

A simple solution to the Dark Matter problem

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Astronomers examining spiral galaxies in the 1950s expected to see stars near the center moving faster than on the outer edges. Instead, they found the stars in both locations traveled at the same velocity¹. This could not be explained by our current understanding of gravity. To account for this discrepancy, astronomers theorized that a halo of invisible matter surrounding the galaxies would create the observed phenomena. The mass of this invisible matter would then provide the missing gravitational forces to cause the outer stars to have the observed velocity.

However, the matter that comprised this halo could not be seen, and so the term dark matter was coined.. Astronomers have been trying for over 40 years to find and identify dark matter without success. This document suggests that dark matter does not exist, and there is an alternative explanation which has not been previously suggested. The proposed alternative will surprise you, and of course will be controversial, but handily does away with the troublesome concept of an invisible “dark matter”.

Introducing the Logarithmic aspect of gravity

A little-known and virtually ignored feature of gravity is that, in at least one experimentally verified instance, the force of gravity does not decrease by the expected $1/D^2$ relationship first postulated by Newton, but by the factor $1/\ln(D)$, where D is the distance from the gravitational force and Ln is the natural logarithm. This relationship was shown by Dr. Irwin Shapiro² in experiments called the Shapiro effect, which studied the delay of radio signals reflected off the satellites Mars and Venus as the signals passed near the Sun. This experiment has been repeated numerous times since, using transponders left on Mars, and satellites. The results show that the velocity of light passing through a gravitational field is reduced, and that the reduction is a function of the logarithm of the distance from the gravitational source (the Sun in the experiments). (See www.deceptiveuniverse.com/The-Shapiro-Effect.htm for more information.)

The Shapiro effect studied the delay of radio signals, representing a reduction in velocity of light as it passes through a gravitational field, as stated by Einstein:

"...according to the general theory, the speed of a light wave depends on the strength of the gravitational potential along its path."

And another quote from Einstein:

"So, it is absolutely true that the speed of light is not constant in a gravitational field [which, by the equivalence principle, applies as well to accelerating (non-inertial) frames of reference]. If this were not so, there would be no bending of light by the gravitational field of stars. One can do a simple Huyghens reconstruction of a wave front, taking into account the different speed of advance of the wavefront at different distances from the star (variation of speed of light), to derive the deflection of the light by the star"

¹ https://en.wikipedia.org/wiki/Galaxy_rotation_curve

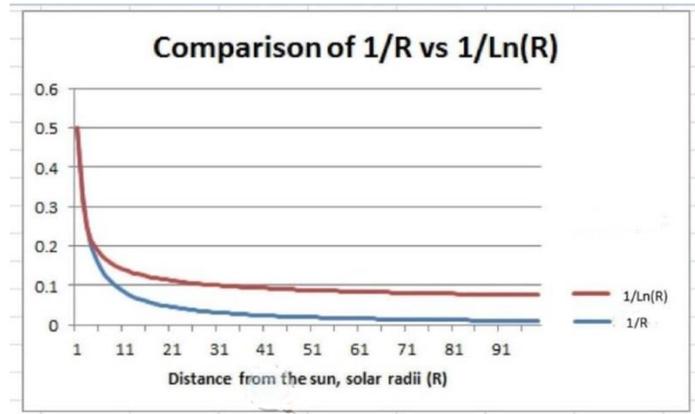
² Fourth Test of General Relativity

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So light does not always travel at the speed of light (c), but depends on the strength of the gravitational field it passes through. One might then conjecture that if the reduction of velocity decreases logarithmically with distance, perhaps the attractive force of gravity decreases logarithmically as well. In other words, perhaps Newton's guess was wrong, and the attractive force of gravity is not related to the square of the distance, but decreases logarithmically. This would mean that gravitational attraction is much greater at a distance than presently believed. If this were true, then the need for dark matter to explain star motion in spiral galaxies would not be needed.

The distinction between a linear reduction in the velocity of light with distance versus a logarithmic reduction in velocity, as related to the Sun, is major, as illustrated in the following figure:



As this illustration demonstrates, gravitational attraction at a distance is much greater if the logarithmic function applies. This function has been demonstrated to be true for the reduction in velocity at a distance. It seems reasonable that it is also true for gravitational attraction as well. Although this conflicts with Newton's law of gravitation, he did not derive his law by any rigorous process, but simply deduced (guessed) it. Thus we are not violating his law, simply modernizing it, based on experiments not available to him at the time. This seems reasonable, as it readily explains the action of stars orbiting in a spiral galaxy, for which only the mysterious and undetectable "dark energy" seems to explain.

Conclusion

A revision of the law of gravitation attraction to be a logarithmic function would explain the motion of stars in spiral galaxies and eliminate the need for dark matter, which has eluded explanation or discovery for over 40 years. There are other implications as well, as discussed in my website www.deceptiveyniverse.com.

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