A Newtonian Solution to the Missing Matter Problem

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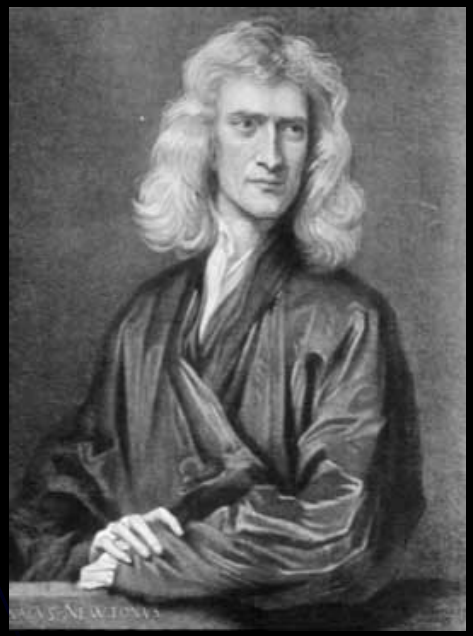

Outline

I. *Experimental Overview*
II. *Theoretical Overview*
III. *Newtonian Philosophy*
IV. *Ritzian Emission Theory*
V. *Galactic Rotation Curve*
VI. *Conclusions*
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Experimental Overview

- *1930's Fritz Zwicky measures flat rotation curves; dark matter is postulated*
- *1990 Observing programs search for MACHOs*
- *1990's WIMPs and other exotic dark matter*

Theoretical Overview

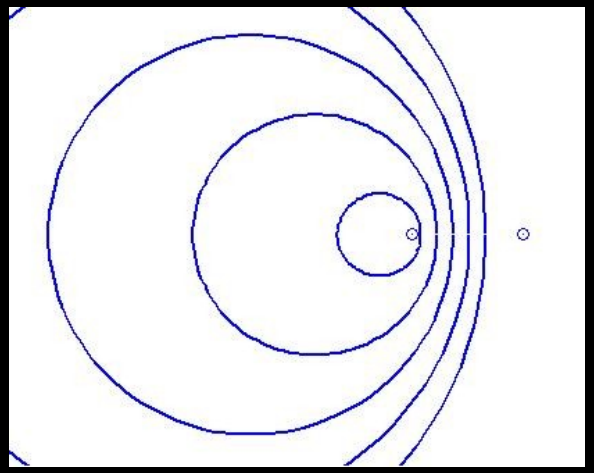
- *Milgrom modifies Newton's laws in order to obtain flat rotation curves without dark matter halos*
- *Cooperstock and Tieu (2005) apply GR to galactic dynamics, obtaining similar results to Milgrom, again without dark matter*

Newtonian Philosophy

- *Absolute space and time*
- *Atomic Hypothesis*
- *Determinism*
- *Three laws of motion*
- *Action-at-a-Distance*
- *"The whole burden of philosophy seems to consist in this- from the phenomena, to investigate the forces of Nature and then from these forces to demonstrate the other phenomena"- Newton*
- *Unification of Force is implicit*

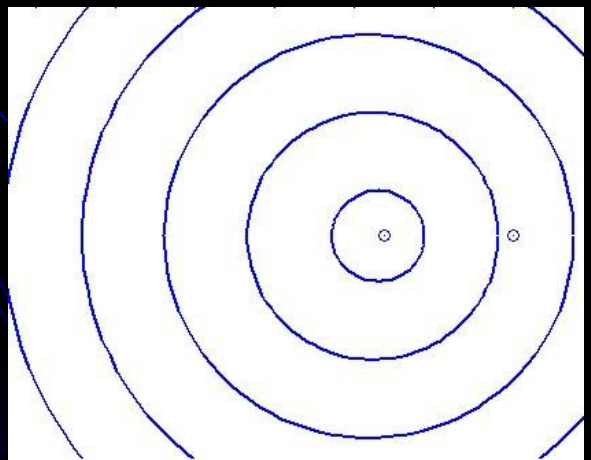
Force Transmission

Medium method → Ether



$c + v' = c$

Ballistic method → Action-at-a-distance



$c + v' = c + v'$

Ritzian Emission Theory

$$\vec{F}_{2\to 1}=\frac{Q_1 Q_2}{4\pi\varepsilon_0 r^2}\left\{\left[1+\frac{3-k}{4}\left(\frac{v}{c}\right)^2-\frac{3(1-k)}{4c^2}(\vec{v}\cdot\hat{r})^2-\frac{r}{2c^2}(\vec{a}_2\cdot\hat{r})\right]\hat{r}-\frac{k+1}{2c^2}(\vec{v}\cdot\hat{r})\vec{v}-\frac{r}{c^2}\vec{a}_2\right\}$$

Explains:

- *Electrostatics*
- *Magnetostatics*
- *Electrodynamics*
- *Radiation/Optics*
- *Radiation Reaction*

