The Physical Cause of Gravitation

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The physical cause of gravitation is simple: the collision of one thing with another. Here I propose that the unseen particles involved in these collisions provide the acceleration that drives gravitation. We do not know exactly what these particles are, but it is clear they must be decelerated in the process. Here I assume they are "aether" particles, as distinguished from the anathematic fixed "ether" particles nullified by the famous Michelson-Morley experiment. Having been decelerated, aether particles become lethargic, tending to hang around whatever baryonic matter was involved in the collision. Like the nitrogen in Earth's atmosphere, these aether particles are entrained, attached to Earth as a far-reaching "dark matter" halo. They provide the physical reason for interpretations of gravity calling for "curved space." At low altitudes this entrained "aetherosphere" allows little of the "ether wind" that Michelson and Morley tried to measure. The upshot: proximal aether is less active (lower pressure) than distal aether (higher pressure). Things in the vicinity of massive objects receive stronger impacts from the distal side of the halo than from the proximal side. This Aether Deceleration Theory is supported by much of the data generally considered as confirmation of General Relativity Theory.

INTRODUCTION

The physical cause of gravitation is simple: the collision of one thing with another. According to Newton's Second Law of Motion, all causes involve the acceleration of one object by another. It is obvious that gravitating objects undergo acceleration. We can measure it precisely on Earth: 9.81 m/s^2, but it has never been obvious as to what has produced that acceleration. Whatever it is, it must be decelerated in the process. Let us assume, as Aristotle did, that matter is infinitely divisible. If true, this means that all matter must contain and must be surrounded by other matter, some of which is so tiny it can neither be seen nor detected by current instruments. Let us call those tiny bits of matter "aether," as opposed to the "fixed ether" mostly nullified by the Michelson-Morley experiment [1]. And like all things, these aether particles are in motion, traveling over short interparticle distances at velocities possibly greater than the speed of light. However, when they collide with baryonic (ordinary) matter, they must lose some of this velocity (Figure 1). After these collisions, decelerated aether particles would have decreased motion, tending to accumulate near baryonic matter, and not doing as much high-velocity colliding as before. Particles that venture from the location of the initial aether-baryonic collision would themselves be targets for more energetic aether particles. This would cause those energetic particles to decelerate in turn, forming an endless chain of deceleration that diminishes with distance per Newton's equation. All baryonic matter would have a relatively dense "halo" or "aetherosphere" of these slowed aether particles similar to Earth's atmosphere. However, unlike the atmosphere, this aetherosphere would be a region of decreased aethereal activity (pressure). Distal aether particles, having yet to collide with baryonic matter, would continue to travel short interparticle distances at high velocities, with their most successful trajectories being toward regions with relatively low aethereal pressure.

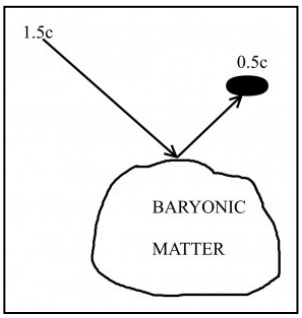

FIG. 1. Hypothetical aether particle losing velocity upon colliding with baryonic matter [2].

This gravitational mechanism is analogous to what happens to a helium-filled balloon as it rises in

Earth's atmosphere. In that case, the pressures are reversed. The pressure (activity of nitrogen) is higher beneath the balloon than above it. The balloon is pushed from the high pressure region at low altitude toward the low pressure region at high altitude. The air molecules that push do not have to travel any great distance to do that. At sea level their interparticle velocities are about 515 m/s (50% greater than the speed of sound waves in air) [3]. A gravitational field works the same way—in reverse. Aether pressure is greater on the top of a falling object than it is on the bottom of the object. Let us now examine some of the other ramifications of this Aether Deceleration Theory (ADT).

