Principles for quantization of gravitation

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Abstract. Summary of articles [1, 2] is shown, and a new approach to quantum gravity is presented. It is based on suppositions that masses of black holes can be smaller than Planck's mass, that dimensionless masses of particles or black holes are a first hint toward development of quantum gravity. It is shown a new way at development of principle of uncertainty, and this principle is more fundamental than wave function. Virtual gravitons are based on a wave function and if it does not exist, they also do not exist. Thus, it is excluded contradiction that "virtual photons exist in background space-time".At the same time all is based on the principle that "gravity is not a force".

1. Introduction

Here a summary is made for what is described in [1], but something also in [2].

Physical world is built up from the bottom-up. A quantum theory is on the bottom. Thus gravity should also be quantized, or more precisely said, curved space-time should be quantized. But here some prejudices are that gravity is not a force [3, 4, 5]. The author agrees that gravity is something different than other forces, thus it should be quantized differently. The distinction between gravity and other forces is a very obvious thing and it is not talked enough about it.‡

2. Principles of quantization

The author's quantization of gravity is built up on the following principles:

1 Time runs only where matter is present. (This can be obtained also by Special relativity theory [6]) and by general relativity.

2 Thus the author agrees with Markopoulou that space-time is emergent [7]. Thus space-time without matter does not exist.

3 The smallest elements of rest matter are elementary particles or, possibly, their sub-particles. The most fundamental elements of matter are also black holes (BHs). Thus they are also the most fundamental elements of space-time.

‡ Such similar unexplained and ignored example in physics is also consciousness.

4 It is interesting that their masses can be described with dimensionless masses [8, 9]. This is possible with inclusion of the gravitational constant, the speed of light, and Planck constant. It is important that gravitational constant is also used. This is the same principle which gives also Planck's mass.

5 Thus, those dimensionless quantities are also foundations of quantum gravity.

6 The principle of uncertainty ($\Delta p_x \Delta x \geq \hbar/2$) is more fundamental than wave functions.

7 The principle of uncertainty is based on flat background space-time and it is not suitable for uncertainties of masses of BHs or elementary particles [10, 11].

8 Uncertainty of masses of elementary particles or BHs is more fundamental than the principle of uncertainty.

9 Masses of elementary particles or masses of BHs use a different distribution function than wave functions. Their assumed positivity of mass should be respected [12].

10 Such a principle of uncertainty enables that mass of a BH can be smaller than Planck's mass.

11 Finite information is hidden in a finite volume [13] and physics is digital.

12 Thus this gives a hint that a wave function is not appropriate for them.

13 Gravitational waving is in accordance with general relativity and thus real gravitons also exist. This waving exists on background space-time.

14 It seems that virtual gravitons should exist on background space-time, but this is illogical, because gravity does not exist on background space-time, whereas virtual gravitons should be a perfect substitute for gravity. Thus, it is logically that they do not exist.

15 A simple model with a rocket on a quantum propulsion can be made and this tells something about properties of gravitational uncertainty, without developing the above conclusions.

16 If it is said that space-time is emergent, it is a consequence of reactions among elementary particles (Markopoulou [7]). This is not in contradiction with the conviction of Einstein, that gravity is "not a force".

17 Distinction between gravitational force and other forces is, for now, mostly philosophical, but we need to find also physical differences. Otherwise, Petkov claims, that quantization of gravitation does not exist, but physical world is built up from bottom-up, thus gravity should also be quantized. Hadley claims similarly.

18 It is important that Hadley did not find connection between the Gravitational constant and Planck constant. (The author claims that these connections are Planck masses and masses of elementary particles.)

19 The existence of dimensionless masses of elementary particles and BHs also confirms quantization of gravitation.

20 Petkov suspects in grained space-time [14]. The author avoids to grained space-time. The author understand quantization of gravity that gravity is described with quantum language. The first key are dimensionless masses of elementary particles and BHs.

21 It is suspicious that gravitational field of a BH single in the universe exists without particles which interact with it. (Petkov claims that it exists.) Cramer, for instance, interprets quantum theory so that a photon as first checks where it will land and then it flies [15]. Mach principle claims similarly - that acceleration of a single particle in universe does not exist. Admittedly, Mach principle in general relativity is incorrect, but maybe it is correct in quantum gravity.

22 Although gravity is distinct from other forces, it is necessary to explain, why it is distinct and where similarities are.

3. Conclusions

The author deeply agrees that gravity is different than other forces. But he thinks that virtual gravitons does not exist and that this is a key of this distinction. His derivation is based on analysis of special relativity, on analysis of source of wave function, in analysis of BHs, and in analysis of principle of uncertainty.

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