

# Critical Comments on Emission of Gravitational Potential Energy

Sylwester Kornowski

**Abstract:** Here, within the Scale-Symmetric Physics, the critical remarks about luminal gravitational waves and luminal gravitons are presented. The mechanism of emission of the potential gravitational energy differs very much from the mechanism described within the General Relativity.

According to the Scale-Symmetric Physics, [1], during the inflation, the non-gravitating Higgs field (it consists of the superluminal pieces of space and their size is about  $10^{-64}$  m) partially transformed into the luminal Einstein spacetime composed of the neutrino-antineutrino pairs. The pairs consist of the binary systems of closed strings (entanglons) which are responsible for the superluminal quantum entanglement of the luminal Einstein-spacetime components. The entanglons have internal helicity and in their interactions with the Higgs field, they transform the chaotic motions of the Higgs-field components (i.e. the chaotic motions of the superluminal pieces of space) into the divergent motions. The collisions of the chaotically and divergently moving superluminal pieces of space produce the gradients in the Higgs field – they are the gravitational fields of the neutrinos i.e. the neutrinos carry the smallest gravitational masses. Such is the true Higgs mechanism.

Emphasize once more that neutrinos are the smallest gravitational masses. Neutrinos, due to their internal structure, produce the weakest gravitational fields. Such gravitational fields consist not of luminal gravitons or luminal gravitational waves – they consist of the non-gravitating superluminal pieces of space the Higgs field consists of.

We can see that potential gravitational energy consists of the non-gravitating superluminal pieces of space.

So what is the mechanism of emission of the potential gravitational energy?

Consider a merger of black holes. A merger causes that a part of their gravitational mass decays to the free (i.e. not entangled and/or not confined) luminal Einstein-spacetime components. It causes that local gravitational-mass density of the Einstein spacetime increases (the additional components are the dark energy) i.e. there increases local dynamic pressure – such region starts to expand but with such expansion is not associated a gravitational wavelength. The expansion tries to equalize the dynamic pressure in the Einstein spacetime – it has nothing with gravitational waves. But the expanding region carries the additional Einstein-spacetime components so carries as well associated with them the weakest gravitational fields. It leads to conclusion that the local number density of the non-gravitating superluminal pieces of space decreases i.e. there decreases the gravitational potential energy.

The described here mechanism shows that luminal non-gravitating gravitational waves and luminal non-gravitating gravitons are not in existence. Gravitational potential energy is carried by expanding gravitating dark energy composed of additional Einstein-spacetime components.

Consider creation of a mass. New mass appears due to an increase in local gravitational-mass density of the Einstein spacetime i.e. there must be flows in the Einstein spacetime. It leads to conclusion that besides the new mass there are produced mass holes in the Einstein spacetime and the speed of light in “vacuum”  $c$  is the characteristic speed for their disappearance. The gravitational field produced by the new mass propagates with superluminal speed but due to the existence of the expanding mass holes, which expand with luminal speed, a very distant observer cannot see the new mass immediately. It follows from the fact that the resultant gravitational field of the new mass and the expanding mass holes is for the very distant observer equal to zero. To see the whole new mass, the mass holes must disappear. It leads to conclusion that we cannot detect the superluminal propagation of a new gravitational field.

The Scale-Symmetric Theory shows that the gravitational fields are not associated directly with the luminal Einstein spacetime. They are directly associated with the superluminal pieces of space the Higgs field consists of. During the inflation there were produced Einstein-spacetime components and the associated with them the new gradients/potential-gravitational-energy in the Higgs field had propagated with superluminal speed. Today, probability of production of new neutrinos is practically equal to zero (it follows from the present-day very low number density of the Higgs field).

Due to the weak interactions, which follow from the confinement (to the confinement leads the Mexican-hat mechanism), in the Einstein spacetime can appear local fluctuations, not gravitational waves.

The present-day densities of the modified Higgs field and Einstein spacetime are very different. The ‘Einstein-to-Higgs ratio’ is about  $4 \cdot 10^{42}$  [1] and it is the reason that the gravity is so weak in comparison with the electromagnetic, weak and strong interactions.

The very different properties of the Higgs field and Einstein spacetime cause that unification of gravity and Standard Model within the same methods is impossible.

## References

- [1] Sylwester Kornowski (6 March 2015). “The Scale-Symmetric Physics”  
<http://vixra.org/abs/1203.0021> .