

# Gravity Speed and the Quantum Gravity Field

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This paper examines information to support the idea that Space contains the Quantum Gravity Field and that field must be responding much faster than light speed 'c' for our solar system, galaxies, and galaxy clusters to come to be and maintain their stable state. These structures can only be stable and in equilibrium if they function as a unified system with Space as the Master Energy Field component working collectively to control all the parts. Universe's need to manage change requires that it can make adjustments and effect change with a force field in a workable time frame on all scales without handicapping that force field by limiting it to the relatively slow light speed 'c'. That force field is the Quantum Gravity Field emergent response of Space to any object's accelerations at any and all scales. The **Quantum Gravity Field (QGF)** cannot be limited in its scope by distance or to a light speed of 'c' if we are to understand how celestial mechanics performs.

## Quantum Gravity Field

Light radiation as the photon and Gravity radiation as the elusive graviton might be consistent with light speed 'c', but that speed would not permit the formation, maintenance, and observed behavior of the solar system, galaxies or their clusters we see today. Gravity Radiation or waves is not the Quantum Gravity Energy Force Field we seek. 2

Space is the master controller of all fields whether the field is a particle or a force field of the standard model, or the **Quantum Gravity Field (QGF)** itself. The QGF permeates all Space and is involved at every scale in establishing stable states whether in atoms or galaxies. This QGF resides at equal to or less than the Planck length and manifests in response to any acceleration at any scale. It is beyond detectable limits and is not limited by space or time. Its strength would be proportional to the volume space and the mass of the collective system whether at the micro scale, galactic scale or anything in between. It is an energy field without mass. Its realm is Space that reaches all objects at all scales.

Energy fields of standard model particles can emerge from Space with help from the Higgs field. These fields have discrete energies as understood from Quantum Field Theory (QFT). Even within these particle fields Space is present and is a part of the whole particle energy field and that includes the QGF. Gravity is present even at the smallest scale. E. Schrodinger said; "What we observe as material bodies and forces are nothing but shapes and variations in the structure of space". Could a unique quantum field be the hidden energy field that permits seemingly instantaneous transfer of info between particles?

Physics no longer gives emphasis to the world of particles; all are just localized energy fields with unique geometries and wave functions. The particle comes into being when we seek to measure it and the wave function has "collapsed".

The wave function collapse is a current issue for physics that has led to the adoption of the now popular multiverse approach. An alternative view by the late H. Dieter Zeh assumes that the collapse does not happen and the "full quantum multiplicity of the wave function" is preserved. 4

*"In the real world ...the wave function of any particular object becomes hopelessly enmeshed with that of everything else in the environment making it impossible to keep track of all the countless quantum interactions going on around us...the wave function becomes 'entangled'...that preserves connectedness even over large distances." 4*

Zeh named this "decoherence" and has been adopted by many physicists. Others say this does not solve the measurement problem. Theoretical physicist Miles P. Blencowe at Dartmouth College:

*"You still have to invoke the collapse postulate"...*

*"...How do we go from an entangled state to the perception of the world as always finding one unique path into the future? ...It does not solve the problem." 4*

Physics need to consider that there is another perspective in this wave function collapse. The problem is the world of objects is not perceived directly; but what is really there is the infinity of energy fields. Only after light energy has interacted with the 'object's'

energy fields around us and that information reaches our eyes and is then transmitted to and processed by the brain do we convert that data to a translated view of the world at the macro scale and only then do we “see” the ‘physical’ objects. The final step in this wave function collapse or decoherence is us.

### **Conflicts in Physics with Gravity Limited to Light Speed**

It is well established that at the quantum level particles have shown experimentally that they are seemingly communicating faster than the speed of light.

- Spooky action at a distance and entanglement. Particles that are separated by vast distances can still somehow maintain a connection as observed when one particles measurement affects another. Bell’s theorem proves that there can be some communication that is not caused by some previously locked in ‘hidden variable’ and it is happening at faster than light speed. Perhaps the QGF accommodates this action. 1
- Newton’s gravity force method formulas work with an instantaneous gravity speed. The late Tom Van Flandern, a NASA astronomer who specialized in celestial mechanics discusses this oddity in his paper.

*“Indeed, it is widely accepted, even if less widely known, that **the speed of gravity in Newton’s Universal Law is unconditionally infinite** (e.g., Misner et al., 1973, p.177). This is usually not mentioned in proximity to the statement that GR reduces to Newtonian gravity in the low-velocity, weak-field limit because of the obvious question it begs about how that can be true if the propagation speed in one model is the speed of light, and in the other model it is infinite.” 2*

- Celestial mechanics calculations only work with instantaneous gravity speed. Van Flandern comments:

***“The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous.***

*“This seemed unacceptable on two counts. In the first place, it seemed to be a form of “action at a distance. ”Perhaps no one has so elegantly expressed the objection to such a concept better than Sir Isaac Newton:*

*“That one body may act upon another at a distance through a vacuum, without the mediation of anything else, by and through which their action and*

force may be conveyed from one to the other, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it" (See Hoffman, 1983). But mediation requires propagation, and finite bodies should be incapable of propagate at infinite speeds since that would require infinite energy. So instantaneous gravity seemed to have an element of magic to it." 2