Gravitational Version

$$Q \to M$$

$$\frac{1}{4\pi\varepsilon_0} \to G$$

$$\vec{F}_{2\to 1} = G\frac{M_1 M_2}{r^2}\left\{\left[1+\frac{3-k}{4}\left(\frac{v}{c}\right)^2\ldots\right]\right\}$$

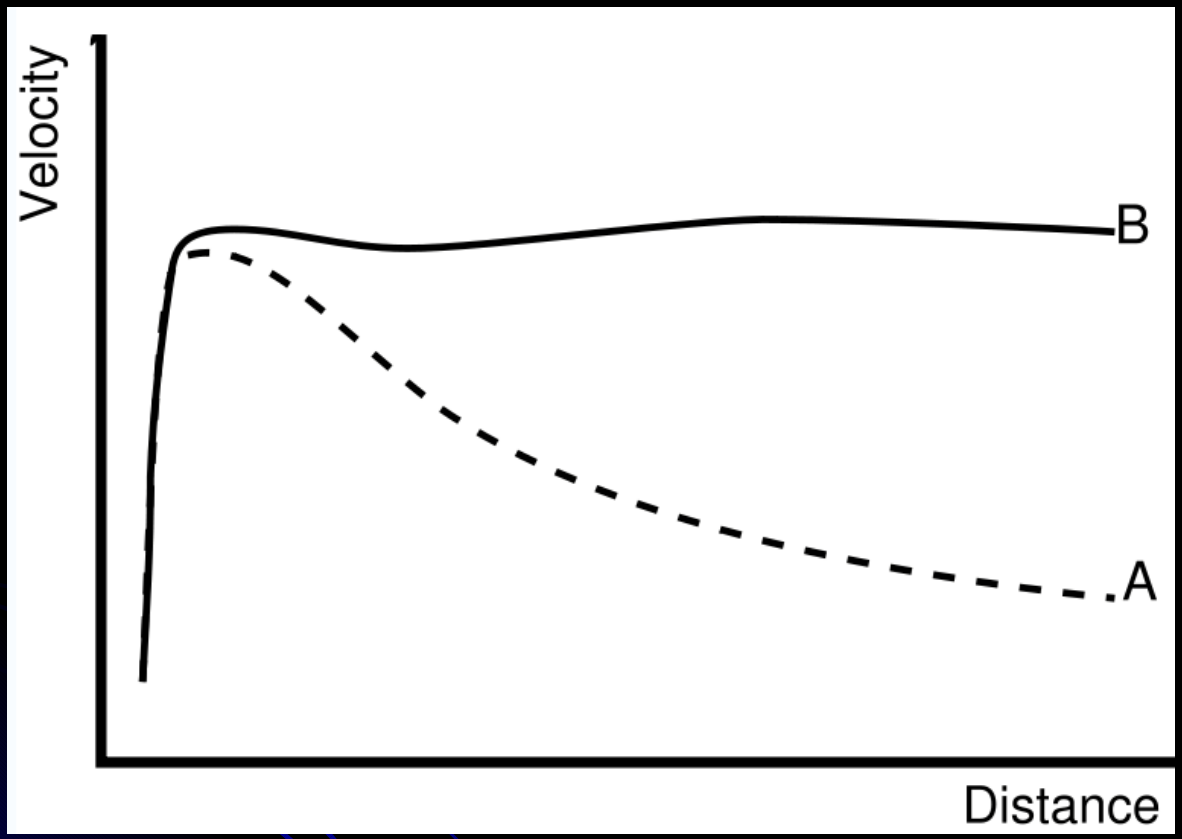
Insert into Newton's 2nd Law

$$M_1\vec{a}_1 = G\frac{M_1 M_2}{r^2}\left\{\left[1+\frac{3-k}{4}\left(\frac{v}{c}\right)^2\ldots\right]\right\}$$

Previous results

- Gravitational redshift explained with Newton's law of gravity.
- Precession of Mercury, Bending of Starlight and Gravitational Radiation explained by Ritzian law of gravity with k=7.

Galactic Rotation Curve



A = Keplerian

B = Observed

The Milky Way curve flattens at a distance of roughly 5kpc to a velocity of ~225km/s

Results

Tohline's equation explains curve and produces stable galaxy simulations

$$F = -\frac{GMm}{r^2}\left(1 + \frac{r}{a}\right)$$

Our equation reduces to one of similar form…

$$F = -\frac{GMm}{r^2}\left(\hat{r} - \frac{r}{c^2}\vec{a}\right) \rightarrow F \approx -\frac{GMm}{r^2}\left(1 + \frac{r}{sc^2 / v_s^2}\right)$$

Conclusions

- *Galactic rotation curve can be explained by using Newtonian system and applying ballistic generalization to Newton's law of gravity.*
- *Our methodology is to modify Newton's law of gravity for ever increasing range of experiments, not just one set of data.*
- *Solar system tests (Mercury, bending of starlight) of GR are explicable by velocity terms of our force law.*
- *Galactic rotation and gravitational radiation are explicable by acceleration terms.*

Future Work

- *Gravitational Lensing*
- *Unify Gravity and Electromagnetism*

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