PRESSURE AND DENSITY

ADT is such a simple deduction from Newton's Second Law that it is a wonder that he did not propose it himself. Actually, he did have a nearly unknown alternative to the attraction theory:

"Is not this Medium much rarer within the dense Bodies of the Sun, Stars, Planets and Comets, than in the empty celestial Spaces between them? And in passing from them to great distances, doth it not grow denser and denser perpetually, and thereby cause the gravity of those great Bodies towards one another, and of their parts towards the Bodies; every Body endeavouring to go from the denser parts of the Medium towards the rarer? …I see no reason why the Increase of density should stop any where, and not rather be continued through all distances from the Sun to Saturn, and beyond. And though this Increase of density may at great distances be exceeding slow, yet if the elastick force of this Medium be exceeding great, it may suffice to impel Bodies from the denser parts of the Medium towards the rarer, with all that power which we call Gravity."[4]

This theory never got popular, not the least because he uncharacteristically got it backwards. There are two important reasons aether density must increase, not decrease toward baryonic matter. First, acceleration of one body always leaves a decelerated body behind, per his Second Law of Motion. Second, the increase in aether density with nearness to baryonic matter is expected if aether is the precursor to baryonic matter as Descartes [5] had suggested before Newton. All things are the result of other things coming together. Newton's laws gave no mechanism for his medium to be rarer near bodies undergoing gravitation. This is where the difference between pressure and density must be understood. Pressure describes the activity or interparticle velocity within a region; density merely describes the number of particles within a region. For instance, the density of water may be high and its pressure low, while the density of steam may be low and its pressure high. That completes ADT, with pressure differentials due to deceleration providing the force as well as the increased proximal density and lethargy responsible for aether entrainment.

LONG-RANGE VS. SHORT-RANGE PARTICLE TRAVEL

Since Newton's failed effort, there have been many attempts to devise a push theory of gravitation [6]. Like Le Sage [7], most hypothesize long-range particle travel, which nonetheless must be ruled out due to the observed lack of aberration for gravitational phenomena. Light from the Sun, for example, displays an aberration in which it takes eight minutes for light waves to reach Earth. On the other hand, gravitational effects, such as the tides, have no aberration. They appear to occur instantaneously, almost as if the Moon was at the end of a spoke on a gigantic wheel centered on Earth. Earth rotates at 465 m/s at the equator, with the entrained atmosphere, making it appear as though it is part of Earth. The aetherosphere is similar. To fit gravitation's instantaneous appearance, a long-range particle or wave would need a velocity over 20 billion times the speed of light [8]. Unless you are willing to make that fantastic ad hoc, no theory that requires long-range travel is viable as the physical cause of gravitation.

Lately, there has been much rejoicing over the detection of the so-called "gravitational waves" produced by a binary black hole merger [9]. According to ADT, these waves are merely shock waves in the aether. A subsequent detection involving the collision of neutron stars was able to use triangulation to show LIGO waves travel at the speed of light [10]. That proves, of course, that both wave phenomena use the same medium: aether. In tune with GRT, the waves supposedly are "ripples in spacetime" or the result of the alternating compression and decompression of empty space. The LIGO measurements are no support for long-range particle travel. With a velocity of $\boldsymbol{c}$, they do not resolve the aberration problem. Of course, these shock waves have little to do with the cause of gravitation in the same way a dynamite blast has little to do with the cause of atmospheric pressure. In any case, the LIGO waves do not support any mechanism using "attraction" as the cause of gravity.

GRAVITATION AND THE FORMATION OF BARYONIC MATTER

One of the implications of ADT is the formation of baryonic matter from aether particles. According to relativism [11], no two objects are perfectly identical—including aether particles. If aether particles were identical their high velocity collisions with each other would not produce anything new. However, in the real world larger, slower aether particles inevitably must exist among the smaller, faster aether particles. That presents the possibility for baryonic matter to form. Large particles tend to shield smaller particles, with those small particles being pushed toward the large ones as a result (Figure 2). The formation of a vortex, with a smaller particle rotating around the larger is particularly significant here. It amounts to the conversion of high velocity linear motion into high velocity rotational motion. The newly formed rotating complex has less linear velocity as a whole and more mass than a single particle. At the most fundamental level, the formation of baryonic matter from aether particles amounts to the transformation of relatively high velocity motion of single particles into relatively low velocity motion of duplexes. Any combinations beyond the duplex level increase the propensity for colliding particles to lose velocity, become lethargic, and form an especially dense region around the duplex.

