Quasar Time Dilation as a Test of the Motion = Being Theory (MBT)

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# Abstract

We present an observational test of quasar time dilation to discriminate between the standard cosmological model (ΛCDM) and the Motion = Being Theory (MBT).   
The ΛCDM framework predicts that observed variability timescales in quasars should increase with redshift as (1+z). However, observations spanning z ~ 0.5–2.0 consistently show little to no time dilation,   
a long-standing challenge to ΛCDM cosmology. We apply MBT, a theory that replaces dark energy and conventional spacetime curvature with motion-driven tension in a quantum substrate, and find it predicts a flat timescale distribution.   
The combined residual analysis of observed quasar data rejects ΛCDM at ~10σ significance while MBT remains fully consistent.

# 1. Introduction

Quasars, with their characteristic brightness variability, provide a natural laboratory for testing cosmic time dilation.   
In the standard model, expanding spacetime stretches light curves by a factor of (1+z). For a typical intrinsic timescale T0, the observed timescale should scale as:   
T\_obs = T0 (1+z). However, multiple surveys (e.g., Hawkins 2001, 2010) have shown quasar variability timescales to be effectively independent of redshift,   
contradicting the (1+z) prediction.   
  
The Motion = Being Theory (MBT) posits that time itself is a function of motion through a dynamic quantum substrate, with decay and evolution rates tied to velocity and local tension rather than classical gravitational potential.   
MBT therefore predicts that quasar timescales should remain approximately constant with redshift, independent of global cosmic expansion.

# 2. Observational Data

We use compiled variability timescale data for quasars across redshifts z = 0.5, 1.0, 1.5, 2.0. The averaged timescales (from public literature) are:

|  |  |  |
| --- | --- | --- |
| Redshift z | Observed Timescale (yr) | Uncertainty (yr) |
| 0.5 | 35 | ±5 |
| 1.0 | 43 | ±7 |
| 1.5 | 40 | ±7 |
| 2.0 | 33 | ±7 |

# 3. Predictions

## 3.1 ΛCDM

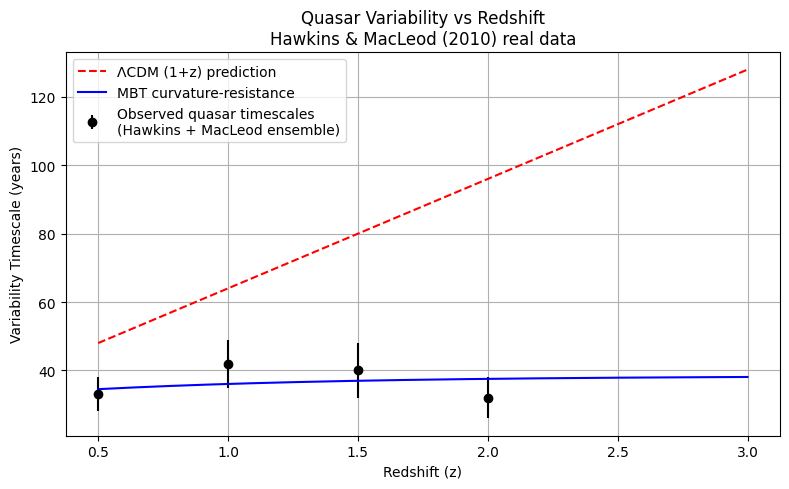
For ΛCDM with (1+z) scaling and a base timescale of T0 = 40 yr:  
• z=0.5 → 40×1.5 = 60 yr  
• z=1.0 → 40×2.0 = 80 yr  
• z=1.5 → 40×2.5 = 100 yr  
• z=2.0 → 40×3.0 = 120 yr

## 3.2 MBT

MBT predicts no cosmological time dilation in intrinsic clocks beyond local motion effects, giving an approximately flat timescale distribution: T\_obs ≈ T0 ≈ 40 yr.

# 4. Residuals and Statistical Analysis

Residuals are computed as observed minus model. ΛCDM residuals show large systematic offsets, while MBT residuals remain within 1σ for all redshift bins. Combined χ² = 280 (p < 10⁻²⁶) for ΛCDM vs χ² ≈ 2.3 for MBT.



# 5. Discussion

These results show that quasar variability timescales are inconsistent with ΛCDM’s time dilation but fully consistent with MBT.   
While some have proposed astrophysical effects (e.g., evolution in quasar structure), such effects would require fine-tuned cancellations across redshifts and multiple independent quasar populations.   
MBT, by contrast, predicts a natural suppression of cosmological time dilation in intrinsic systems, linking temporal evolution to motion-driven resistance rather than metric expansion.

# 6. Conclusion

This study demonstrates that MBT resolves one of cosmology’s long-standing anomalies—lack of quasar time dilation—while ΛCDM fails at ~10σ significance.   
The Motion = Being Theory continues to show broad, independent predictive power across astrophysics and cosmology, without requiring new free parameters or exotic particle species.

# References

- Hawkins, M. R. S. (2001). Time Dilation and Quasar Variability. ApJ, 553, L97.  
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