Fractal Causality™ — The Model of LOE™ (The Law of Expansion)

BURSTING FOREVER™

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Our 3+1 universe is a brane embedded in a hidden 5th spatial dimension we call the **Law of Expansion (LOE)**. LOE holds and continuously creates structure: **Cosmic Quantum Bursts (CQBs)** within LOE project discrete bulk modes whose weighted projection onto our brane interfere and recurse. **Fractal Causality (FC)** is the model describing this continuous birth of structure across scales.

Why this matters
This is a falsifiable hypothesis: we provide compact templates and runnable code to search for interference beats in the matter power spectrum (P(k)), log-periodic echoes in ln(k), and phase-coherent structure in the bispectrum. The model also suggests possible correlated signals across optical-clock networks and other precision experiments.

What to test (immediately)
1) Power-spectrum residuals P(k): fit two-mode interference + log-periodic templates on BOSS/DESI residuals.
2) Bispectrum phase coherence: test whether phase relations match P(k) template predictions.
3) Precision metrology: search for correlated tiny frequency shifts across separated clocks consistent with LOE spatial correlations.

Pass / Fail criteria
• *Pass:* A statistically significant nonzero ε (echo amplitude) with Bayes factor strongly favoring the model and consistent cross-dataset corroboration (P(k) + bispectrum and/or clock correlations).
• *Fail:* No improvement relative to null across independent datasets and tight upper limits on ε that rule out the parameter space of interest.

Compact Templates (practical forms for data fitting)

Two-mode interference (observable template)
$P_{obs}(k) \approx w1^2\, P1(k) + w2^2\, P2(k) + 2\, w1\, w2\, \sqrt{(P1\, P2)} \cdot \varepsilon \cdot \exp[-(k/k_c)^{\alpha}] \cdot \cos(2\pi\, k / k_{mode} + \phi)$

Recursive echo (log-periodic residual)
$\Delta(k) \approx A \cdot \cos(\omega \ln k + \phi) \cdot \exp[-(k/k_c)^{\alpha}]$, with $\omega \approx 2\pi / \ln \beta$

Brane / bulk intuition
$\varepsilon \propto g(y■)^2 \cdot \Lambda_{bulk} / M_{eff}■ \times overlap(\chi_n, W)$, and $k_{mode} \leftrightarrow |\mu■ - \mu■|$ (mode spacing set by LOE geometry)

Deliverables included
- This 2-page Proof Pack (plain summary + templates).
- Runnable fitting skeleton (least-squares + MCMC) — available in the repo.
- Toy simulator demonstrating log-periodic residuals (in the code directory).
- Visuals: example recursion plots and LOE canvas (see repo assets).

How to reproduce
1) Clone the repo and install dependencies (Python, numpy, scipy, emcee or other MCMC tool).
2) Run the injection demo to reproduce detectability plots (provided).
3) Use the template function in the fit module to fit public P(k) residuals and compute Bayes factor vs null.