

Gravity as We Have Not Known It: Could All of Cosmology Be Wrong?

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Abstract

**What links the flat rotation curves of galaxies,
the immense energy of quasars
and the "ghosts" of dark matter?**

A new approach shows that the answer lies not
in invisible particles, but in a fundamental error
in our understanding of the force of gravity.

This error has been made since the time of Newton.

1. A simple thought experiment that shatters the foundations.

Let's imagine two situations:

1. A Thought Experiment That Overthrows the Dogma: Mass Dispersion STRENGTHENS Gravity.

Imagine two star systems in empty space:

- **System A:** Two stars with masses 4 and 1 Solar mass (M_s), placed at the ends of a segment 20 light-years long.
- **System B:** Five stars, each with a mass of $1 M_s$, distributed uniformly over the same 20-ly segment.

The total mass and space of both systems is identical ($5 M_s$).

Question:

in which system will the gravitational force acting on the farthest star (from all the others) be greater?

Intuition, shaped by the current paradigm, suggests that the force should be very similar, or perhaps even slightly smaller in the dispersed system.

Meanwhile, calculations give the result:

- In **System B (5 stars)**, the force is **5.7 times greater than in System A !**
- When the same mass is divided into 10 stars, the force increases by **7.2 times** compared to the 2-star system.
- When we increase the mass in the dispersed system fivefold, the gravitational force increases not 5, but **25 times**, resulting in a **142-fold increase** compared to the initial example ! And 195 times when compared to the system with ten stars.
- It can be easily shown that in two different locations within the same

space, the gravitational force can be thousands of times greater with a small, e.g., fivefold increase in mass.

One mass = 4.95. the second mass 0.05. distance 20 light-years.

The second case, the mass is 5 times greater.

That means 25 solar masses are divided into 100 spheres, distributed over the same segment at equal intervals, and we calculate the gravitational force on the extreme sphere from all spheres on the left side.

The difference between the force in the first and the second case is 4,055 times. Such cases in space, or similar ones, may be very common. This means that in one case, in the same space, there is some relatively small mass, in another place in the same galaxy, the mass may be five times greater, but distributed differently, and the gravitational effects in both these situations are extremely different. This is how it works in space, full of various random systems. That's why quasars and other strange objects exist.

The conclusion is undeniable:

Contrary to what has been taught so far, the dispersion of mass in space does not weaken, but powerfully **STRENGTHENS** its resultant gravitational influence.

Current models, based on the theorems of Newton and Birkhoff, relied on a specific, extreme case (isolated point masses or ideal spheres), completely ignoring the key factor:

the geometry of mass distribution and the gravitational contribution of the neighborhood.

2. The Source of the Great Misunderstanding: Blind Application of Newton's and Birkhoff's Theorems.

The key error of modern astrophysics lies in the uncritical transfer of mathematical theorems from ideal conditions to the real, chaotic cosmos.

Newton's theorem (and its generalization, Birkhoff's theorem) states that for a perfectly spherical, symmetric galaxy, the gravity outside is *as if all its mass were concentrated at the center*.

The problem is that galaxies are not ideal compact spheres.
They are dynamic, asymmetric, loose structures with spiral arms, gas clouds, star clusters, and vast voids.

We are making a fundamental error:
we neglect the colossal, and often dominant, gravitational contribution of matter dispersed between stars and their neighbors.

It is this very error that generates the illusion of "missing" mass, which we try to fill with metaphysical "dark matter".

The proposed modification to Newton's law of universal gravitation takes the form of a correction factor that depends on the local matter density (ρ):

$$F = F_{\text{Newton}} \cdot \left[1 + \alpha \cdot \ln \left(1 + \frac{\rho}{\rho_0} \right) \right] \quad (1)$$

**Now we know the origin of the equation presented above.
Its derivation, simulations, and calculations for extremely different objects can be reviewed in the attached appendix.**