the general science journal

2018

A different Approach to the Mystery of Gravity

An Emergent Force from Accelerating Matter

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Kenneth Paul Hoffman

9/10/2018

the general science journal

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10 Sept, 2018

An Emergent Force from Accelerating Matter

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This is to examine the inconsistencies in the view currently held by physics on gravity, to provide an explanation for the gravitational field's existence, the origin of the gravitational force, and its compatibility with the laws of thermodynamics.

This paper contends that there is a natural real response via space's interaction with matter to any acceleration of matter at any scale from the atomic to the galactic. That response is the force of gravity. Gravity emerges when space detects any acceleration at any scale. The force of gravity at the scale of an atom seems insignificant, but with the accumulation of gravity output from the acceleration effects of 10^{50} atoms/molecules as in the example of the earth[1], it adds up.

The G-Force

When an object accelerates in space w/o any presence of a gravitational mass, the object will experience the G-Force.

If a car accelerates on earth, the occupant will experience the G-Force.

If a rocket is accelerated upward from the moon, the astronauts will experience the G-Force.

A man inside at the outer perimeter wall of a rapidly rotating system will feel the G-Force pushing him against the wall.

All these are examples of the G-Force generated from acceleration. It has long been accepted that any acceleration of an inertial mass such as a rocket ship in the vacuum of space would result in the generation of this force from acceleration, that is, the G-Force.[2] This is explained by Newton's 3rd Law; any force applied will produce an equal and opposite force. Strangely, a G-force is not in the same class as the four forces of nature, the Strong, the Weak, the EM, and Gravity. Although not an 'official' force of nature, the G-Force is real enough to injure or kill.

However, physics claims an object free falling to earth, experiencing acceleration, is not exposed to the G-Force. An individual in free fall will feel weightless even though he is accelerating at 'g', 9.8 m/sec^2, but there is no G-Force. This seems to be inconsistent. Why does this example of acceleration not result in the G-Force?

According to physics there is ***no external contact force*** pushing or pulling; only the force acting at a distance, gravity, is present.[3] An individual standing on the ground is in receipt of an upward force on his feet to be consistent with Newton's 3rd law. This is to counter the downward force of gravity.

The argument for being weightless is that only a contact force can be felt. If no contact force is there to be felt, then weightlessness is experienced. Gravity is action at a distance, so there is no contact force. But gravity as a force acting across a distance was Newton's non-explanation for what gravity is. General Relativity (GR) rejected this with the theory that the curvature of space was somehow caused by matter and then that curvature directs the movement of matter. Is this still considered action a distance, is it still a non-contact force?

To keep it consistent with the light postulate in Special Relativity (SR), Einstein combined Space with Time to give a 4D explanation for it all which left gravity no longer being a force and space was just an illusion.

Acceleration

The curvature of space coupled with time given by Einstein is complex mathematical speak for motion in a nonlinear direction, in other words, acceleration. Any curvature in the forward motion of a body involves acceleration and any force is related to that acceleration. In the current view the force in Newton's 2nd Law F = ma is equal to the force in Newton's gravitational force law, F = M_1m/r^2; the mass 'm' cancels. The amount of matter of the falling object does not play a part. All objects fall at the same rate of acceleration, regardless of the mass, and that is what is always observed. Apparently, Inertial Mass (IM) is the same as Gravitational Mass (GM), but why is unclear.

The source of gravity has eluded science. Maybe a clearer understanding of all this could be found if the focus is placed on acceleration and the role of space.

A different perspective is presented here to provide an origin for the emergence of the force of gravity and a consistent explanation for what is observed. To do this requires a radical, but rather simple approach to the question of the force of gravity and what role space plays in the universe.

The Role of Space with the Forces of Nature

This paper discusses the interaction of the four (now five with the discovery of the Higgs boson) forces of nature with Space. A new perspective that is not yet considered by physicists is offered here in order to give a new definition to these constituents; to look at their relation with each other, and to provide a different view of their part in the process that governs matter in the universe**.**

Physics has not given space much attention through history. Space has been the empty void for almost everyone. There is nothing there to see. Historically it was briefly referred to as the aether when it was believed there must be something there to carry light across the vacuum. Einstein said it was not needed, even declaring it a non-entity in Special Relativity until he needed it to be there to support his GR theory which essentially dismisses the perception of space as it was once viewed. There are prominent physicists who will openly and comfortably now declare that space is an illusion. It only exists now as the vacuum continuum that is married to Time in a 4D block called SpaceTime.

This paper suggests Space is much more. It is the missing "physical" variable in the interaction of all the forces with matter. As Schrödinger wrote, "*What we observe as material bodies and forces are nothing but shapes and variations in the structure of space."* [4] Thus, it may actually be more correct to say that a gluon is just the energy/shape shift that space adopts in the presence of and its interaction with quarks, protons, and neutrons as it plays its role in maintaining an efficient stable system in the nucleus.

So how does physics understand what the forces are and there place in the whole? Currently, physics accepts that Space is limited to its connection to matter in the universe as outlined by Einstein's Theory of General Relativity; space directs matter where to go. Apparently it can do this because matter has told space where to curve.

This paper gives space a larger role. Space is an unseen partner, the hidden factor in the interaction with all the force particles with matter.

