QCFT Glossary
Quantum Chronotension Field Theory

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1. Field Structure

- $\eta(x,t)$ – Time-viscosity scalar field. Governs local rate of time passage. High $\eta \Rightarrow$ slower time.
- $\eta^a(x,t)$ – Quantized, vector-valued field with SU(N) symmetry. Supports braiding, solitons.
- **Gradia** ($|\nabla\eta|$) – Spatial gradient of η; perceived as gravitational tension.
- η^2 **Density** – Field energy: $\rho_\eta = \eta^a\eta^a$, conserved under ideal conditions.
- **Emergent Geometry** – Effective metric: $ds^2 = -\frac{dt^2}{\eta^2(x,t)} + \eta^2(x,t)dx^i dx^i$

2. Dynamics and Equations

- **Canonical Redshift:** $1 + z = \exp\left(\int_{\text{path}} \frac{d\eta}{\eta}\right)$
- **Redshift Residuals:** $\Delta z = \ln(1 + z_{\text{obs}}) - \ln(1 + z_{\text{model}})$
- **Redshift Components (8):**
  1. η_{emit}
  2. η_{obs}
  3. $\partial\eta/\partial t$
  4. $\nabla\eta_{\text{emit}}$
  5. $\nabla\eta_{\text{obs}}$
  6. $\nabla\eta_{\text{IGM}}$
  7. $\eta_{\text{aniso}}(\theta,\phi)$
  8. $\eta_{\text{fluct}}(x,t)$
- **Lagrangian:** $\mathcal{L} = \frac{1}{2}\delta^{ab}\partial_\mu\eta^a\partial^\mu\eta^b - \lambda(\eta^a\eta^a - v^2)^2 + \theta\epsilon^{\mu\nu\rho\sigma}f^a_{\mu\nu}f^a_{\rho\sigma}$
- **Collapse Threshold:** $\eta_{\text{crit}} \approx 10^{-4}$

3. Quantization and Interaction

- **Chronode** – Solitonic knot in η^a. Encodes charge, spin, mass via topology.
- **Chronode Interactions:** Merge, split, braid, annihilate.
- **S-Matrix:** $S_{fi} = \langle \text{final} | \hat{U} | \text{initial} \rangle$, with $\hat{U} = \exp\left(-i \int \mathcal{H}_{\text{int}} dt\right)$
- **Gauge Emergence:**
  - SU(3): η^a braids (color)
  - SU(2): η^a twists (weak)
  - U(1): Circulation in η^0 (charge)
- **Mass:** From η^2 compression and oscillation

4. Cosmology

- **The Great Unfurl:** Universe emerges via η decay
- **Chronogenesis:** First chronodes from interference
- **Field Collapse Events (FCEs):** Occur when $\eta < \eta_{\text{crit}}$; emit η-waves
- **Eta-Scars:** Residual structures from FCEs — explain voids, lensing anomalies
- **CMB:** Projection of early η^2 pattern, not relic radiation

5. Particle Mapping and Topology

- **Charge** – U(1) winding
- **Spin** – Circulation twist (e.g. Möbius)
- **Color** – SU(3) braids
- **Generations** – Harmonics of same knot
- **Neutrinos** – Minimal-twist chronodes
- **Bosons** – Structured η^a pulses

6. Experiments and Technology

- **Gradia Clock Drift:** Clocks across $\nabla\eta$ detect local time rate shift
- **Residual Mapping:** $\eta(z, \theta, \phi)$ inferred from redshift
- **Lensing Deviations:** Gradia causes deflection even without mass
- **Eta-Wave Echoes:** Detected in pulsar timing / quantum phase shift
- **Chronotension Devices:**
  - Temporal shielding
  - Eta-membranes (delay, energy)
  - Chronode lattices
  - Synthetic η-gap coherence (AI)

7. Abbreviations

Term	Meaning
η	Time-viscosity scalar field
η^a	Quantized SU(N) eta-field
Gradia	$\lvert\nabla\eta\rvert$, spatial tension
Chronode	Soliton (topological knot)
FCE	Field Collapse Event
η_{crit}	Collapse threshold
η-gap	Coherence zone between chronodes
S-Matrix	Scattering formalism
The Unfurl	Cosmogenesis via η decay