

An Invisible but Intelligible Gravity

Gravity according to Newtonian Mechanics acts mutually in all directions for its action as a whole to conserve momentum. More mass changes less velocity towards a lesser mass than does the lesser mass change in velocity towards the greater mass. The product of mass and its change in velocity, as change in speed or direction, or a combination of both, is the same in magnitude for both masses, but is opposite in direction for the total momentum to remain the same. The same is true if the two masses change momentum by means of a collision, such that gravity of mass is in proportion to the amount of mass. This principle result is known as the equivalence of inertial and gravitational mass whereby they equate by means of a constant of proportionality.

What is not obvious is how mass gravitates other mass, as by some sort of contiguous action also obeying conservation of momentum. If gravity is some form of radiation, as consisting of gravitons, how does a graviton continually gravitate mass through which it passes without itself somehow changing its momentum? The action must be more complex, as for it to include more than the mere action of the graviton on matter.

For an answer, consider gravity results as a vacuum effect occurring in the wake of emitted radiation converting energy from one form to another. One form of the energy is pushed into the otherwise vacuum where matter converts it to a form of energy that allows it to escape the field. The escaping energy is invisible except for the gravitational effect that results.

How can radiation be invisible?

Radiation is already considered invisible to itself in a sense that it is able to occupy the same space whereas matter cannot. Such invisibility is typical of wave action. Waves can superimpose, which produces visible effect only if the medium of a wave action changes in a way it becomes observable. If the total action within a space large enough to be measured is counterbalanced, then no change of the medium need be seen to occur.

Although light is invisible to other light, as to be classified as massless, it still has momentum with regard to the presence of mass, and sometimes it even converts to mass by interacting with it. Mass in relative motion is relatively greater than mass relatively at rest. If the relative motion is caused by the reflection of light, then light loses energy in converting it to more mass of the mass

from which it reflects. Mass is also created by a Higgs Mechanism whereby massless particles similar to light pass through the Higgs field. More in general it is assumed that vacuum or empty space is not actually empty but contains some form of energy whereby the massless particles moving at light speed are somehow slowed for them to convert into a new form: mass. Light and relative motion within the gravitational field, for instance, move relatively slower than in gravitational free space, whereby mass-energy of the field is perceived from outside the field as relatively greater.

On an atomic scale our means of observation is limited by whatever means we have for detecting a minute volume of space varying in action before restoring equilibrium. More rapid change associates with shorter wavelength and smaller space, such that a greater, more concentrated energy is needed to penetrate a field of energy that is more counterbalanced and illusive to our normal senses.

Suppose particles of light cross paths from approaching in exact opposite directions. The difference in opposite velocities is $c - (-c) = 2c$. If each particle of light contains mass m , then the total momentum is zero: $mc + (-mc) = 0$. Moreover, their total kinetic energy, as twice $K = (\frac{1}{2})mc^2$ for twice m , is mc^2 , as to become the internal mass-energy of mass m relatively at rest.

In quantum physics there is a virtual field of energy that is detectable according to probability. According to the Born rule, a quantum wave function is interpreted as a probability amplitude, as a measure of change, as for detecting a particle within a given time and/or particular location. Billions of neutrinos, for example, move through our bodies every second, but our Earth only detects a few of them. Neutrinos are thus virtually invisible for the most part.

Suppose mass is a state of equilibrium of waves moving at light speed and crossing paths from every direction. It is contained by not allowing other waves to pass through it. It allows some of the waves to pass through while it reflects others in maintaining its form. The form itself is also capable of moving through space at different speeds, as does mass. How this free motion is possible is according to its particular state of equilibrium. If in motion, then more energetic waves are allowed to pass through in the direction of relative motion. A reflected wave from the opposite direction is thus met with more resistance. The exact opposite occurs for the penetration and the reflection of waves in the opposite direction of relative motion. In effect, mass itself is wavelike motion moving through quasi-vacuum space as its medium of propagation. (Note: all other waves either pass through in neutralizing each other in a state of equilibrium without effect, or they are a part of our world producing normal effects, as does ordinary light.)

Suppose that this new wave form of energy has additional properties, such as further converting energy to gravity. Consider that the probability of detecting this massless gravitational energy is extremely slim in providing a vacuum effect in the wake of its emission. An invisible radiation thus becomes intelligible in effect of the establishment of our observable world. In being invisible it has converted into a new form of energy that is only detectable as gravitational effect. Since it does not directly change the motion of other matter, it is not subject to conservation of momentum. However, intelligible awareness of our world still depends on it.

What then becomes of this gravitational radiation?

If our universe is a finite anomaly of an infinite source of virtual energy, then the supply of energy could be indefinite, such that there could be no observable effect of its recycling back into its original form after escaping the anomalous conditions of mass and gravity. However, there could be observable consequence for it recycling back into its original form before leaving the confines of our universe. Perhaps it recycles back as dark energy to cause the universe to expand at a greater rate. This effect could occur if the recycling is between galaxies where the gravitational fields are neutralized into a homogeneous state.

Astronomical observations of supernovae further indicate the universe now expands at a greater rate. An increased amount of dark energy is assumed in order to explain the increased rate of expansion. However, the details have not been worked out for the satisfaction of all physicists. Some physicists question whether the exploding stars are a reliable parameter for determining distance. They note light from background galaxies can statistically appear fainter by the de-amplification from Gravitational Lensing and by cosmic dust. Astronomical study by Alexander Kashlinsky, who is a cosmologist at NASA's Observational Cosmology Laboratory, also indicates the region of the universe within 2.5 billion light years from us moves relative to the outer part of the universe. There is thus the possibility that our part of the universe is a moving part contained within a larger universe, which could even be of infinite extent.

If our universe is infinite in extent, then the recycling need be gradual for it to allow for a gravitational force that is extremely weak in comparison to such other forces of nature, such as is the electromagnetic force of attraction between the electron and the proton about 2.23×10^{39} times greater than a gravitational force of attraction between them.

Radiation gradually converting to another form is typical of tired light theory, which is an alternative explanation of a redshift in the spectrum of starlight from more distant stars. Instead of the light being weaker due to the recessional speed of the source, the energy is gradually lost during its propagation through the quasi-

vacuum space. A difference in the electromagnetic radiation and gravitational radiation loss of energy and momentum is that light is initially more directly detectable in effect, but both changes in energies are gradually passed on as momentum in the direction of their motion. If the minute amount of reflected energy is further reflected about, then it is typical of a cosmic background radiation that seemingly has no detectable source, as being the same from all directions and thus neutral in momentum, as does dark energy need to be in order for it to push the universe apart.

Indications are that the universe is indeed expanding, but it is also possible both "tired light" and "big bang" theories apply. If our part of the universe is not expanding, then more resistance to light by the medium occurs. If our part of the universe expands, then the tired light aspect is negated. As to whether our universe is finite or infinite, it depends on the means we use to observe it. More energetic waves can last longer.