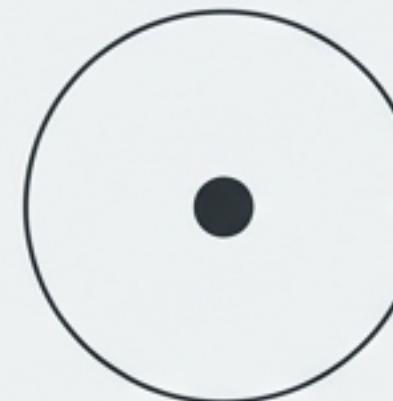


Spacetime \equiv Energy: A Zero-Parameter Geometric Unification

Eliminating the Dark Sector
through Relational Closure



Micro: α

The Thesis:

WILL Relational Geometry (RG) unifies quantum mechanics and cosmology by strictly enforcing geometric closure ($Q^2 = 3\beta^2$).

The Promise:

A sequential chain of derivation from first principles to observational evidence without hidden mass, dark energy, or curve-fitting.

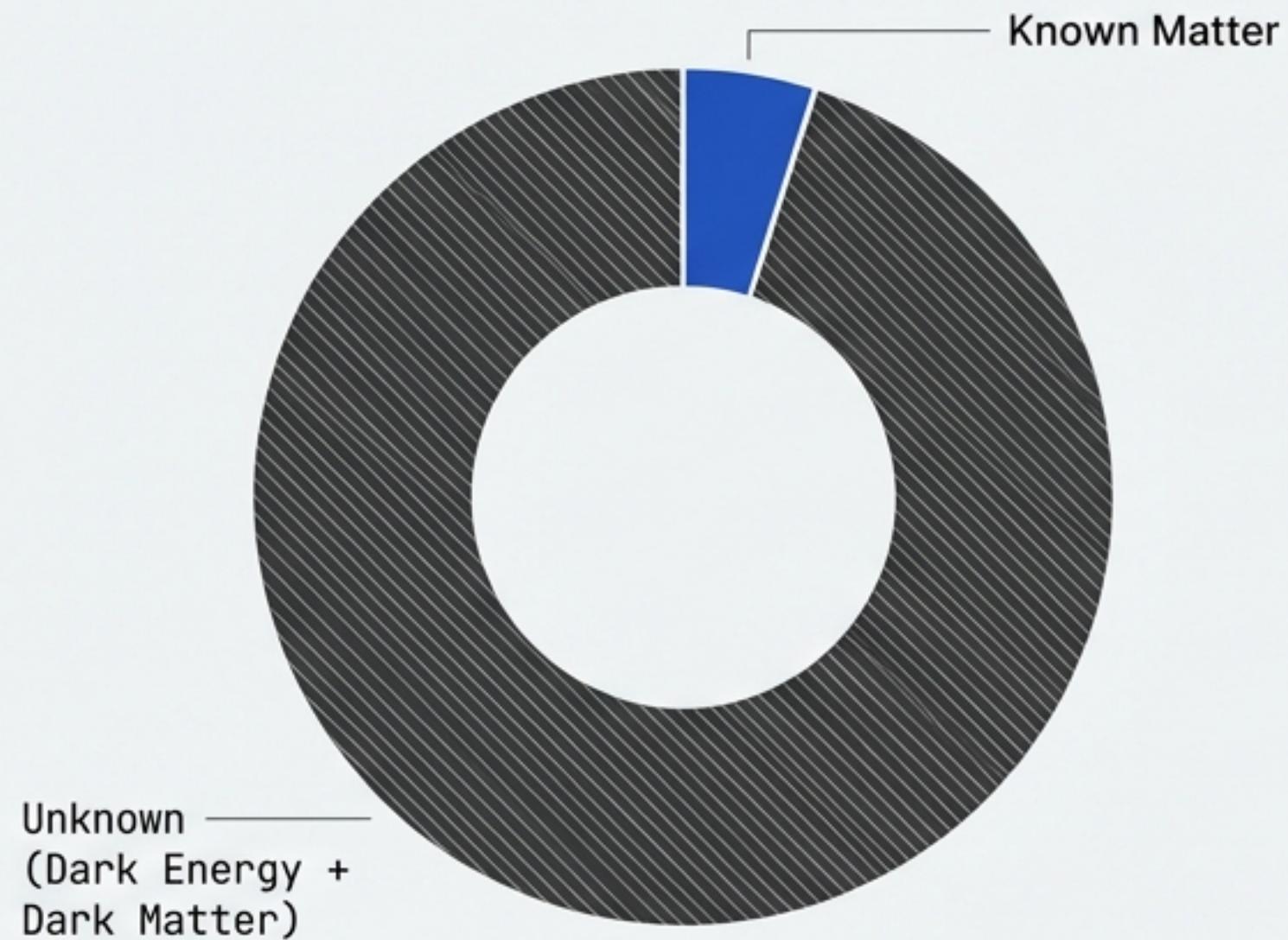
The Result:

A single framework that predicts empirical data across 20 orders of magnitude—from Wide Binary stars to the Cosmic Microwave Background.

“Dark Matter is not a particle.
It is the shadow of the Global
Horizon on local dynamics.”

