The rotational speed of Galaxies

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Abstract
It has been observed that the rotational velocity of Galaxies does not depend on r, but remains constant as r varies; this has led to the hypothesis of the existence of dark matter. In this Theory we show that we can explain the constancy of this velocity with the use of quantum mechanical principles. This does not rule out the existence of dark matter and dark energy.

Introduction
Let there be a mass M in O; the volume given by the product of a/|r| with the spherical surface of origin O and radius r, represents the locus of the points at which the probability density of finding a particle, at orbital velocity v(r), has its maximum value; this value must be the same for every r.
Also the probability of finding a particle with orbital velocity v(r), in the volume $4\pi c^2(a/|r|)$ must also be equal for each r.
Since the Probability and Probability Density are constant, while volume $4\pi c^2(a/|r|)$ is a function of r, to obtain from the Probability Density, the Probability of finding a particle with orbital velocity v(r) in volume $4\pi c^2(a/|r|)$, we must multiply that volume by r.

Theory
For the Theory of General Relativity, this portion of the volume being equal to $4\pi c^2(a/|r|) = 8\pi(GM/|r|)$, that is $c^2a/2|r| = GM/|r|$, (in which time has been eliminated), where a/|r| represents the length to be subtracted from a segment of unit length placed at distance r from O. Then we derive that the orbital velocity of a particle must be $v = (GM)^{1/2}$ and not $v = (GM/r)^{1/2}$.

Conclusion
Let M be the mass of the Galaxy at distance r from O. If we imagine that the Galaxy is formed from a disk of particles with uniform density, since quantum mechanics is valid for such particles, the most probable velocity for such particles is $v = (GM)^{1/2}$; subsequently, for stars and planets generated from such particles, quantum mechanics will no longer be valid because of their large size, but classical mechanics will be valid; consequently, the orbital velocity within planetary systems must be $v = (GM')^{1/2}$ (M' mass of the star). But even if the orbital velocity within planetary systems turns out to be $v = (GM'/|r|)^{1/2}$, by Newton's first law (the law of inertia), the particles in the Galaxy, although they will form planetary systems, will forever retain their primordial orbital velocity. Then we will observe the stars and planets close to Earth in motion at velocity
$v = (GM'/|r|)^{1/2}$, while the most distant planetary systems, in the arms of the Galaxy, in motion at speed $v = (GM)^{1/2}$. For those Galaxies where $v = (GM/|r|)^{1/2}$, we might assume that they originated from the collision of two or more non-primordial Galaxies.
This theory does not rule out the existence of dark matter and dark energy.

Declarations Conflict of interest The author declares no conflict of interest.

Reference
1) Albert Einstein: Die Grundlage der allgemeinen Relativitästheorie.