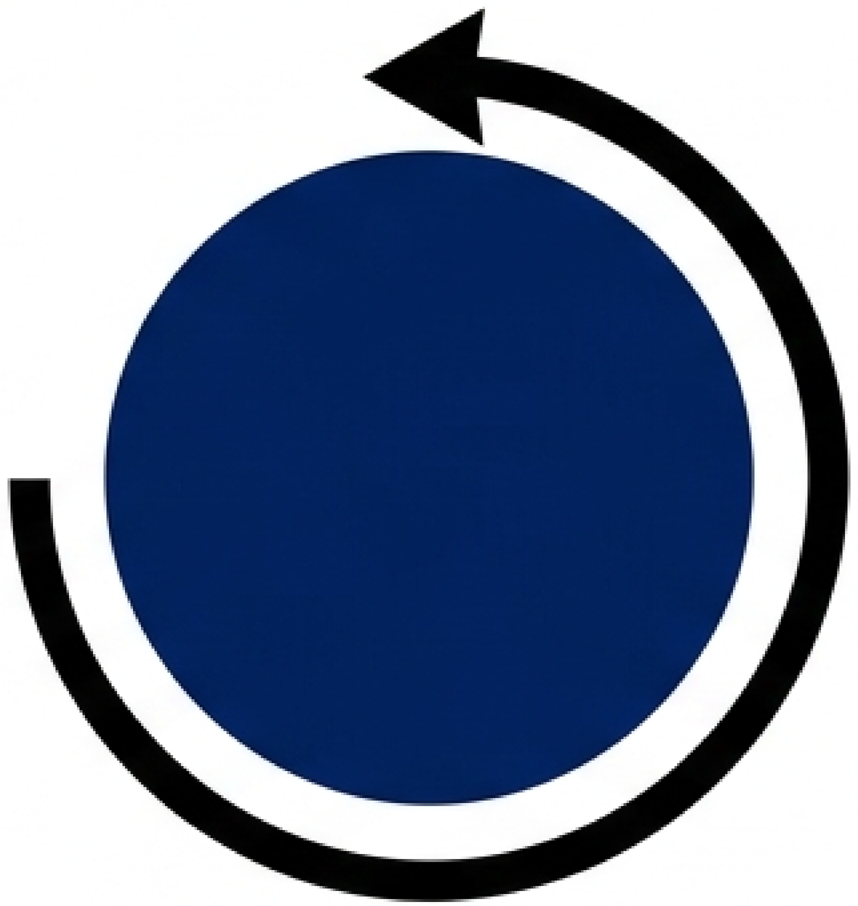
Cosmic-Scale Rotation and the Age of the Universe: A Timescale Argument