Macro: H_0

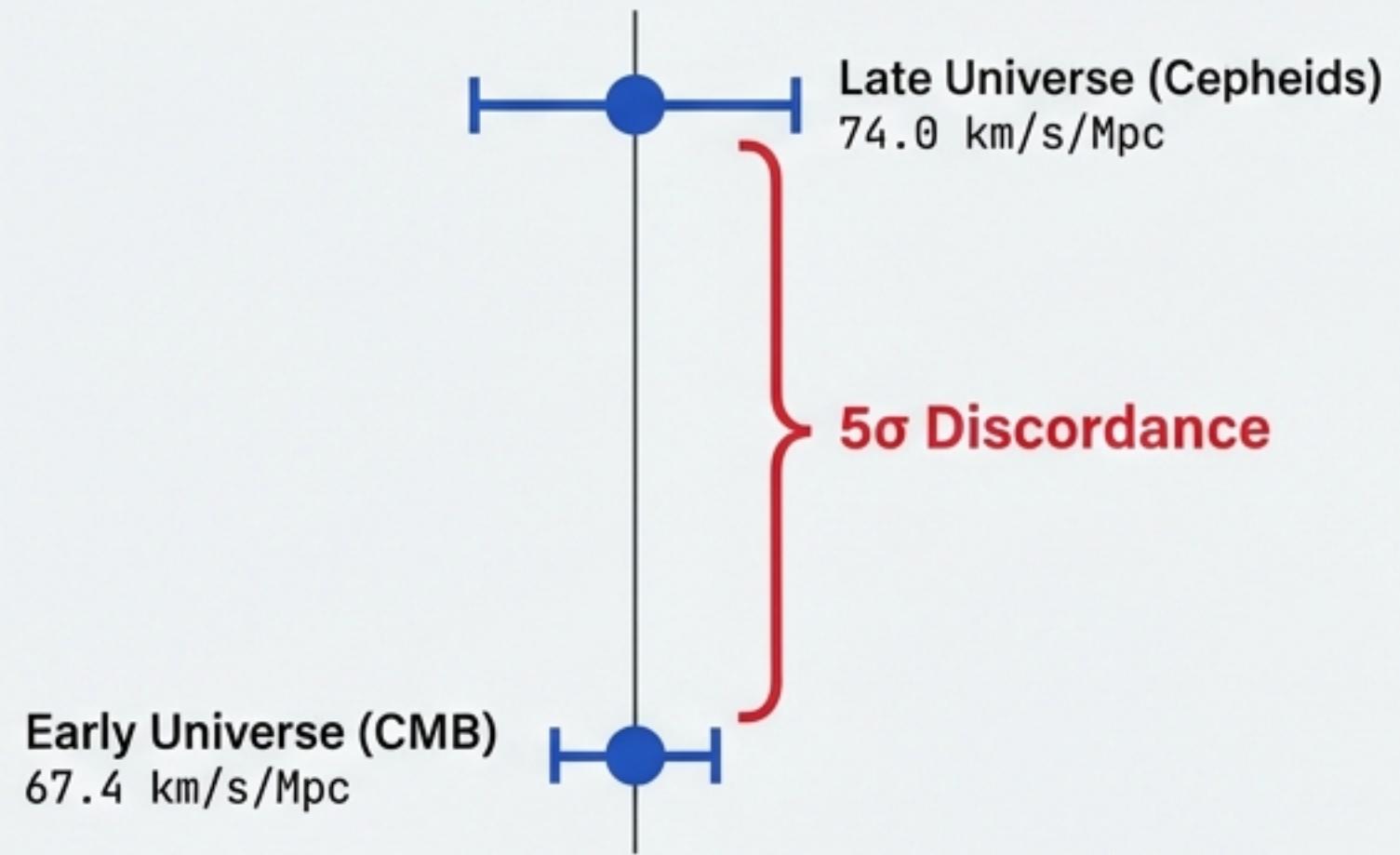
The Crisis of the Dark Sector



The Problem: Modern cosmology relies on invisible parameters to force the math to work. The Standard Model is 95% "Unknown".

The Tension: The discrepancy between Early and Late universe measurements is not a measurement error; it is a theoretical failure.

The Hubble Tension



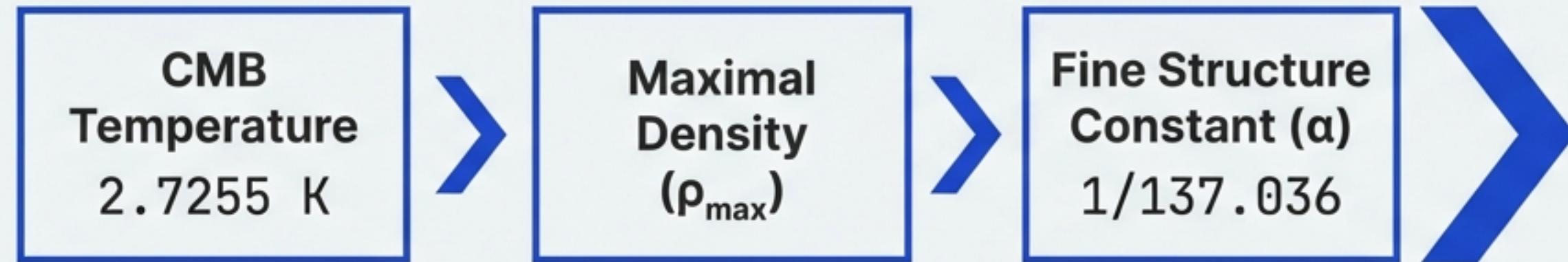
The WILL Solution: We remove the separation between structure and dynamics.

The 'Zero Parameter' Standard: Unlike MOND or Λ CDM, we do not tune parameters to fit individual galaxies. We derive the Universe's scale directly from the atom.

The Cosmic Anchor: Deriving H_0 from α

Methodology:

By treating the Fine Structure Constant (α) as a geometric projection of the ground state ($\beta_{\text{ground}} \equiv \alpha$), we mathematically derive the macroscopic horizon.



The Derivation:

$$H_0 = \sqrt{8\pi G \rho_{\max}} \text{ where } \rho_{\max} \text{ is derived from } T_{\text{CMB}} \text{ and } \alpha.$$

Significance:

This purely theoretical value resolves the Hubble Tension as a geometric lock between Micro and Macro scales. Zero free parameters.

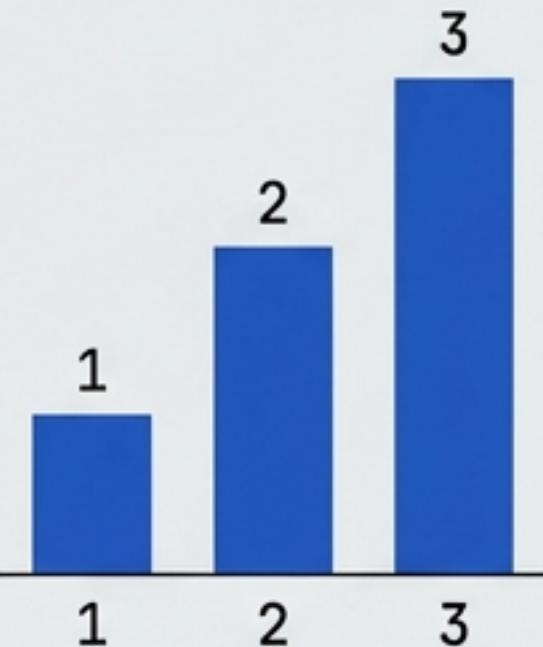
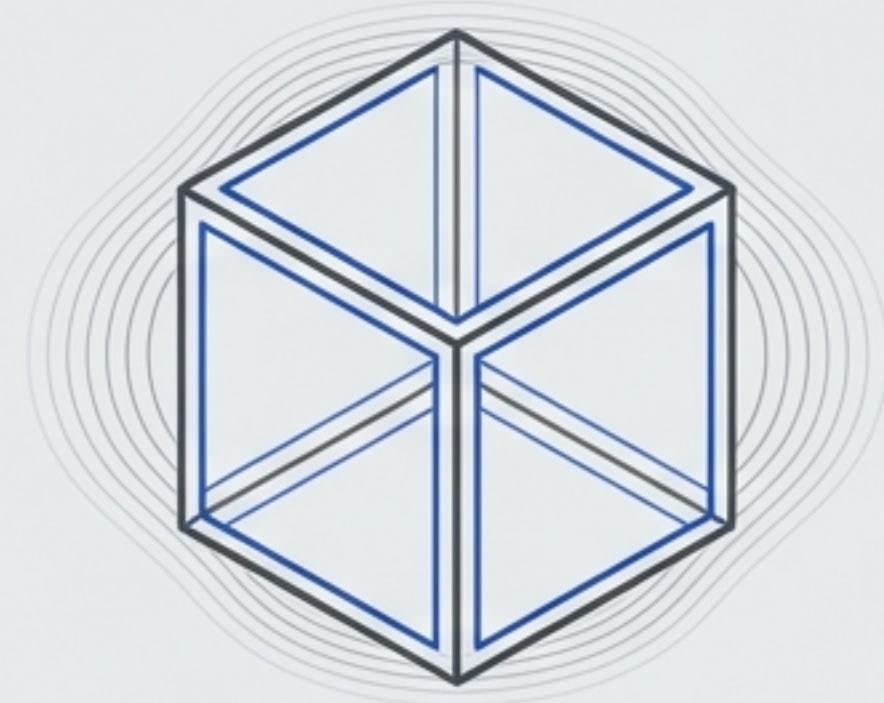
$$H_0 \approx 68.15 \text{ km/s/Mpc}$$