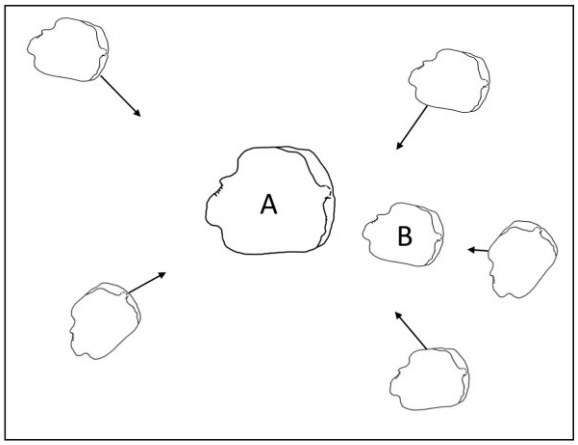

FIG. 2. The origin of baryonic matter from aether particles via Aether Deceleration Theory. Note that large particle A in the center shelters particle B from impacts from the left. Consequently, B will be pushed toward A, with the likelihood it might even end up rotating around A, forming the first vortex—a common structure that harnesses high-velocity motion throughout the universe [2].

PREDICTIONS OF AETHER DECELERATION THEORY

Curved Space

Unfortunately, misinterpretations of the Michelson-Morley experiment led to the abandonment of the aether concept altogether despite Einstein's later recantation [12]. Because aether is entrained, the sought-for "ether wind" produced by Earth's motion was barely detected by the experiment. In hindsight, that would have been like trying to use an anemometer to detect the jet stream at sea level.

The "aetherosphere" or halo that tends to accumulate around baryonic matter, of course, is curved just like the atmosphere around Earth. Just like the atmosphere, the aetherosphere is an integral part of Earth. In a sense, one could think of the aetherosphere and its manifestations as "curved space" or "curved spacetime." One could even mistake its manifestations as being the immaterial "cause" of gravitation. Nonetheless, physical causes always involve collisions per Newton's Second Law of Motion. The existence of a thing per Newton's First Law of Motion is not a cause. In this case, the existence of the aetherosphere is not a cause, but an effect. Per ADT, the cause of gravitation is the collision of aether particles with other matter.

Purported confirmations of General Relativity Theory (GRT) cannot recognize a physical cause, because that is not part of the theory. As in the Eddington experiment [13], simple refraction of the light path still is being interpreted as "curvature of space-time when pulses pass near the massive companion" [14]. Light slows down when it enters an atmosphere, resulting in a "Shapiro delay." The delay must be accounted for and "added to the pulse arrival times when propagating through the curved space-time near the companion" [14]. Again, these data simply result from atmospheric and/or aetherospheric encounters and have nothing to do with the acausal perfectly empty curved space or spacetime hypothesized in GRT.

Gravitational Redshift

The velocity of wave motion through a medium is controlled by that medium. For instance, sound waves travel through the atmosphere at a constant velocity of 343 m/s—as long as the properties of that medium remain unchanged. Altitude is particularly

important with regard to the properties of a gaseous medium: the velocity of sound on Mount Everest is about 300 m/s. According to ADT and Newton's equation for gravitational potential, the properties of the aetherosphere also vary with distance from any massive body. Again, aethereal pressure increases with altitude, while aethereal density decreases with altitude. If aether is the medium for light waves, and if sound is a good analogy, we should expect the velocity of light to be a function of aethereal pressure. Light going away from Earth should speed up and light going toward Earth should slow down.

In 1960, Pound and Rebka [15] performed a celebrated experiment that showed exactly that. They used Mossbauer spectroscopy to demonstrate electromagnetic radiation indeed was blueshifted when directed down a 22.5-m tower and redshifted when directed up the tower. Subsequent observations confirmed the effect, with electromagnetic radiation emitted from all sources, such as galaxies and even galactic clusters being redshifted as it left the vicinity of those massive objects. This so-called "gravitational redshift" was then, and still is, interpreted as a confirmation of GRT. Per convention, light speed was assumed constant and the wavelength observations were interpreted instead as the results of the "time dilation" proposed by Special Relativity Theory.

