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Journal Name:	Physical Science International Journal
Manuscript Number:	Ms_PSIJ_22197
Title of the Manuscript:	The graviton field as the source of mass and gravitational force in the modernized Le Sage's model
Type of the Article	Original research paper

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	<p>The topic addressed is interesting, however, the generation of a massive graviton classically is somewhat difficult. I would like to ask authors:</p> <p>1-how the present theory can be compared to gravitons theories discussed in literature? 2-how we can really confirm that its is the massive graviton mass we are talking about even if the gravity is present? 3-How an implement the present findings in EGR?</p> <p>I look forward to read the revised version.</p>	<p>Answer to question 1-how the present theory can be compared to gravitons theories discussed in literature?</p> <p>The references to some gravitons theories are [9, 10,11] . At page 9 line 264 of the paper there is the next text:</p> <p>In (16) and (17) the quantity which is not yet determined is the cross-section of gravitons' interaction with the matter σ . In [9] for the case when gravitons interact with electrons in atoms, there is an estimate of the cross-section $\sigma \approx \ell_p^2$, where ℓ_p is the Planck length. In [10] there is a relation for the cross-section: $\sigma \approx 4\pi^2 \ell_p^2 = 8 \cdot 10^{-69} \text{ m}^2$, with the conclusion that the interaction cross-section is only slightly dependent on the type of particles of matter. All these estimates are based on the fact that the energy of gravitons is expressed in terms of the Planck constant and the emission wavelength. But as it will be shown below, from the standpoint of infinite nesting of matter,</p>



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		<p>gravitons appear primarily not at the level of elementary particles and atoms, but at the lower levels of matter. And each level of matter is characterized by its own constant, similar to the Planck constant that differs from it in value. This fact is taken into account in [11], but since the energy of gravitons in the form of photons is related to Planck units by equating the Planck length to the photons' wavelength, the cross-section of interaction of these photons with nucleons is overrated and equals</p> $\sigma \approx 8 \cdot 10^{-38} \text{ m}^2.$ <p>In connection with this, we will take a different approach to determination of cross-section. We can use as a rough estimate of σ the relation $\sigma n x \approx 1$ for the densest objects with high concentration of particles n.</p> <p>In the text the present theory is compared with gravitons theories discussed in literature, in relation of interaction cross-section, their connection with the Planck constant and origin of gravitons.</p> <p>See also the Conclusion of the paper at page 23 line 750, where the quantum theory of gravitation and general relativity are compared with the present theory:</p> <p>We should also note the difference in how we understand the concept of the graviton field. In</p>
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		<p>our approach, the graviton field is the source of gravitational force, it exists as a necessary addition to the matter in the form of elementary particles and bodies composed of them, it creates these bodies in the processes of gravitational clustering of scattered matter, and is generated due to the emission from the densest objects, such as nucleons and neutron stars.</p> <p>In contrast, in the quantum theory of gravitation the concept of a graviton field is maximally reduced to such a graviton field, to which any gravitational wave corresponds. Such gravitons are attributed, by analogy with the electromagnetic wave and photons, the dependence of the graviton energy on the Planck constant h and on the frequency of the gravitational wave ν. In our opinion, this approach could be erroneous, especially if we take into account that most part of gravitons can be generated not at the level of atoms, but at a lower level of matter, where the Planck constant should be replaced with some other similar constant.</p> <p>... line 768</p> <p>In the General Relativity, two bodies rotating near each other, emit a quadrupole gravitational wave. From the standpoint of the Covariant Theory of Gravitation [5], each body produces mainly dipole emission, but in the total emission of the system the dipole</p>
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		<p>components are canceled and only the quadrupole component is left. The gravitational wave carries the energy and angular momentum away from the system. This happens because during rotation the bodies have a time-varying centripetal acceleration and the bodies carry out work against the graviton fluxes, when their angular momentum is reduced. As a rule, the energy of the gravitational wave is equal to the change in the total energy of the system in the form of two bodies. Obviously, such a gravitational wave is just a ripple on the graviton field, which is involved in producing the gravitational force between the bodies of the system. Accordingly, the gravitons of this wave, if we artificially separate them with the help of the Planck constant as portions of the gravitational energy, can have nothing in common with real gravitons, which produce the graviton field in our model.</p> <p>Answer to question 2-how we can really confirm that its is the massive graviton mass we are talking about even if the gravity is present? In view of the question I add a new text to the paper at page 22 line 709 and 713, in yellow colour. I hope it improve the paper.</p> <p>Answer to question 3-How an implement the present findings in EGR? In Conclusion of the paper there is the main findings of our graviton approach: 1. The graviton field is the substantial physical model for explanation of gravitation and origin</p>
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		<p>of mass.</p> <p>2. The graviton field is connected with the gravitational field strength and so it is the base of covariant theory of gravitation as analytical and mathematical theory for description of gravitation.</p> <p>3. The graviton field is quite differing from the standard quantum approach to graviton problem. For example, instead of only one Planck constant in standard quantum approach, we assume that the every level of matter has its own action constant for quantum rotary momentum.</p> <p>4. We made an estimate of the energy density of the graviton field, the cross-section of gravitons' interaction with the matter, and so on.</p> <p>5. We explained the origin of gravitons at each level of matter and their action on forming of other levels of matter.</p>
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		