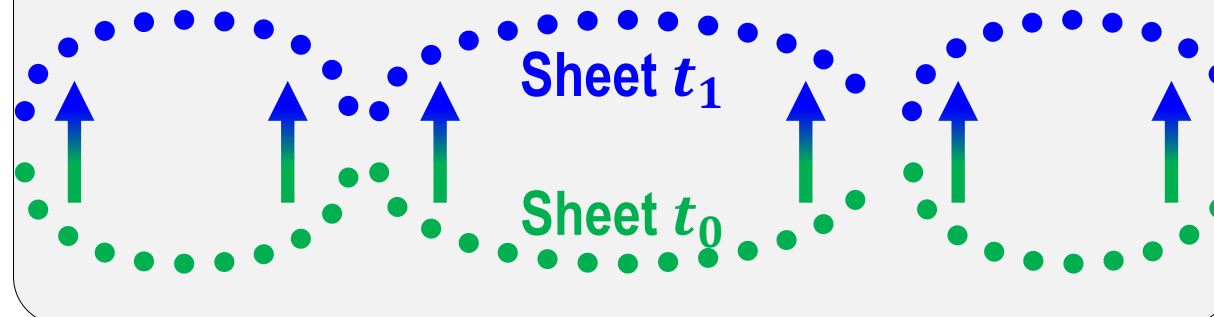
Issue (2): Simultaneous co-existing worlds sheets (here with ER bridges) are conceivable



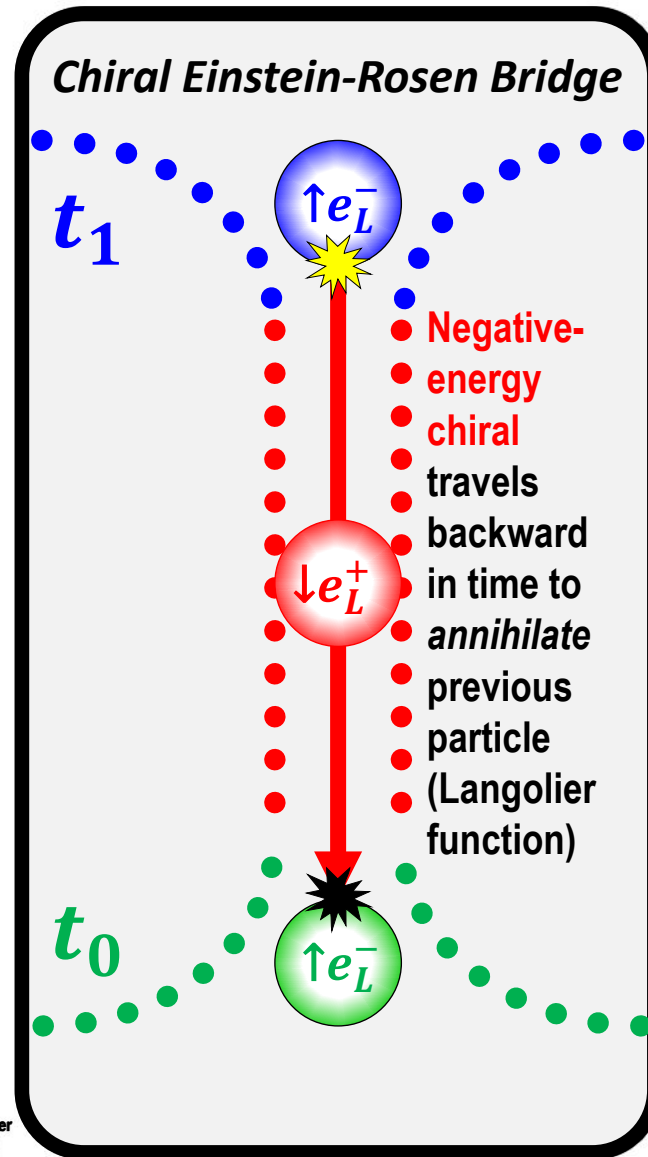
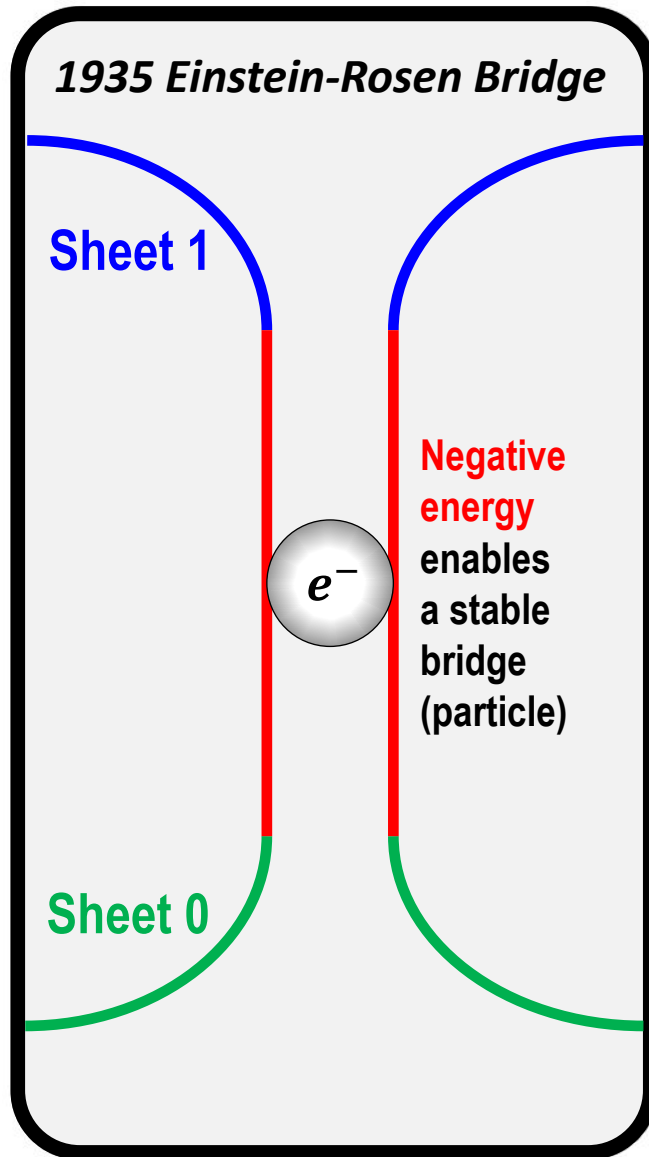
Time-Front Manifolds

(1) Resolution depends on available energy, and so becomes *blurred* at particle scales

(2) In time-front manifolds, adjacent parallel sheets imply *movement*, versus co-existence



Einstein-Rosen Bridges



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