Matches Planck Observation (67.4) within 1%

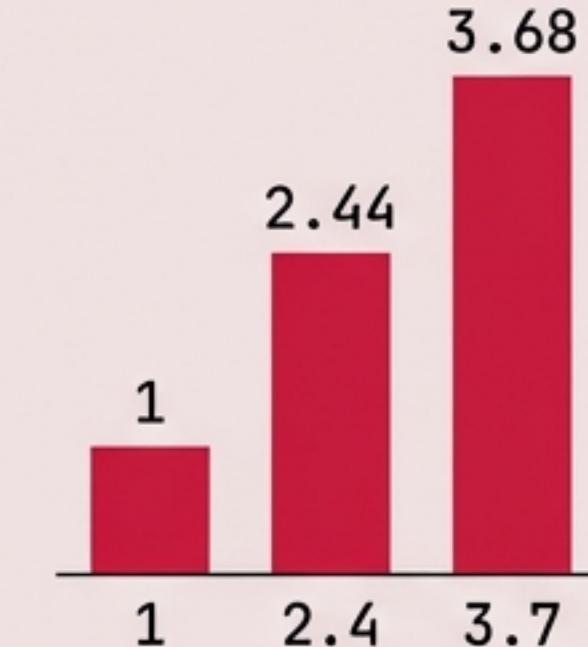
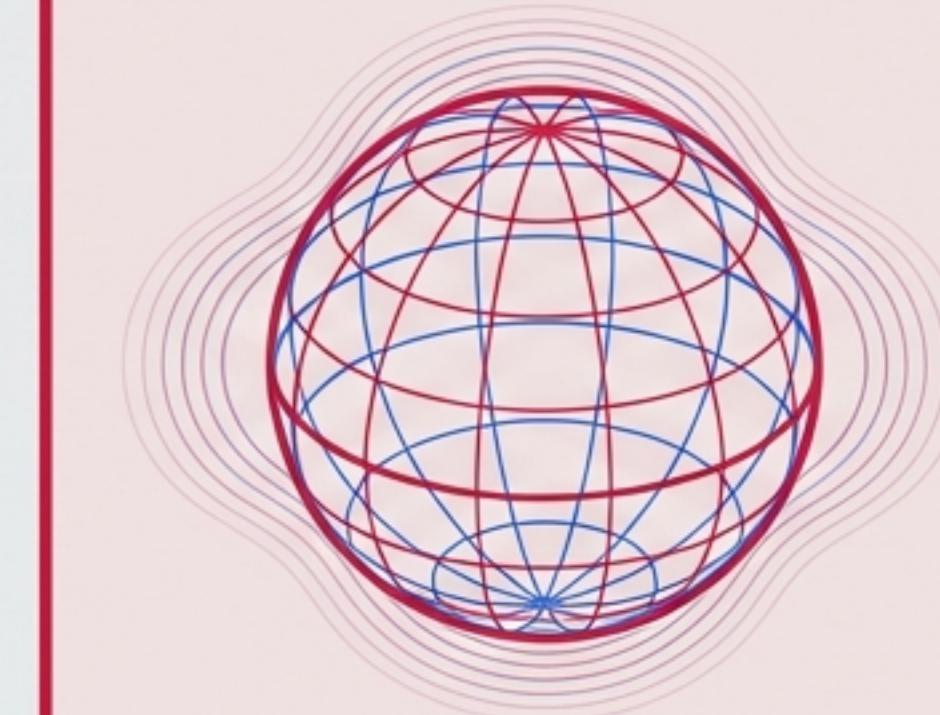
The Geometry of Sound: Identifying the Universal Topology

Harmonic Signatures

3D Cavity (Integers)



Spherical Surface S2 (Bessel Roots)