Newton's work brought together the motion of the planets with the falling of an apple when he developed his theory of gravity. Einstein expanded on this when he showed that the gravity in the distant cosmos was also part of the same force. He introduced space itself as being part of the process with the curvature of space.

However, Einstein's theory ties space to time via a 4D theory called SpaceTime that essentially concludes that space, and gravity as a force, are both an illusion. If gravity is not a force, what curves space? The frequently given statement that matter directs space how to bend and space directs matter where to go does not provide an understanding of the phenomenon.

Key constituents of nature are the Strong force, the Weak force, Electromagnetism, Gravity, and the Higgs. These forces are responsible for governing all matter in the universe. These five forces are associated with force carriers: [5, 6]

- Strong force-Gluon
- Weak force—two W bosons, (-1 & +1); & Z boson
- Electromagnetism – Photon
- Gravity- Graviton (not yet found)
- Higgs bosons give W, Z, and other particles mass via the Higgs field

Space, which is ignored when analyzing nature's constituent forces, plays a key role in governing the forces that govern matter because space is tied to all matter at the smallest scale. Space is the master director of the universe's four (five, if we now count the Higgs boson) forces and a partner with all the particles.

Space in its interactions with matter responds uniquely to any acceleration at the atomic scale with the emergence of gravity. At the atomic scale this is an incredibly small force, but the accumulation of a large numbers of atoms such as 10^{50} in the earth means gravity on a large scale. The earth here is the Gravitational Mass (GM).

If a super large rocket were to be on one side of the earth and fired, the earth would accelerate from its constant velocity. This large GM would then become what could be considered an accelerated Inertial Mass (IM). An additional force could be felt and measured. This could be called a G-Force, but it could be viewed as just space again responding to acceleration, now at a larger scale, and judged as an additional gravitational force. The same object can be an IM and a GM.

Now take again the example of an object in free fall to earth (assuming no atmospheric interaction). If we follow the idea for the emergence of a force (gravity) with acceleration *even without a contact force*, the free falling object will accelerate at 9.8 m /sec^2 as it receives the force created by the earth's gravity pulling down. There will also be a force equal and opposite per Newton's 3rd Law. So a 9.8 m/sec^2 upward force would be on the object and the forces cancel out. This would be true for any object in free fall of any mass. The forces automatically cancel each other and no G-Force is felt. There is no need to feel fortunate that the masses conveniently cancel. All objects will fall at the same rate regardless of their mass as is always observed; and understandably, weightlessness is experienced. When the acceleration stops, the emergent force also stops. Thus gravity can also be a temporary force, the G-Force.

The Gravitational Field

. Once it emerges at the smallest scales gravity is isotropic and cannot be shielded; the individual gravitational fields are always in phase and do not cancel; the sum is always equal to the sum of its parts. The earth is an example of a Gravitational Mass (GM). The accumulated gravitational force is the sum of the individual atomic gravity forces that emerge from the internal accelerations that take place within all the atoms and molecules.

This approach for the generation of a gravitational field emerging from accelerations within an atom suggests any possible force particle involved with the process should be a massless boson to be free of the Pauli Exclusion Principle. Also, the inclusion of space as part of the system would insure the presence of a cold sink on the conversion of heat to satisfy the tax imposed by nature under the second law of thermodynamics for the energy contribution required to do the work of generating the gravitational field. [7]

Conclusion

If it is reasonable and acceptable that matter can curve space and space can direct where matter will move, it also seems reasonable that there could be this hidden interaction between space and the force of gravity if space is connected to matter and intimately involved with all the forces with each force having its own unique strength and range. It is also reasonable to see that this would still lead to a curvature of space but without the need to link it to Time in a 4D block.

This approach to gravity conveniently spans the entire scale from the atomic, where the force of gravity is very small, to the galactic, where we can observe the effects of large gravitational masses. Where there is mass, there is gravity. Gravity is an emergent force awakening when there is any acceleration at any scale. As long as atoms and their constituents are in motion (above zero Kelvin) some degree of gravity is present and the collection of atoms/molecules is a Gravitational Mass.

If the total stationary or constant velocity GM then moves under acceleration, an additional force manifests from this acceleration of the Inertial Mass (IM) and is present until the acceleration force stops. A free falling object in a gravitational field generates an equal and opposite force, regardless of its mass, canceling the gravitational force and thus there is weightlessness.

With this approach to gravity there would be an inherent connection at the smallest scale of this force to the quantum world. If an extra dimension is necessary it could be here without the need to involve the 'dimension of Time'.

Kenneth Paul Hoffman ©

Kenhoffman48@msn.com

1. http://www.fnal.gov/pub/science/inquiring/questions/atoms.html
2. http://www.gforces.net/what-is-g-force-meaning.html
3. https://www.physicsclassroom.com/class/circles/Lesson-4/Weightlessness-in-Orbit

4. https://quotefancy.com/quote/1403993/Erwin-Schr-dinger-What-we-observe-as-material-bodies-and-forces-are-nothing-but-shape
5. http://webhome.phy.duke.edu/~kolena/modern/forces.html#005
6. https://www.livescience.com/48575-strong-force.html
7. Atkins, Peter; FOUR LAWS THAT DRIVE THE UNIVERSE 2007