

DARK MATTER HYPOTHESIS UNNECESSARY

by

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ABSTRACT

The hypothesis of the dark matter was introduced in order to somehow understand the apparent expansion of the universe. It is shown in this short paper that that hypothesis is really unnecessary. The dark matter appears to be a dogmatic fiction, just like the hypothetical quarks. It is further shown that the generalized Newton law of gravity as obtained in the unified field theory of this author explains fully the apparent expansion of the universe. That unified field theory is available on <http://jovandjuric.tripod.com>

INTRODUCTION

The American astronomer Edwin Hubble discovered in 1929 that the velocities of the receding galaxies (called nebulae at that time) increase with the distance from the Earth. These velocities are called the recessional velocities, and they appear to be greater than the speed of light, which obviously violates the basic tenet of the theory of relativity, and that is certainly the reason why they are called recessional. The ratio of the velocity of an observed galaxy and its distance measured from the Earth is defined as the Hubble's constant, which expresses the rate of the apparent expansion of the universe.

The apparent expansion of the universe, which manifests itself by the repulsion of the galaxies from each other, is difficult to understand. Due to the gravitational attraction, it would be natural to expect the contraction of the universe, rather than the observed expansion of the universe. In order to resolve the problem, the hypothesis of the dark matter was postulated, and that hypothetical dark matter is the cause of the observed repulsion of the distant galaxies from each other, i.e., the cause of the apparent expansion of the universe.

PROBLEM

The hypothetical dark matter resolves one problem apparently, but obviously brings forth another problem and the question, namely, why the repulsing galaxies do not collide with that dark matter? That collision should be considered as the inevitable certainty after a sufficient time period, since the estimated dark matter is by far more prevalent in the universe than the visible matter. There is also a serious remaining problem that the distant galaxies are observed to be receding, i.e., moving much faster than the speed of light, which is impossible according to the relativity theory, and which is really postulated without any physical justification from the mathematical term $\sqrt{1 - v^2 / c^2}$ in the well-known Lorentz transformations.

POSSIBLE SOLUTION

The possible and logical solution of the outlined problem is to abandon the basic tenet of the relativity theory that the velocities are limited to the speed of light c . Indeed, it is logically very strange that only the velocities of all other physical quantities are limited to a certain value, and especially in view of the fact, which was observed by Hubble in 1929, that the distant galaxies are receding, i.e., moving as observed from the Earth with the velocities apparently much higher than the speed of light c . Once the limitation of the velocity is abandoned, it is logical to formulate a new theory without any limitation of the velocity, such as the unified field theory of this author, which is available on the Internet Site <http://jovandjuric.tripod.com> which was also very briefly outlined in his Fifth Award winning essay in the 1963 competition of essays on gravity of the Gravity Research Foundation, New Boston, New Hampshire, USA, old address; new address: Wellesley Hills, Massachusetts, USA. That unified field theory is based on the symmetrical Maxwell equations which unify gravitation and electromagnetism.. It is shown there, that the point mass M , located at the point defined by the vector \vec{r}_0 , attracts the point mass m , located at the point defined by the vector \vec{r} and moving with respect to the point mass M with the velocity \vec{v} , by the force given by the expression (23)

$$\vec{F} = -mGM \frac{\vec{r} - \vec{r}_0}{|\vec{r} - \vec{r}_0|^3} - \frac{mGM}{c^2} \cdot \frac{\vec{v} \times \left[\vec{v} \times \left(\frac{\vec{r} - \vec{r}_0}{|\vec{r} - \vec{r}_0|^3} \right) \right]}{|\vec{r} - \vec{r}_0|^3}$$

where G is the universal gravitational constant equal to $6.672 \times 10^{-11} \text{ m}^3 \text{ s}^{-2} \text{ kg}^{-1}$, and c is the speed of light in vacuum. It is obvious that this expression reduces very approximately to the classical Newton's law of gravity for $|\vec{v}|$ much smaller than c , which is the normal case for the motion of the planets in our planetary system. But it is obvious that this expression of the generalized gravitational force can become repulsive when the velocity $|\vec{v}|$ exceeds the speed of light c . This can easily explain the actually observed repulsion of the distant receding, i.e., moving galaxies faster than c , without resorting to the logically absurd hypothesis of the dark matter.

CONCLUSION

The logical antigravity term in the generalized gravitational force expression appears to be the explanation of the puzzle as observed by Hubble in 1929, and it makes the dark matter hypothesis absolutely unnecessary. The true validity of the generalized gravitational force can be checked and experimentally proved by an experiment of the acceleration of electrons above the speed of light c , as proposed by this author on the mentioned Internet Site <http://jovandjuric.tripod.com> based on a tentative model of electron whose magnetic moment is identified as the intrinsic mass moment. The estimated cost of such an experiment is about 10 millions of US dollars, which is by far less than the cost of the recently constructed Large Hadron Collider at the CERN for the experimental investigation of the hypothetical sub-elementary particle called *quark*, which is shown by the experiments of this author to be absolutely unnecessary, just as the

dark matter hypothesis is also absolutely unnecessary. Dark matter and quarks appear to be only the dogmatic and totally unnecessary fictions..

The unified field theory of this author is based on the symmetrical Maxwell equations and the correct application of the two very important points of a mass distribution, namely the center of mass and the center of gravitation, which points were never properly distinguished in the physics textbooks so far, particularly the center of gravitation, which must be defined as the point at which the gravitation of the observed mass distribution is zero, and that definition of the center of gravitation cannot be found in the published physics literature so far. That error in the very foundations of physics dates back to Newton, who created the point mass concept, which point is also the center of mass, but he never introduced the concept of the mass distribution, which concept was introduced later by Poisson with his volume mass density in the Poisson equation. But neither Poisson nor any other physicist up to this present time ever introduced the obvious center of gravitation as the evident point at which the gravitation is zero. With the correct application of those two centers, i.e., the center of mass and the center of gravitation, the identification of magnetism as the manifestation of gravitation is inexorable as shown by this author in his two experimental and theoretical research papers entitled “MAGNETISM AS MANIFESTATION OF GRAVITATION” and “EXPERIMENTAL CONNECTION OF MAGNETISM WITH GRAVITATION” available in the pdf format on the mentioned Internet Site <http://jovandjuric.tripod.com>

This error and deficiency in the very foundation of physics should have been discovered at least after Pierre Curie’s experiments with heated magnets in 1895, but somehow the scientists of that era went astray by being excited very much by the newly opened research field of the microcosm, and they left some obvious misunderstandings of the macrocosm unresolved, particularly the problem of the origin of the Earth’s magnetic field, which this author was and is still trying to resolve and to publish his results, but his efforts were suppressed and not permitted to be published for many decades, almost 5 decades, up to now, by the present physics establishment without any scientific argument against, but evidently clinging to the old-fashioned erroneous dogmas.