However, as implied above, ADT provides a far simpler explanation of the experiment involving slight changes in the aether medium. If aethereal pressure actually increases with distance, then the velocity of light and the wavelength of any electromagnetic wave leaving its source will increase. This is, after all, what happens when light leaves water at 225,000,000 m/s to enter air at 300,000,000 m/s. The wavelength of a red laser light will increase from 488 nm in water to 650 nm in air, although its frequency will remain unchanged.

The Hafele-Keating experiment [16] supplied a similar confirmation of ADT that was originally considered proof of GRT, although, as usual, no physical mechanism was given. Cesium beam clocks flown around the world sped up at high altitude. Now, any clock dependent on the speed of light would be influenced by the increased aethereal pressure there. The cesium beam clock uses a microwave beam to trigger a measurable response from ^{133}Cs. In effect, a slight increase in the speed of light would register as a slight increase in the number of cycles per second, which is measured as a time gain. The time gain due to the effect of altitude was only about 160 ns, but that was enough to "confirm" GRT (and ADT). The upshot was that Einstein's equations had great predictive value in the same way that Newton's equally kinematic equation ($F_g=Gm_1m_2/r^2$) predicts the effect of gravity. In either case, knowledge about the physical cause (i.e., what is colliding with what) is not required. We can get to the Moon without knowing whether gravitation is a push or a pull.

Dark Matter

Even though there has been much speculation about dark matter since the late 1800's, it still remains a mystery. Data have been accumulating in support of the dark matter concept since the 1970s. Perhaps the most famous work was by Vera Rubin, who used rotation rates to prove many galaxies behave as though they are six times more massive than their illuminated contents would indicate [17]. Some galaxies would simply fly apart without that extra matter to provide the gravitational push to keep them together. Others are moving toward each other at rates much higher than indicated by their visible contents. Current investigations involve the search for an unknown elementary particle, with nonbaryonic matter still in contention. None have been successful.

That is because decelerated aether is the most likely candidate for dark matter. Aether particles cannot do their pushing job without losing some of their motion and piling up around baryonic objects in a layer of increasing proximal density. These proximal aether particles do not have enough velocity to leave the vicinity of baryonic matter entirely, especially in view of their bombardment by still higher velocity distal particles. The aetherosphere around every cosmological body obviously contributes an enormous mass even though each of its relatively lethargic particles has only a tiny mass. The aetherosphere or "gravitational halo" extends as far as the effects of gravitation can be felt. The halos around each body obviously interact with those of other bodies as demonstrated by the tides, satellites, and recent astronomical observations [18]. Both ADT and GRT require the existence of dark matter, although its true nature will not be resolved as long as aether and its deceleration remain ignored.

CONCLUSIONS OF AETHER DECELERATION THEORY

1. Gravitation is caused by accelerations of baryonic matter by locally active aether particles exhibiting high velocity short-range motion.

2. Aether collisions produce decelerated aether particles that accumulate around other aether particles and around baryonic matter—a process ruled out by the hypothesized fixed "ether" of the Michelson-Morley experiment.

3. Aethereal pressure increases and aethereal density decreases with distance from baryonic matter per Newton's law of gravitation and his Second Law of Motion.

4. Michelson and Morley's attempt to detect the ether wind was ill-advised and misinterpreted. Their methodology was not suitable because aether is entrained.

5. The gravitational redshift occurs because distil aethereal pressure is greater than proximal aethereal pressure, resulting in slight increases in the speed of light and consequent increases in the wavelength of electromagnetic radiation traveling away from a source.

6. Time gains measured by cesium clocks result from tiny light speed increases of the microwave beam at high altitude.

7. Dark matter is entrained aether extending in all directions from baryonic matter as an aetherosphere or gravitational halo, contributing to the unseen mass of all objects.

8. None of the above conclusions are possible without aether. Without aether, there can be no physical explanation for gravitation, the gravitational redshift, dark matter, and other so called confirmations of GRT.

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