**"...The second objection was that we had all been taught that Einstein's Special Relativity (SR), an experimentally well-established theory, proved that nothing could propagate in forward time at a speed greater than that of light in a vacuum. Indeed, as astronomers we were taught to calculate orbits using instantaneous forces; then extract the position of some body along its orbit at a time of interest, and calculate where that position would appear as seen from Earth by allowing for the finite propagation speed of light from there to here. It seemed incongruous to allow for the finite speed of light from the body to the Earth, but to take the effect of Earth's gravity on that same body as propagating from here to there instantaneously. Yet that was the required procedure to get the correct answers."** 2

**"...the most frequently asked question and debated topic is "What is the speed of gravity?" It is only heard less often in the classroom because many teachers and most textbooks head off the question by hastily assuring students that gravitational waves propagate at the speed of light, leaving the firm impression, whether intended or not, that the question of gravity's propagation speed has already been answered."** 2

- Our Solar system cannot be stable if force interactions are limited to light speed.

**"...Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed... Expressed less technically by Sir Arthur Eddington, this means: "If the Sun attracts Jupiter towards its present position S, and Jupiter attracts the Sun towards its present position J, the two forces are in the same line and balance. But if the Sun attracts Jupiter toward its previous position S', and Jupiter attracts the Sun towards its previous position J', when the force of attraction started out to cross the gulf, then the two forces give a couple. This couple will tend to increase the angular momentum of the system, and, acting cumulatively, will soon cause an appreciable change of period,**

***disagreeing with observations if the speed is at all comparable with that of light***  
*Eddington, 1920, p.94).* 2

- There are other questions raised by Van Flandern that also have a problem with light speed: 2
  - *“Why do photons from the Sun travel in directions that are not parallel to the direction of Earth’s gravitational acceleration toward the Sun?”*
  - *“Why do total eclipses of the Sun by the Moon reach maximum eclipse about 40 seconds before the Sun and Moon’s gravitational forces align?”*
  - *“How do binary pulsars anticipate each other’s future position, velocity, and acceleration faster than the light time between them would allow?”*
  - *“How can black holes have gravity when nothing can get out because escape speed is greater than the speed of light?”*

[All My bold and italics above]

- Van Flandern also points out the fact that unlike light *“Gravity Has No Aberration”* 2
  - *“The effect of aberration on orbits is not seen”*
  - *“Gravity and light do not act in parallel directions”*

### **Beyond Light Speed and Geometry**

Currently the behavior of galaxies cannot be explained by the current theory of General Relativity, Newton’s theory, or a Modified theory of Newton’s approach. The desire to apply the still elusive Dark Matter has yet to consistently compensate for failure of current theories in order to explain the behavior of galaxies and galaxy clusters. 8

General Relativity Theory (GRT) is based on the notion that Gravity is not a true force and cannot explain how space can be curved by mass. It gives complex mathematical analysis combining time with curved geometry that turns space into an illusion.

Although the mathematical analysis describes the geometry it does not give an explanation that provides an understanding of the celestial mechanics that is observed if it is required to hold that gravity is limited to the speed of light and there is no Quantum Gravitational Force Field to make it all happen at what Van Flandern estimates is a necessary speed that is not instantaneous but is many orders of magnitude higher ( $2 \times 10^{10}c$ ) 2

For a collection of objects as large as a galaxy to perform as has been observed by astrophysicists/cosmologists it seems it is necessary to define a unified collective frame operating as one. How does a massive flock of starling birds,<sup>5</sup> a large school of fish,<sup>6</sup> or a swarm of bees<sup>7</sup> accomplish this feat? Although they have been under study, how it is done is still a mystery. The links seem to offer possible solutions that one would suspect are too slow to work in the given time window. None suggest a special quantum field as a possible solution.

The evidence on gravity points to the existence of a special energy field, a **Quantum Gravity Field**, to operate at far greater than light speed responding to any acceleration at any speed with a reach that is not diminished in distance. For this to happen it is proposed here that from the micro to the macro **Space is primary and the Master Player of a Quantum Gravitational Force Field** that works as a collective control system.

Perhaps a direction to a standard model that better combines quantum field theory with what is observed cosmologically will be found if physics accepts that the force of gravity is real, moves much faster than light speed, and is a possible emergent force of a Quantum Gravity Field.

- 1 <https://www.thoughtco.com/what-is-bells-theorem-2699344>
- 2 [https://www.gravitywarpdrive.com/Speed\\_of\\_Gravity.htm](https://www.gravitywarpdrive.com/Speed_of_Gravity.htm)
- 3 Scientific American article by Davide Castelvecchi “HERE COME THE WAVES”; EXTREME PHYSICS issue, July 2019
- 4 Scientific American article by Tim Folger “Crossing the Quantum Divide”; EXTREME PHYSICS issue, July 2019
- 5 <https://www.audubon.org/magazine/march-april-2009/how-flock-birds-can-fly-and-move-together>
- 6 <https://www.thesprucepets.com/schooling-fish-1378344>
- 7 <https://journals.biologists.com/jeb/article/211/20/3287/17708/The-mechanism-of-flight-guidance-in-honeybee>
- 8 Scientific American article by Hossenfelder and McGaugh “Is Dark Matter Real”; EXTREME PHYSICS issue, July 2019