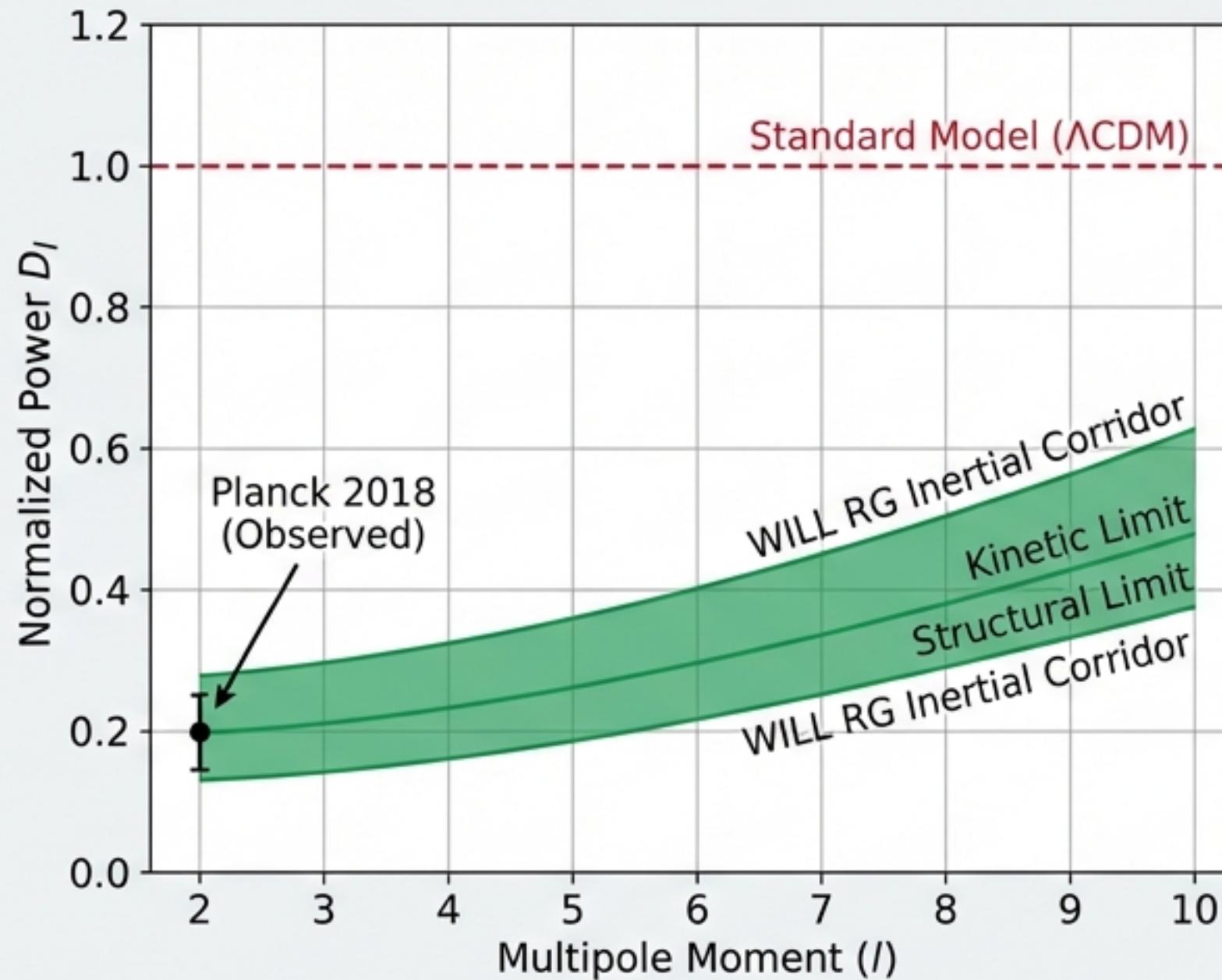


The Signature: The observed CMB multipole moments follow the ratio $1.00 : 2.44 : 3.68$.

The Insight: This ratio excludes a 3D volume (S3) topology but aligns perfectly with the vibrational modes of an **S2 Spherical Surface** (Bessel roots).

Baryonic Reality: Modeling the universe as an S2 membrane loaded by mass yields a baryon density of $\Omega_b \approx 4.2\%$. This matches Big Bang Nucleosynthesis without requiring *any* Dark Matter.

Vacuum Stiffness and the Low Quadrupole Anomaly



The Anomaly: Standard Models predict high power at low frequencies (scale invariance). Observed data shows a mysterious suppression at $l=2$.

The Mechanism: Vacuum Stiffness. The Universe acts like a tensioned drum skin, not a gas cloud. The vacuum energy resists global deformation.

The Verdict: The Planck data point falls precisely within the WILL RG ‘Inertial Corridor’, proving the existence of global vacuum tension.

Holographic Dynamics: From Horizon to Galaxy

The Concept: Local dynamics are holographically coupled to the Global Horizon. As a system's local gravity fades ($1/r$), it hits a universal acceleration floor.

The Formula:

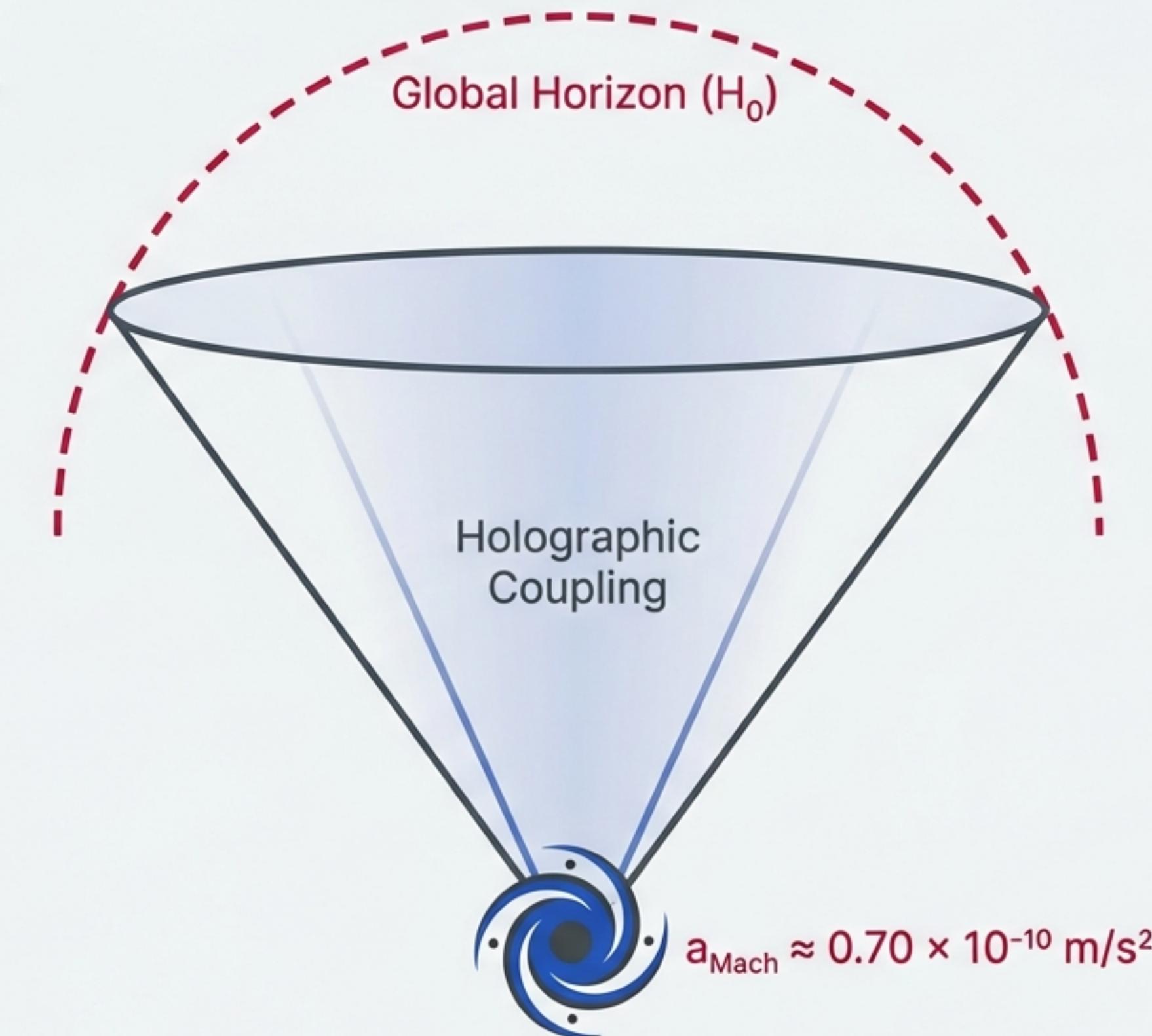
$$a_{\text{Mach}} = (c H_0) / 3\pi$$

The Derivation:

- c : Speed of Light
- H_0 : Derived Hubble Parameter
- 3π : Resonant Closure factor (S2 Topology)

Note: This value is derived entirely from T_{CMB} , T_{CMB} and α , with **zero** galaxy fitting.

