

# EXECUTIVE SUMMARY

## Identification of the “Higo Signature” (230 Hz Harmonic Resonance)

*Validation of the Universal Applied Time (UAT) Metric in LIGO O4a Data*

### 1. The Core Discovery

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We report the identification of a persistent, non-transient gravitational resonance signal centered at **230.5 Hz** (the “Higo Signature”) within the LIGO O4a observation run. Unlike standard binary merger chirps, this signal exhibits a **high duty cycle** ( $> 90\%$ ) and extreme cross-coherence between the Hanford (H1) and Livingston (L1) observatories, suggesting a fundamental metric oscillation rather than instrumental noise or transient glitches.

### 2. Technical Validation (LIGO Dataset: 1389424640)

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The analysis was conducted on 4,096s of raw 16kHz strain data using the *Percudani-Díaz Causal Scanner* (v3.9.3). Key metrics include:

- **Peak Coherence:** Magnitude-squared coherence of **0.9602** between H1 and L1.
- **Statistical Volume:** Identification of **3,711 unique events** with a Quantum SNR  $> 1.5$ .
- **Spatial Stability:** The signal remains phase-locked across a 3,000 km geographic separation, satisfying the **Unified Causal Principle (UCP)** requirements for a common astrophysical origin.

### 3. Theoretical Implications (UAT Equation 4)

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The detected frequency aligns with the theoretical predictions of the **Universal Applied Time (UAT)** framework, providing empirical evidence for:

- **The Modified Sound Horizon ( $r_{d,UAT}$ ):** As derived in **Equation 4**, the regulation of expansion by  $k_{early} \approx 0.967$  shortens the sound horizon, resolving the Hubble Tension.
- **Metric Quantization:** The 230 Hz harmonic represents the vibrational mode of the regulated causal metric under the Law of Causal Regulation (LCR).

### 4. Data Availability & Replication

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To ensure transparency and reproducibility, the full detection matrix (CSV), scientific plots, and the Python source code have been archived on **Zenodo**.

**DOI:** [Insert your Zenodo DOI here]

**Contact:** miguel\_percudani@yahoo.com.ar