Distillation of Paper P76

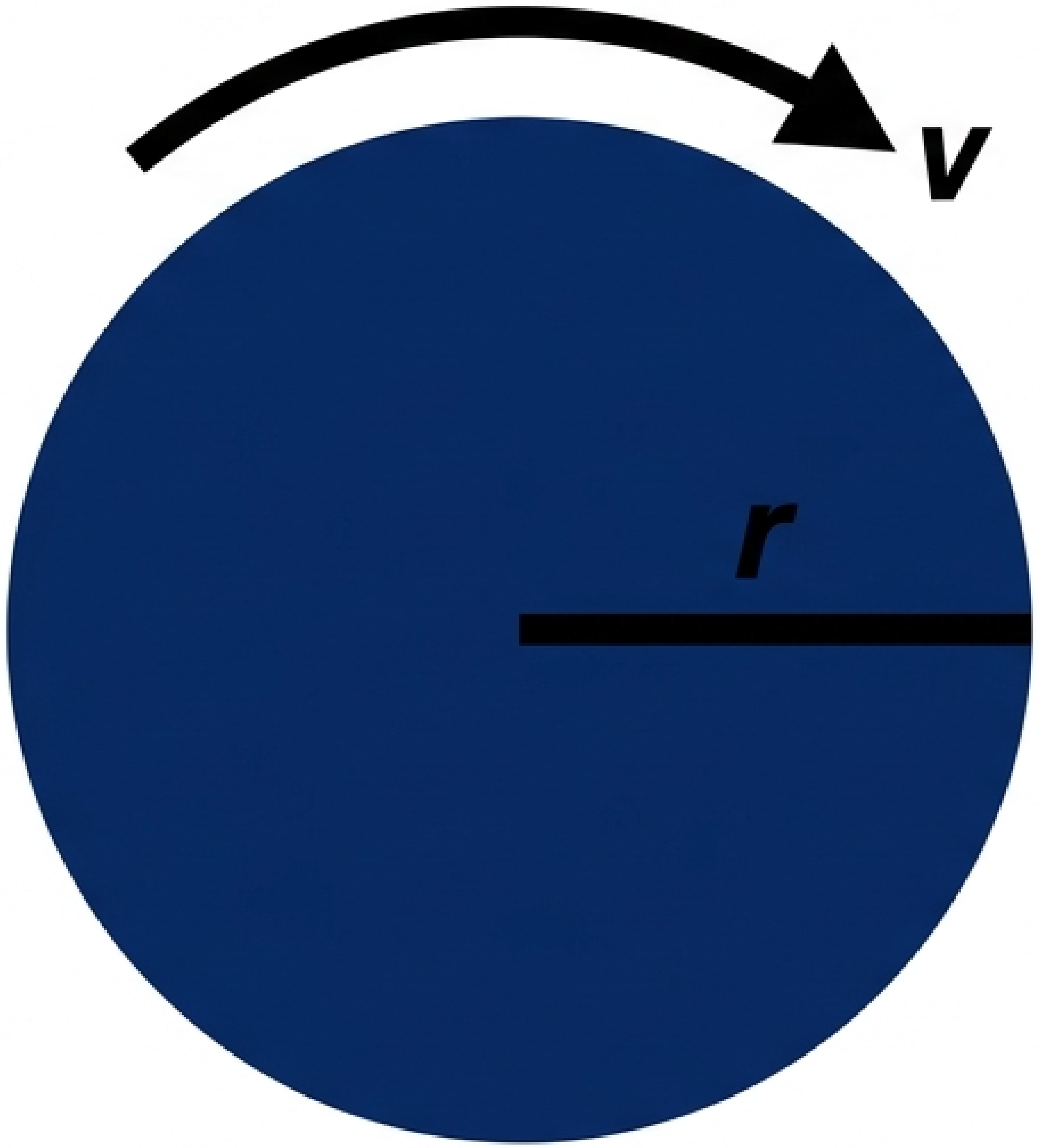
ABSTRACT SYNTHESIS

Recent direct measurements of galaxy-cluster-scale rotation present a fundamental timescale anomaly. By applying standard textbook orbital mechanics to the Abell 2107 cluster, we derive a characteristic rotational period of ~24.2 billion years. This calculation requires no non-standard cosmological models—ony erithmetic. It reveals a severe tension with the standard cosmological age of 13.8 billion years, suggesting the structure has not had sufficient time to complete even a single rotation since the beginning of cosmic history.



The Cleanest Directly Measured Case: Abell 2107

Coherent rotation is now directly measured at the galaxy-cluster scale. The calculation relies purely on reported observational data, independent of physical mechanism assumptions.



System: Galaxy Cluster Abell 2107
Observed Characteristic Radius (r): ~1.5 Megaparsecs (Mpc)
Observed Rotational Velocity (v): ~380 Kilometers per second (km/s)

THE ARITHMETIC CONSEQUENCE:

What happens when we compare the period implied by these two directly measured variables against the standard cosmological age of the universe?

The Timescale Formulas

Two elementary equations formalize the structural comparison without relying on alternative cosmological frameworks.

1. Characteristic Rotational Period (T)

$$T = 2\pi r / v$$

Where r is the structure's characteristic rotational radius, and v is its characteristic rotational velocity.

2. The Tension Index (TI)

$$TI = T / 13.8 \text{ Gyr}$$

A simple diagnostic ratio comparing the calculated rotational period (T) to the standard Planck Planck CMB cosmic age of 13.8 billion years (Gyr).

***Rule:** A TI > 1 indicates the structure's rotational period exceeds the entire age of the universe.*

Evaluating Abell 2107

Applying standard orbital mechanics to empirical measurements.

Calculate the Period (T)

$T = 2\pi \times (1.5\ \text{Mpc}) / (380\ \text{km/s})$

$T \approx 24.2$ Billion Years (Gyr)

↓

Calculate the Tension Index (TI)