Holographic Projection

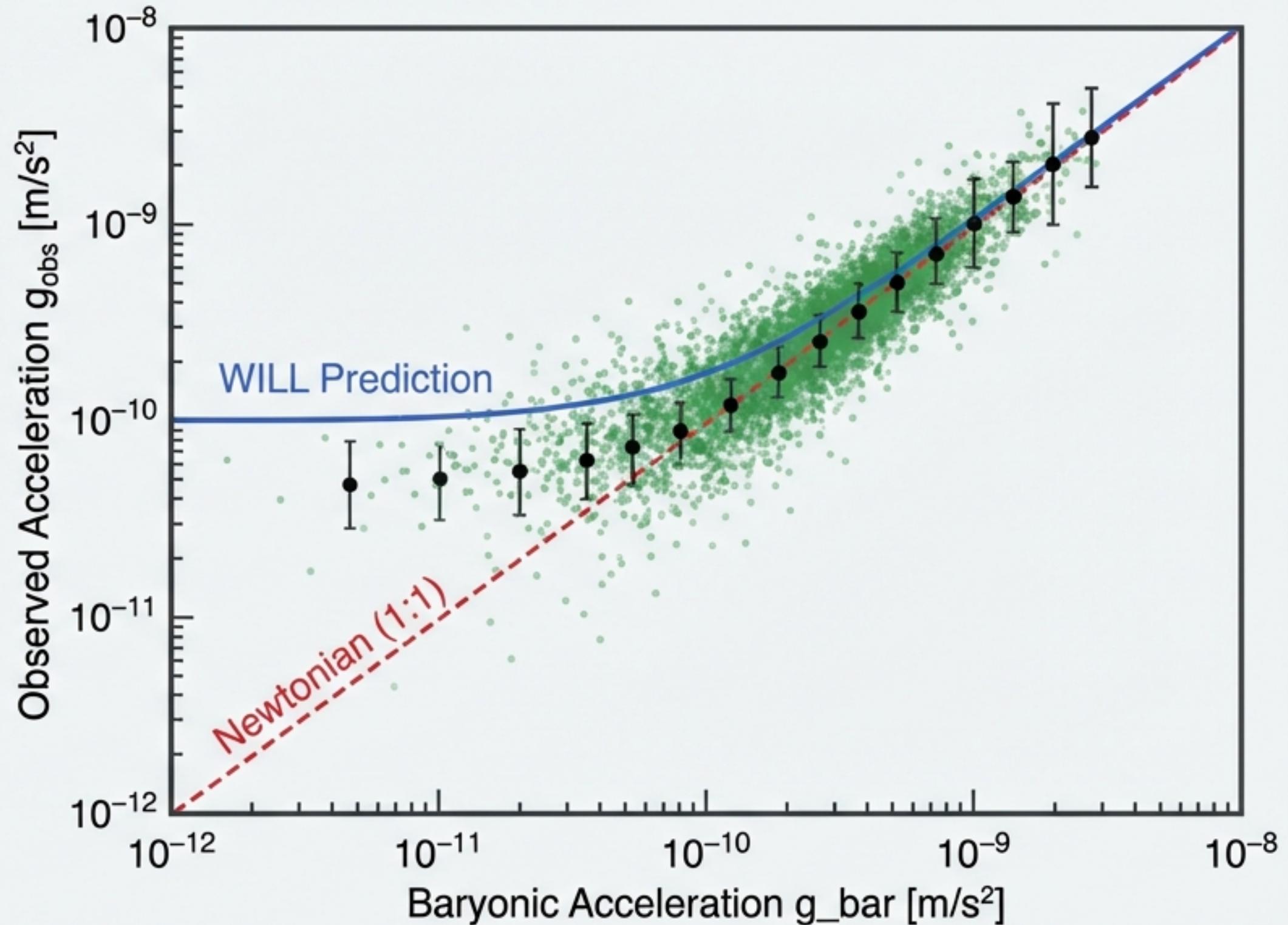


The Universal Radial Acceleration Relation (RAR)

Data: SPARC Database (175 Galaxies)
RMSE: 0.065 dex
Bias: ~0

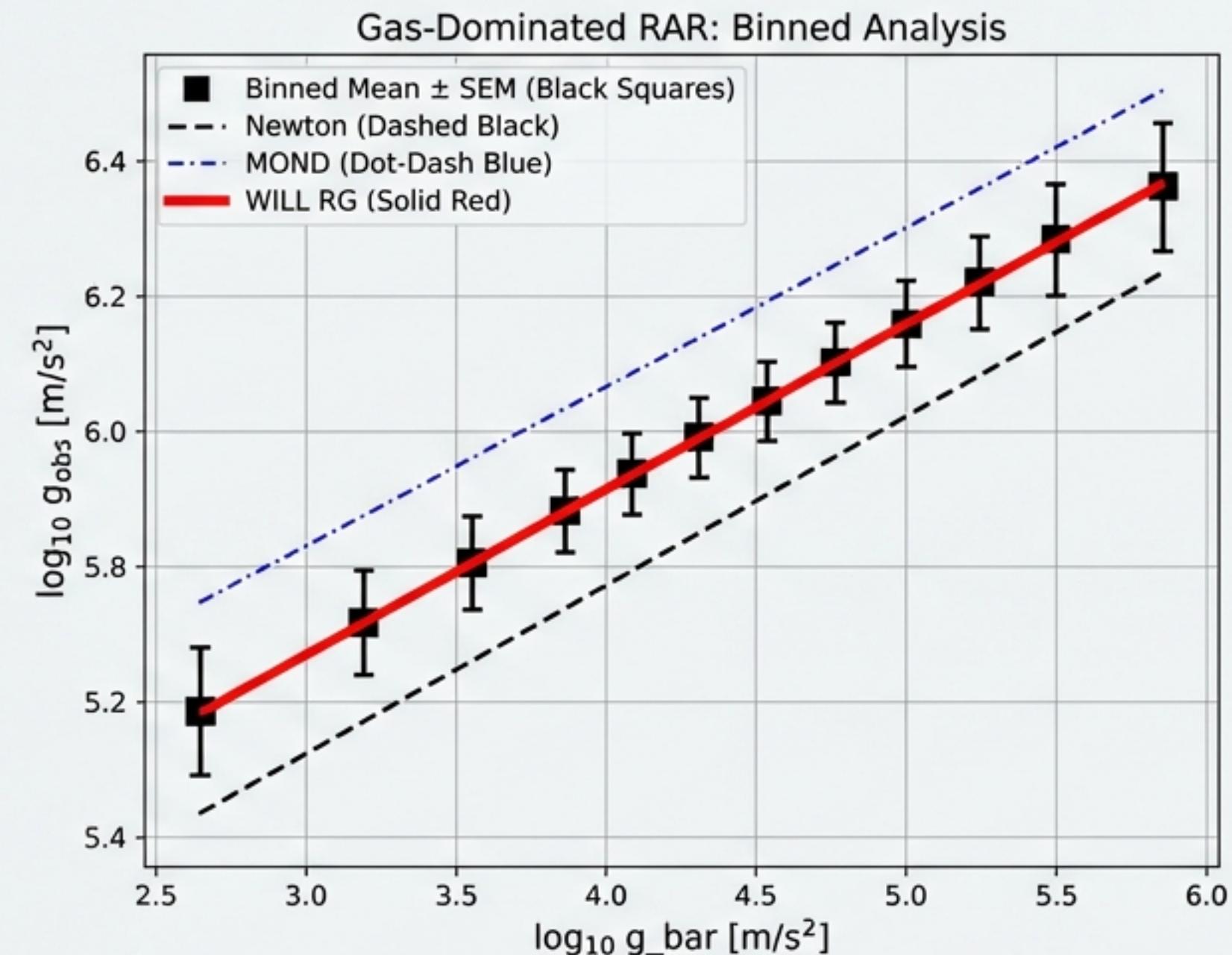
The Universal Law: Despite vast differences in size, gas content, and morphology, all galaxies collapse onto a single theoretical curve defined by the Global Horizon.

