On the compactification of the gravitational field

S. Halayka*

March 4, 2019

Abstract

The emission of gravitons by a mass is considered.

1 On stars, GASERs, galaxies, and cosmic filaments

It is assumed that the gravitational field is quantized, and that the quanta are gravitons. It is assumed that these gravitons propagate at the speed of light in vacuum c.

In *gravito-hydrodynamically-bound* systems like the Sun, a mass is an omnidirectional graviton emitter. However, if one is to increasingly gravitationally stimulate a mass, then the stimulation will eventually turn that mass from an omnidirectional graviton emitter into a unidirectional graviton emitter – a mass reciprocates gravitons toward the gravitational stimulation, *in lieu of* the mass's usual omnidirectional graviton emission. For a perfectly unidirectional graviton emitter, the strength of the gravitational interaction would increase by a factor of c^2, because the gravitational field (a bunch of gravitons) would be compactified from a (3+1)D field down to a (1+1)D beam. A perfectly unidirectional graviton emitter would be like a GASER (the gravitational analogue of the electromagnetic LASER).

In *gravitationally-bound* systems like the Milky Way, it is the inherently anisotropic gravitational interaction of the galaxy that makes the gravitational interaction stronger than that found in *gravito-hydrodynamically-bound* systems. For instance, the galaxy is a (3+1)D ball at the centre, and is more and more like a (2+1)D disk the further from the centre one goes. The strength of the gravitational interaction would increase as the shape goes from (3+1)D to (2+1)D, and in the case of a perfectly flat (2+1)D disk, this compactification of the gravitational field would make the gravitational interaction stronger by a factor of c. From this perspective, it is seen that dark matter is not absolutely required to explain the galactic dynamics.[1] Likewise, the dynamics of cosmic filaments do not absolutely require dark matter if one idealizes a cosmic filament as a (1+1)D beam, where in the perfect case the strength of the gravitational interaction would increase by a factor of c^2.

*sjhalayka@gmail.com

[1] Disk slope at any given distance from the centre of an ideal galaxy r is given by $s = R_S/r$, where R_S is the central black hole's Schwarzschild radius, and $s \leq 1$. If $R_S \to 0$ or $r \to \infty$, then $s \to 0$. If $s = 0$, then the strength of the gravitational interaction would be greater by a factor of c.

References

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