$TI = 24.2\ \text{Gyr} / 13.8\ \text{Gyr}$

↓

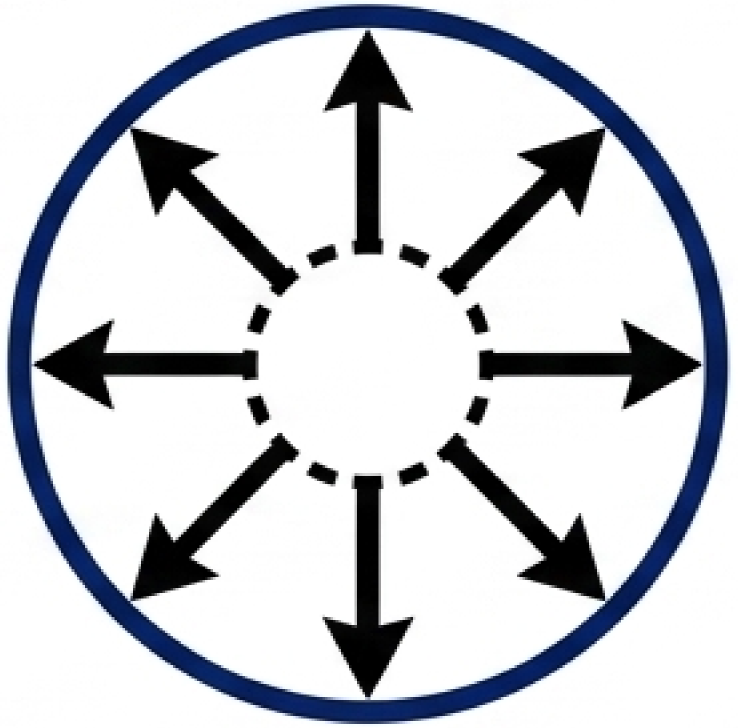
$TI \approx 1.75$

Conclusion: Abell 2107 has not had sufficient time to complete even one full characteristic rotation under the standard cosmological timeline.

Relocating the Tension: The Expansion Objection

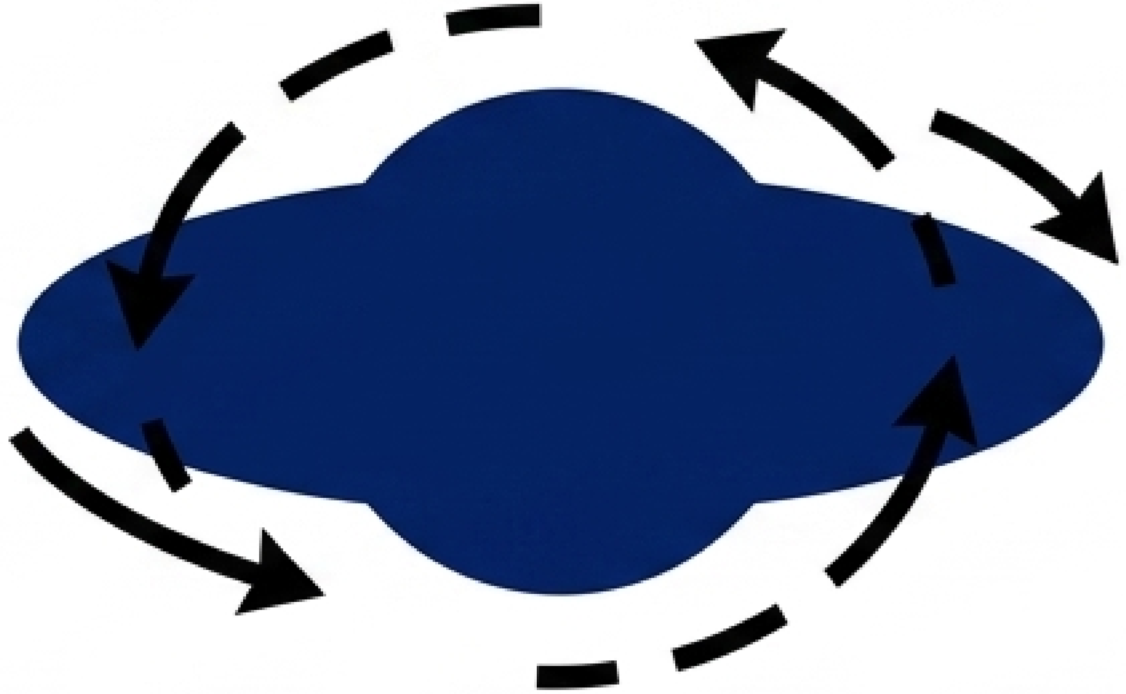
Does assigning the structure's current scale to billions of years of cosmic expansion resolve the timing deficit?

The Objection: Cosmic Expansion



- **Argument:** Abell 2107 was physically smaller in the past due to universal expansion.
- **Implication:** A smaller radius in the early universe would mean a shorter rotational period for most of its history, allowing it to complete rotations.

The Physical Reality: Rotational Coherence



- **The Flaw:** Expanding a structure to 1.5 Mpc over time requires immense differential stretching.
- **The Relocated Problem:** Differential expansion disrupts coherent angular momentum; it does not preserve it. How did coherent rotational organization survive billions of years of being stretched?

<u>Conclusion</u>: Expansion substitutes a timing problem for an unresolved dynamical coherence problem.

Observational Context & Falsifiable Predictions

Abell 2107 is not an isolated case. Coherent rotational organization continues to be detected at progressively larger scales as velocity-field mapping improves.

Broader Context

- **Cosmic Filaments:** Angular momentum is now detected in cosmic web filaments extending hundreds of millions of light-years.
- **Consistency:** Broader literature confirms other Mpc-scale cluster radii yielding characteristic periods in the tens of Gyr.

Falsifiable Predictions for P76

- **Prediction 1 (Escalation):** As velocity-field mapping techniques improve, additional systems with a Tension Index $\mathrm{TI} > 1$ will be explicitly identified.
- **Prediction 2 (Robustness):** Revised and improved measurements of the Abell 2107 system will remain consistent with $\mathrm{TI} > 1$, rather than converging below 1 as observational precision increases.