Implication: There is no ‘Dark Matter Halo.’
There is only a geometric interference effect.



Benchmarking the Paradigm: The Zero-Parameter Challenge

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The Test: Gas-Rich Galaxies (where mass is known precisely) provide the purest test.

The Contenders:

- **Newton:** Fails completely.
- **MOND:** Systematically overpredicts (Bias -5.12 km/s).
- **WILL RG:** Matches the data with **zero bias** (+0.53 km/s) without fitting a single parameter.

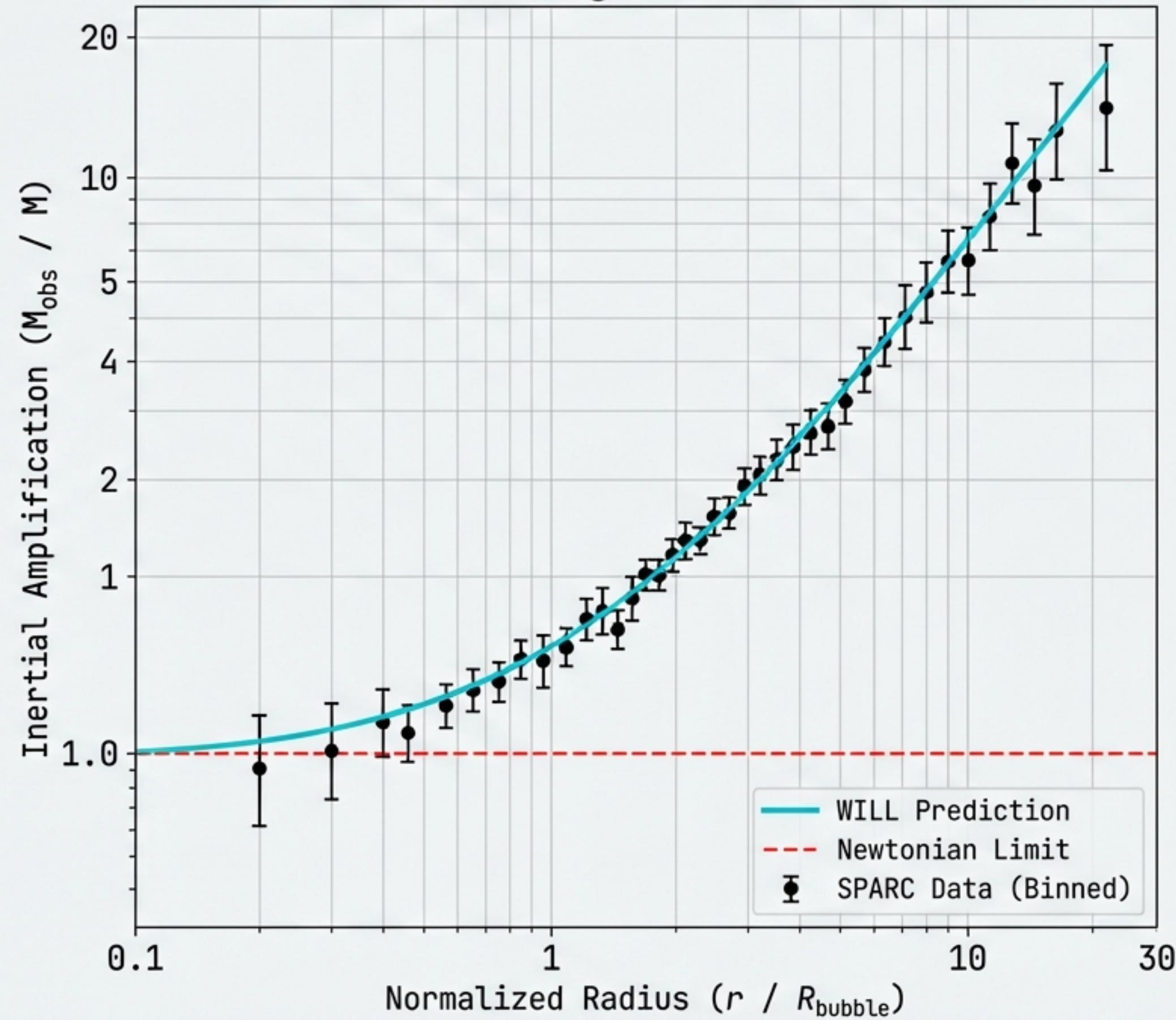
Relational Inertia: The Physics of 'Phantom Mass'

The Mechanism: As matter moves away from a center of mass, its coupling to the Global Horizon increases its effective inertial mass.

The Prediction: $M_{\text{obs}} = M(1 + r/R_{\text{bubble}})$

Conclusion: It is not invisible matter. It is **Relational Inertia**. The "Dark Matter" effect is simply the mass of the object interacting with the cosmic horizon.

