

Pillar 1 Extension

Update 1.1: Extensions for Recent Gravitational-Wave Events, Interstellar Carriers, and Multi-Messenger Anchors in the Lava-Void Macro-Scale Framework

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This update extends Pillar 1 by incorporating recent gravitational-wave observations and interstellar-object dynamics while strengthening multi-messenger falsifiability within the Lava-Void Cosmology framework.

1.1.1 Gravitational-Wave Propagation and Ringdown Tests in Void-Boundary Environments

The GW250114 event provides a high-fidelity ringdown signal enabling tests of viscous boundary effects on gravitational-wave propagation:

$$c_{eff} = c (1 minus (eta_{wall} kappa_{wall}) / (c^2 rho_{wall}))$$

Summary. GW250114 enables precision tests of viscous propagation effects.

Closing Statement. Gravitational-wave observations anchor the macro-scale framework.

1.1.2 Macro-to-Mesoscale Bridge: 3I/ATLAS as an Interstellar Carrier

Void-channeling currents provide a transport mechanism for interstellar objects:

$$a_{visc} proportional to (grad rho / rho) v_{out} approx 10^{-10} to 10^{-9} m/s^2$$

Summary. 3I/ATLAS exemplifies macro-to-mesoscale linkage via void flows.

Closing Statement. This bridge unifies Pillar 1 with Pillar 15.

1.1.3 Multi-Messenger Predictions and Integrated Empirical Anchors

The framework predicts correlated signatures across gravitational-wave, electromagnetic, and cosmic-ray observations.

Summary. Integrated multi-messenger anchors secure falsifiability.

Closing Statement. Observational grounding firmly anchors Pillar 1.

1.1.4 Synthesis and Final Closure for Pillar 1

This update incorporates gravitational-wave data, interstellar-object dynamics, and multi-messenger tests while preserving the core Lava-Wall mechanism.

Summary. Pillar 1 now encompasses recent GW events and interstellar carriers.

Closing Statement. Pillar 1 achieves exhaustive completeness.