Hypothesis

In-System Mechanics in The General Theory of Relativity

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Abstract

The article focuses on a system not fully incorporated into the laws of flat spacetime. The system was drawn without discrediting the laws of quantum mechanics but to mathematically investigate the capabilities of this system in adhering to mechanics. The system uses some of the laws of mechanics, as well as the author's mathematics, to derive forces acting in this system. Incorporating some forces of mechanics, a curvature was derived mathematically in this system. Though not clearly explaining the fundamental forces of physics, the article is meant to be a stepping stone in that direction.

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INTRODUCTION

The General theory of relativity can first be referenced back to the year 1915. The purpose of General relativity was to prevent the Universe from collapsing in onto itself under the effects of gravity. General relativity was abandoned when the Universe was found to be expanding [1]. Today, individual studies still persist on explaining gravity as a geometrical curvature of space-time [2]. Observations of the expanding Universe led to the rejection of General relativity [3]. Newtonian fluid can be traced back to the publication of the Cosmological considerations in the general theory of relativity. Today, the Newtonian system is most commonly observed mathematically and is termed Newtonian fluid [4][5]. When exposed to extreme forces of compression, it's possible for water to phase into its solid state, which is termed ice. In 2007, scientists were able to make ice hotter than the boiling point of water by compressing the water. Water is a Newtonian fluid [6]. Space-time is a four-dimensional manifold. Space-time unifies the 3-dimensional Euclidean space with the 1 dimension of time. Unifying the 3-dimensional Euclidean space with the 1 dimension of time results in the 4-dimensional Minkowski space. Minkowski space is the understanding of space-time in modern physics. Minkowski space is used to define the Universal metric (the physical factor that defines the idea of space and time) today. The Universal metric defines factors such as past, present, future, and distance. Space and time are defined from the y-axis and x-axis that the Universal metric is thought to have. The y-axis defines space. The position or distance of a particle from another particle is defined from the y-axis of space-time (usually). The x-axis of space-time defines time (usually). Time (future, present, past) arises from the expansion of the Universal metric. The expansion of the Universal metric is thought to be by both the y-axis and x-axis. As the Universal metric expands, its position in the entity where it exists moves up the x-axis (space-time focuses on the view of sight of the observer), and parallel to the y-axis.

As the position of the Universal metric moves up/parallel (space-time) the x-axis, matter over/along the Universal metric is moved along with the Universal metric. The moving of matter up/along the x-axis is known as the passing of time (due to space-time being closed). The future is the position on the x (because of the coordinates used in this study) axis the Universal metric is to pass. The present is the position the Universal metric is located at and the past is the position matter over the Universal metric has passed. Euclidean space has a z-axis as well (with the x-axis and y-axis). Unifying the 3-dimensional Euclidean space with the 1 dimension of time gives rise to the expansion of the 3-dimensional Euclidean space (Minkowski space) [7]. Masses which would cause a greater curvature of space-time will move through time much slower than ones which would cause a much lesser curvature [8] [9]. A particle moving through space-time causes a greater curvature than it would if the same particle was at rest [10]. When a particle is at rest it curves space-time. The curvature of space-time caused by a particle at rest is denoted by gμν. gμν is known as the metric tensor. The metric tensor in general is a generalization of the gravitational potential of Newtonian gravity.

The metric tensor is what causes the gravitational constant Gμν. Again, Gμν is loosely a generalization of the gravitational constant of Classical gravity. Masses at rest over the Cosmological constant will displace the Cosmological constant, this is as the Cosmological constant expands. In the Einstein field equations, the displacement of the cosmological constant by masses is such that the stress-energy-momentum tensor arises. The stress-energy-momentum tensor is derived from the geometry of space-time and denoted in the Einstein field equations as Gμν [11]. The General theory of relativity predicts that a shifting gravitational potential exerted by a mass causes Gravitational waves [13]. As energy such as photons moves through space at the speed of light, they deform space-time [14]. Classical gravity states that masses pull other masses toward them with an invisible non-electromagnetic force. The force by which masses pull other masses towards them is termed force at a distance. Newton thought that the force by which large masses, such as the Earth, pull other masses toward them is inversely proportional to the square of their radius. The force by which any mass pulls another mass towards it was thought by Newton to be inversely proportional to the distance squared between the masses.

Newton's third law of motion applies to force at a distance. Newton thought that as a mass pull on another, the mass being pulled also pulls on the pulling mass with the same amount of force as the pulling mass exerts on the mass it's pulling. Because one of the masses is more massive than the other. Newton's equation for gravity denotes that when one mass is exerted on, the equal and opposite reaction of force by which it pulls on the mass exerting the force of gravity does not reduce with distance. In the sense of the above sentence, the mass being pulled on will always pull on the pulling mass that's pulling it no matter the distance between them and the mass of the mass being pulled. Newton's idea of gravity evokes that the two masses exerting gravity on each other communicate somehow before the masses exert gravity on each other [15]. Newton's third law of motion states: for every force of action, there's an equal and opposite reaction [16]. The cardinality of the empty set is zero: |Ø|=0 and its power is the set containing only the empty set. 2ø={Ø}. In standard set-theoretic definition of natural numbers, sets are used to model the natural numbers. In standard axiomatic set theory, by the principle of extensionality, two sets are equal if they have the same elements; therefore, there can be only one set with no elements. Hence, there is but one empty set and it's spoken of as "the empty set" rather than "an empty set" [17]. For a soft particle under uni-axial compression, the volume of the compression path, *i.e.*, the penetration path, will be "reduced". The reduced volume will be migrated to the $2R^2\delta$ [18].