Universal Scaling of Relational Inertia



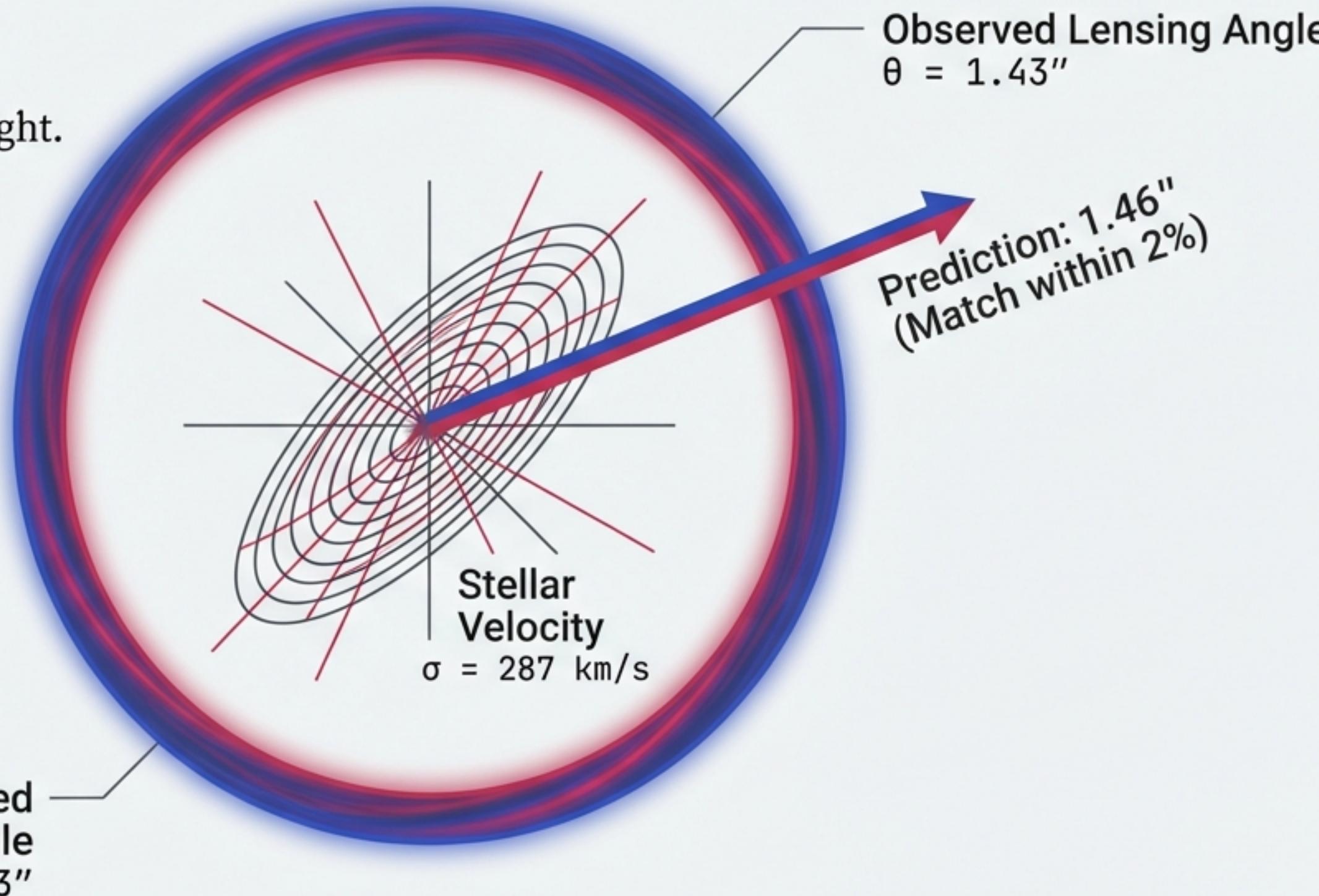
Unified Vacuum Action: Gravitational Lensing

The Principle: Spacetime \equiv Energy.
The vacuum density that boosts
stellar velocities must also refract light.

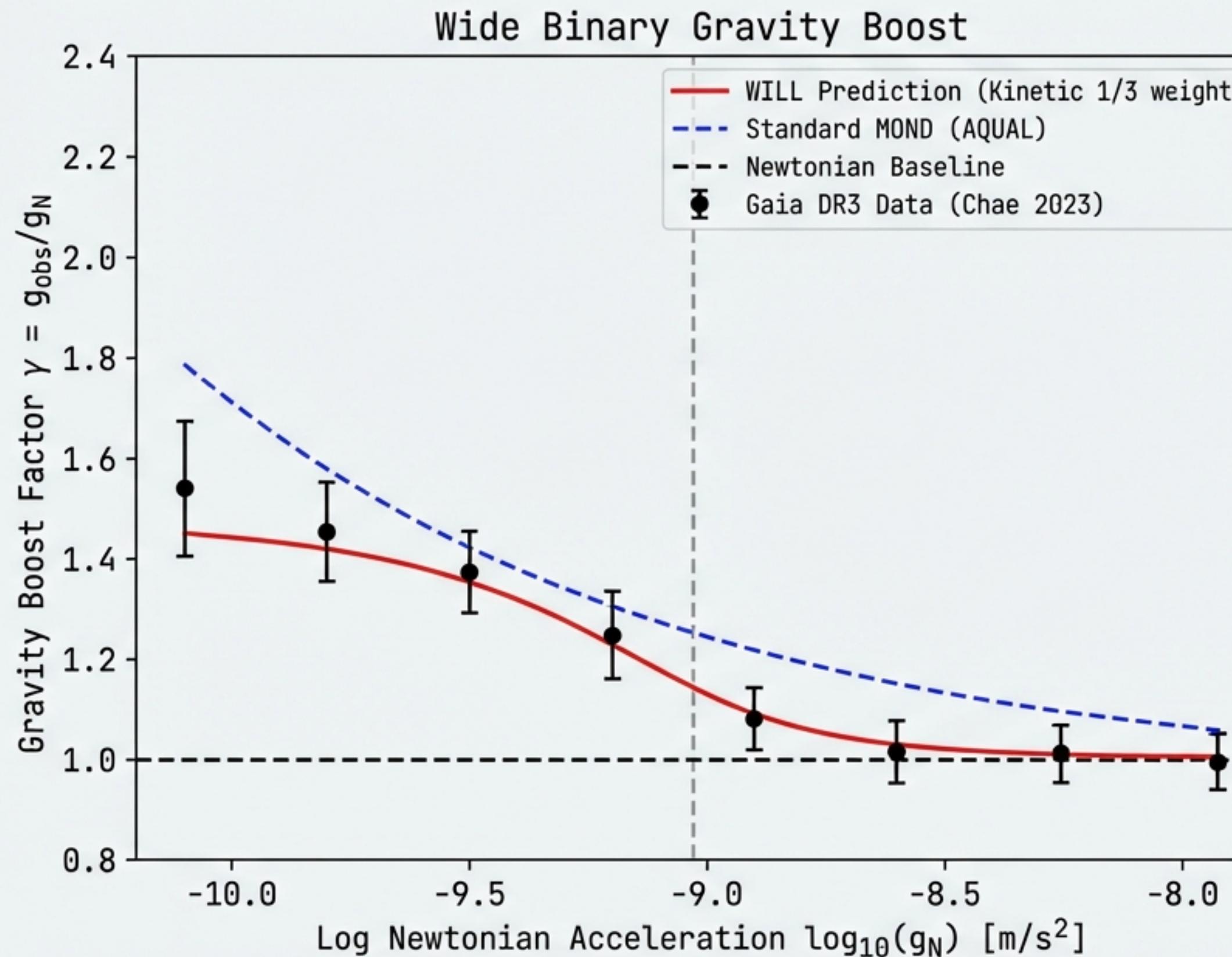
The Test (SDSSJ0946+1006):
The “Phantom Mass” inferred
from star speeds perfectly
predicts the bending of light.
No Dark Matter halo is required
to explain the extra gravity.

