Project Aegis: Student Diagnostic Guide

Testing the Unitary Loop Framework (v8.0)

James Stephenson
Independent Researcher

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1 Introduction

The Unitary Loop Framework treats the universe as a recursive thermodynamic manifold where space-time acts as a superfluid[cite: 40, 41]. Students can use the following variables to test for anomalies across planetary and stellar scales.

2 Core Variables and Constants

The following constants are fixed for all v8.0 Standard calculations[cite: 57, 59]:

- **Cosmological Perturbation (H_0):** $2.2 \times 10^{-18} s^{-1}$[cite: 63].
- **Dynamo Coherence Scale (r_{core}):** $1.0 \times 10^{8} m$[cite: 70].
- **Causal Anchor (c):** $2.99 \times 10^{8} m/s$[cite: 78].

3 Anomaly Testing Suite

3.1 1. Stellar Stability (The "Great Dimming" Test)

To determine if a star is at risk of structural decoupling, adjust the **Envelope Radius (r_{star})**[cite: 189].

$$t_c = \left[\frac{H_0 \cdot A_{star}}{c^2}\right] \cdot \left(\frac{r_{star}}{r_{core}}\right)^4 \tag{1}$$

Goal: Compare the Response Delay (t_c) to the Light Crossing Time (t_{light})[cite: 217, 219]. If $t_c \gg t_{light}$, the star is in a state of *Critical Causal Instability*[cite: 221, 222].

3.2 2. Seismic Forecasting (The 72-Hour Rule)

To test for imminent lithospheric stress release, monitor the **Vacuum Potential Gradient ($\nabla\Phi$)**[cite: 359, 365].

$$t_{lag} = \frac{\rho_{crust} \cdot V_{wave}}{H_0 \cdot \nabla\Phi} \tag{2}$$

Goal: Identify the **Precursor Atmospheric Signal (PAS)**. A valid signal requires:

1. Ionospheric anomalies (Total Electron Content spikes)[cite: 349].
2. Localized Stratospheric Warming ($> 20°C$)[cite: 350].
3. Geomagnetic Jerks (d^2B/dt^2)[cite: 351].

4 Diagnostic Summary Table

Target Anomaly	**Variable to Change**	**Threshold for Success**
Stellar Decoupling	Envelope Radius (r_{star})	$t_c/t_{light} > 1.0$ [cite: 220]
Seismic Event	Vacuum Potential ($\nabla\Phi$)	$t_{lag} \approx 72 \pm 4$ hours [cite: 366]
Galactic Rotation	Disk Surface Area (A)	Universal Scaling Relation [cite: 374]
Magnetic Pole Drift	Solar Flux Intensity	$a_{drift} \propto \frac{d}{dt}(\delta_{risk})$ [cite: 315]

Table 1: Student Testing Parameters for Unitary Loop v8.0[cite: 6].