RESULTS

The Newtonian fluid is thought to behave in the same way as a fluid with varying degrees of viscosity, making up different Newtonian systems of sorts. Using a system that behaves as a Newtonian fluid with varying viscosities and allowing path-connectivity to arise from the degree of compression of the system, a warp in this system could be possible.

The equation $f = m_d \bullet m_{-d}$ was used to demonstrate the compression of the system talked about. is force exerted in the system at acerate in point in this system; is force exerted by the system from a certain direction; is force exerted by the system but in an opposite direction. The system's content interacting in a system that is free from action at a distance and the system expanding infinitely could still allow for the system to exert force on itself. This is from Newton's first and third laws of motion; the content in the system will remain stationary until acted upon, and when acted upon will exert force on the exerting mass. The force of is exerted at a certain point in the system. The system is found to be compressing itself from all directions by reference to the equation when the system is expanding the same in all directions. The equation can also be written to express the net force in the system at a certain point. When is equal to, the net force exerted at that certain point in the system is equal to zero, meaning neither the force nor will move the single system mass that the force is exerted on.

This math talks of compression because when is greater than, the result is pushing the system mass content in the direction of the force at the point that is exerted at in the direction of the force of. When is greater than, the same is true for. The above equation is a vector quantity, and F is positive when is greater than and negative when is greater than. When is equal to, is both positive and negative. The force of results because the system content interacts as the system expands. Following from the above equation [12], the compression of the system by its content as the system expands can be said as the system exerting topological pressure on baryonic matter and energy in the system as the system expands.

When for say $m_d = 10$ and $m_{-d} = 20$,the equation can be written to equal to $f = m_d \bullet m_{-d}$, $f = 10 \times 20$, $f = 200$,and the net force is $f = 10 - 20$, $f = -10$, in the direction

of m_{-d}. These values can be drawn from the edge of the system from one side *i.e.*: $m_d = 10$, and the other value by starting from the point where the 10-value mass/send and all the way to the edge of the system in the alternative direction, *i.e.*: $m_{-d} = 20$. As the system expands and $m_d = 20$, $m_{-d} = 30$,the force in the system increases to $f = 600$.While the net force is $f = 20 - 30$, $f = -10$, the net force is still exerted in the direction of m_{-d} by a value of 10. When the values in the equation are written, multiplying the values of 10 and 20 by a factor of 2, it is seen as $f = 20 \times 40$, $f = 800$.
This can be said as the compression of the system by the mass in the system, being proportional from the distance that is starting from the centre of the system, because when m_d and m_{-d} are equal, at the centre, the net force is zero but the force in the whole system is the same.
The net force is used to demonstrate that there is a possibility for topological pressure on matter in the system. As the system expands, the force within the system also increases. Thus, the net force may be the same at the same point, but the magnitude of the force at that point increases because more force is exerted at that point from all directions as the system expands. The net force at a certain point in this system may always be €€ the same when the system is expanding at the same rate in all directions. However, because the force in the whole system is increasing, the magnitude of the force at that point also increases, so the topological pressure also increases. This can be expressed as, because the force in the system increases as the system expands and the net force from one direction increases when the mass in the other direction is closer to the edge. The flow of matter in the system can be drawn from the buoyancy principle. The closer to the edge of the system that matter is and the further away from the center, the more likely it is to sink when matter is denser than the system. The system is expanding the same in all directions, so the density should always remain constant at different depths. The more the matter sinks into the system, the greater the force in the system is exerted on the matter, and the more the topological pressure on the matter increases due to the system compressing itself and the magnitude of force increasing the closer to the center. The harder it would be for matter to move the system mass content the further it sinks into the system. The path connectivity in the system only arising from the degree of compression within the system can be shown as follows, 2ø. Because the compression increases further down into the system as more force is applied into the system the further down. Although matter does not necessarily have to be counterbalanced at 2ø.
Matter has to displace the system mass content as it sinks, which becomes harder due to the force in the system increasing. The matter in the system can be counterbalanced as follows; allowing for a curvature to form. is introduced because as the magnitude of the force increases, the more the path connectivity of the sets become more rigid and the lesser the matter is able to displace the system. means that at this point the matter is not able to displace the system further besides just slightly, thus one of the sets are substituted as the matter displaces this point of the system slightly. It's because after the one set is substituted, due to compression forces between the matter and the system content, the set that nearly replaces it pushes against the matter and in between two other sets without completing a flat path connected space, and so, this region is not very stable. represents that the curvature forms in such a way as to be stable when the matter is exerted on by topological pressure, so it is. Larger masses need more topological pressure to be moved; the formula also suggests that the larger the mass, the bigger the region of instability of the sets. Baryonic matter and energy are always counterbalanced in the state of the system where the displacement of the system by baryonic matter as well as energy are compatible with a curvature caused by matter in this system.

CONCLUSION

Though a curvature was mathematically derived in this system; which is the force of gravity, the system can still have more potential in incorporating other forces. The Casimir effect, which is a quantum physics force and which may be present in this system, along with other forces relating to mechanics can be more clearly highlighted in following investigations.

CONFLICT OF INTERESTS

The author hereby declares that the disclosed information is correct and that no other situation of real, potential, or apparent conflict of interest is known to them.

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