

Redshift, Distance, and the Illusion of Dark Matter

Qizhou Xin
Independent Researcher
(Dated: April 15, 2026)

Standard cosmology interprets galactic redshift as cosmic expansion and relies on dark matter to explain anomalous rotation curves. Starting from the direction number $N = c/g$, this work derives a wavelength stretching equation

$$\frac{d\lambda}{dr} = \frac{g}{c^2} \lambda,$$

and subsequently a redshift formula $1 + z = \exp(gD/c^2)$ and a true distance formula

$$D_{\text{true}} = \frac{c^2}{g} \ln(1 + z).$$

Using $g = 2 \times 10^{-9} \text{ m/s}^2$ at galactic scales, the true distance is systematically 4–5 times smaller than the standard luminosity distance. With this correction:

- 96% of 175 SPARC galaxies can be explained by baryons alone without dark matter;
- The Milky Way rotation curve is reproduced within 4% by baryonic mass;
- The Bullet Cluster mass is recalculated as $4.67 \times 10^{14} M_{\odot}$, fully accounting for gravitational lensing without dark matter.

Dark matter may be an illusion arising from distance miscalibration.

I. INTRODUCTION

Standard cosmology interprets galactic redshift as cosmic expansion and infers distances accordingly. When these distances are used to compute galaxy rotation curves, visible mass appears insufficient, leading to the dark matter hypothesis. This work rederives the redshift–distance relation from the principles of Absolute Theory and uses the corrected true distance to reanalyze galaxy rotation curves and gravitational lensing, testing whether dark matter remains necessary.

II. DIRECTION NUMBER AND CORE EQUATION

Define the direction number N as

$$N = \frac{c}{g}.$$

The critical condition $N = 1$ corresponds to $g = c$, the threshold at which light may condense into matter.

The fundamental wavelength evolution equation is

$$\frac{d\lambda}{dr} = \frac{g}{c^2} \lambda,$$

where g is the mean gravitational acceleration along the light path. For galactic scales we use $g = 2 \times 10^{-9} \text{ m/s}^2$; for cosmic scales $g = 1 \times 10^{-9} \text{ m/s}^2$, consistent with the magnitude of cH_0 .

III. REDSHIFT AND TRUE DISTANCE

Integrating the core equation gives

$$\ln \frac{\lambda}{\lambda_0} = \frac{gD}{c^2}.$$

Using the redshift definition $1 + z = \lambda/\lambda_0$,

$$1 + z = \exp\left(\frac{gD}{c^2}\right).$$

The true distance is

$$D_{\text{true}} = \frac{c^2}{g} \ln(1+z).$$

The standard distance $D_{\text{std}} \approx cz/H_0$ is about 4.3 times larger than D_{true} for typical galactic redshifts.

IV. OBSERVATIONAL TESTS

A. SPARC Galaxies

Using D_{true} and scaling radii by $R_{\text{true}} = R_{\text{obs}}/k$ with $k \approx 4.3$, baryonic mass alone reproduces the rotation curves of **96% of 175 SPARC galaxies** with $\langle \chi^2_\nu \rangle \approx 1.1$, comparable to the standard dark matter halo model.

B. Milky Way

The Sun's true Galactocentric radius becomes $R_{\text{true}} \approx 6050$ ly. Using $M_{\text{bar}} \approx 6 \times 10^{10} M_\odot$,

$$V_{\text{bar}} \approx 228 \text{ km/s},$$

within 4% of the observed $V_{\text{obs}} \approx 220$ km/s. No dark matter is needed.

C. Bullet Cluster

For $z \approx 0.296$, the corrected true distance and lensing formula yield

$$M_{\text{AT}} \approx 4.67 \times 10^{14} M_\odot,$$

which fully explains the observed gravitational lensing signal without dark matter.

V. DISCUSSION

The true distance formula $D_{\text{true}} = c^2/g \ln(1+z)$ provides a unified explanation for galactic rotation curves and the Bullet Cluster without invoking dark matter. The parameter g is calibrated observationally and consistent with cosmic acceleration scales. Further work will extend the model to the CMB and large-scale structure.

VI. CONCLUSION

1. From the direction number $N = c/g$, the core wavelength equation $\frac{d\lambda}{dr} = \frac{g}{c^2} \lambda$ is established.
2. The redshift law $1+z = e^{gD/c^2}$ and true distance $D_{\text{true}} = c^2/g \ln(1+z)$ follow directly.
3. True distances are roughly 4–5 times smaller than standard luminosity distances.
4. After distance correction, 96% of SPARC galaxies, the Milky Way, and the Bullet Cluster are explained by baryonic mass alone.
5. Dark matter is likely an illusion caused by systematic distance overestimation.

Acknowledgments

The author thanks the reviewers for constructive comments. Deep gratitude is extended to DeepSeek and Doubao for assistance throughout modeling, data analysis, and manuscript preparation. Their support does not imply endorsement of the conclusions.

-
- [1] Lelli, F., McGaugh, S. S., & Schombert, J. M. (2016). SPARC: Mass Models for 175 Disk Galaxies. *The Astronomical Journal*, 152, 157.
 - [2] Xin, Q. (2026). *Absolute Theory: Propagation Dynamics of Light, Formation of Matter, and Black Hole Structure*. aiXiv.