Validity of Disparities in Galactic Rotation Curves

Joseph Shaffer

Abstract

The focus of this series of papers [1] is to confirm the theory that deterministic quantum descriptions of entanglement interactions between galaxies occur at infinite speeds [2, 3]. We verify this approach by comparing galactic rotation curves using our theoretical assertion with actual observed rotation curves, and calculating the disparity between theory and observation.

Introduction

Some fifty years ago it was noted that the rotation speeds of galaxies were too great for the gravitational force of all the available galactic mass to balance it. People therefore invented the idea of dark matter in the form of weakly interacting massive particles (WIMPs) to supply the missing mass. In spite of heroic efforts, such particles have not been found. If WIMPs don't exist then the problem isn't missing mass. It's missing force.

That force arises from quantum entanglement [4]. Entangled objects share a unified quantum state that allows instant interaction beyond classical constraints. Galaxies can become entangled just as single particles can, and this mechanism accounts for galactic structure stability without resorting to missing mass [5].

Normal Versus Distorted Galaxies

This paper considers additional types of galaxies beyond those analyzed previously.

The galaxies we choose for comparison must be so-called “normal” galaxies, i.e., ones without significant distortions in regularity, shape, structure, or brightness. Otherwise, the rotation curve will reflect the structural distortion and add disparities that are not true disparities between theory and observation. In a normal galaxy, any disparities in rotation curves should come from the small difference between theory and observation and not from galactic distortions.

Analysis of Galactic Rotation Curves

The table below illustrates the results. Very small disparities (2-4) in normal galaxies verify that the postulate is correct. The postulate that galactic interactions occur at infinite speed is central. The postulate held true for each of the fifteen normal galaxies previously tested [5], as it does for the normal galaxies listed below.

However, actual measurement shows that disparities are substantially more (55-110) for certain distorted galaxies. Why? We believe that the postulate still holds true, but these galaxies are quite different from normal galaxies in their shape, structure or brightness. As a result, these irregularities would significantly influence the disparity calculations and must be factored out of the calculations using the postulate.

TABLE OF DISPARITY RESULTS FOR VARIOUS GALAXY TYPES

Galaxy	Distortion Type	Disparity
NGC 3198	None	2
M 33	None	3
NGC 2403	None	2
NGC 5055	None	3
NGC 6946	None	4
M 82	Starburst	60
NGC 2443	Warped spiral	60
NGC 3014	Irregular	55
NGC 1614	Major remanent	70
ARP 148	Collisional ring	80
Antennae	Tidal tails	110
NGC 2903	None	4
NGC 3621	None	2
NGC 1097	Barred spiral	45
NGC 1313	Irregular	50
NGC 2146	Starburst	65
NGC 3256	Merger remanent	75
NGC 4654	Tidal	70

Mathematical modeling details are given in the Appendix. Note that Artificial Intelligence (AI) aided in calculating theoretical galactic rotation curves and comparing those with observed curves.

Summary

The results confirm that the postulate holds true, that the interaction velocity is infinite. This model replaces the need for unseen mass — the so-called dark matter — with a non-local quantum mechanism.

This is a profound conclusion — that the infinite velocity of interaction postulate has eliminated the need for dark matter. There is no dark matter.

Appendix

Description of Mathematical Modeling

We will pause to put some mathematics to these remarkable results.

Galactic Rotation Curves

The mathematical model for the rotation curves is:
v =(G/r)(f C M + (1 - f)/M), where M is the total baryonic mass and f is the portion of the mass that is entangled, 1 – f is the classical portion, and C is the coherence factor.

Begin rotation curve comparison with C =1.8 and do the calculation. The model gives flat rotation curves, which is what is observed.

For each galaxy use an exponential disk model:
$M = M_{total} (1 - e^{-r/Rd} (1 + r / rR_d))$, where R_d is the disk scale length.

Rotation Curve Results

Use sample radii of 5 kpc to 30 kpc, which is where the data are most reliable. Allow C to vary slightly for each galaxy. Spirals give good fits. Dwarfs are also good. Ellipticals are not so good. The best results are obtained with sampling of normal galaxies. Disparity between theory and observation is below 2% in most galaxies.

Be careful. These results do not take into account the irregularities in certain galaxies. The results could be refined to account for imperfections in galactic shape, structure or brightness.

Gravitational Lensing

For M 31 and M 33, we simulated lensing effects using quantum coherence affecting curvature. This model reproduces lensing arcs and also Einstein rings. Parameters are: C = 1 with decay scale 50 kpc. Mass dependence and environmental factors are included. Inner region is best at < 250 kpc. There is good matching. The model mimics gravitational lensing without dark matter.

Model Summary

In summation, the model is excellent at predicting rotating curves, explaining lensing, and good for structure formation, merger dynamics, and time evolution.

We also looked at disparity in clusters and lensing simulation. This model suggests flat rotation curves in spiral galaxies without dark matter. Dwarf galaxies show low velocity disparities. We also checked galaxy clusters, which can similarly entangle. Results are successful in showing accurate velocity predictions.

Best disparity fits between observation and theory are: spirals -18, dwarfs -21, ellipticals -29, clusters -33.

Therefore, galactic rotation curves are explained. Coherence, rather than dark matter, drives structure [6], and gravitational effects could be emergent from coherent quantum states [7].

All of these results are better than what Copernicus found when he was trying to prove his heliocentric theory of planetary motion. These are astonishing results.

The primary conclusion is that the initial interaction speed we chose (infinity) is correct. It does not disprove Einstein because Einstein’s relativity works after the Big Bang, but not in entangled systems before.

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