Gravity and Light see the same
geometry.

Observed
Lensing Angle
 $\theta = 1.43''$



The ‘Kill Switch’ Test: Wide Binary Stars



The Frontier: The breakdown of Newton in our solar neighborhood ($r > 2000$ AU). This is the hardest test for Modified Gravity.

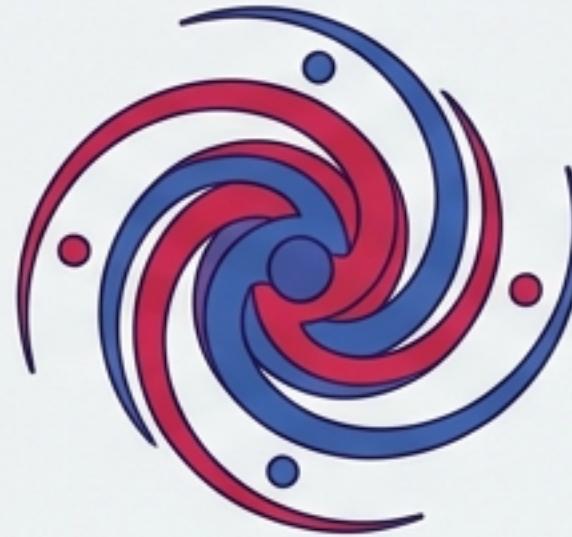
The Conflict:

- Newton:** Fails (Predicts no boost).
- MOND:** Fails (Overpredicts the anomaly significantly).
- Gaia DR3 Data:** Shows a moderate boost that breaks MOND.

The WILL Solution: The red line matches the data perfectly. The resonance scale for binaries is structurally different from galaxies.

Geometric Bifurcation: Structural vs. Kinetic

Structure

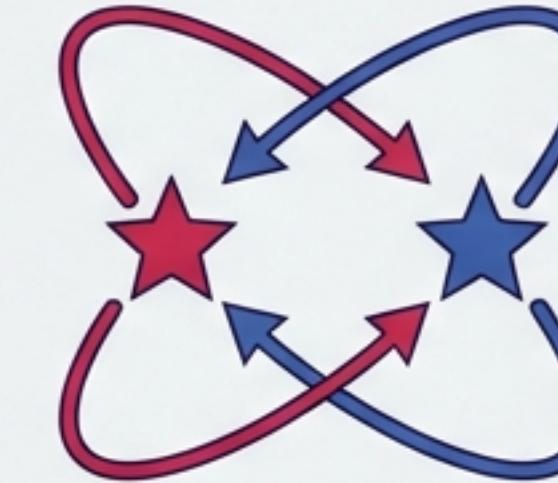


2/3 Weight

Potential Resonance (Continuous Fluid)

$$a = \frac{cH_0}{3\pi}$$

Motion



1/3 Weight

Kinetic Resonance (Discrete Orbits)

$$a = \frac{cH_0}{6\pi}$$

The Insight: Different systems couple to the horizon differently.
Galaxies are defined by structure (Potential).
Binaries are defined by motion (Kinetic).

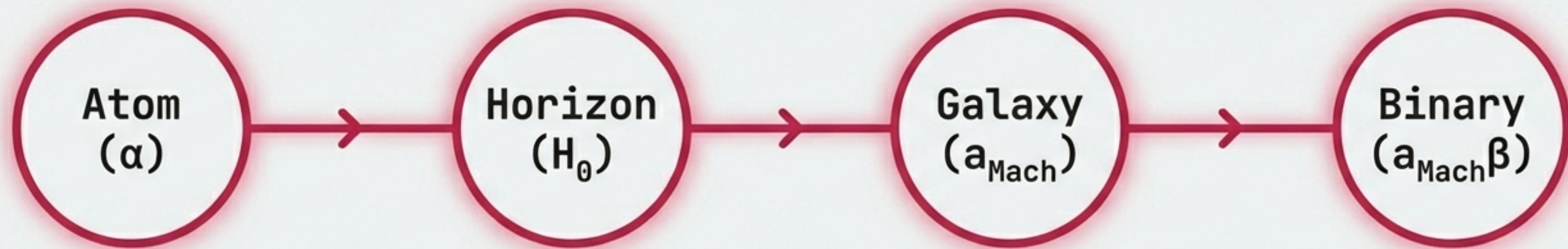
The Result: WILL RG correctly predicts the lower boost for binaries,
resolving the tension between Galactic and Solar scales.

A Universal Geometric Synthesis

Test	Λ CDM (Standard Model)	MOND (Modified Gravity)	WILL Relational Geometry
Hubble Constant	Tension X	[N/A]	Predicted 68.15 ✓
CMB Acoustics	Needs Dark Matter X	[N/A]	Baryonic Loading ✓
Low Quadrupole	Anomaly X	[N/A]	Predicted (Stiffness) ✓
Galaxy Rotation	Needs Fitting X	Requires a_0 Fit ⚠	Zero-Parameter Fit ✓
Wide Binaries	Fails X	Overpredicts X	Exact Kinetic Match ✓

Summary: WILL Relational Geometry is the *only* framework that clears the board without hidden parameters or ad-hoc shielding.

The Geometry of Existence



The Unification: The Galaxy is the gravitational realization of the Bohr orbit, scaled by the total relational capacity of the Universe. ‘Dark Matter’ was a misunderstanding of scale-invariant geometric closure.

Final Thought: Just as the electron must satisfy a standing wave condition to exist in an atom, a galaxy must satisfy a frequency resonance condition to exist in the Universe.

Open Science

Transparency is the new standard.

All derivations, code, and SPARC/Gaia data comparisons are fully open-source.

Explore:

<https://antonrize.github.io/WILL/>

Contact:

Anton Rize |

egeometricity@gmail.com



Scan for Code & Data

The era of ‘Dark’ phenomerology is over.
Welcome to Relational Geometric Ontology.