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REVIEW ON THE ABSTRACT OF THE DISSERTATION
for the degree of Doctor of Physical and Mathematical Sciences
Elena Mikhailovna OVSIYUK
"Quantum mechanics of particles with internal structure
in external electromagnetic and gravitational fields",
specialty 01.04.02 – Theoretical Physics

As can be inferred from the abstract, I had – as well - the opportunity to familiarize myself with the Dissertation of Professor Elena M. Ovsiyuk, which is focused on the study of a broad class of quantum mechanical systems, including particles with different spins in external electromagnetic and gravitational fields.

The investigated case primarily makes use of generalized equations, that account for the presence of additional internal characteristics of particles, such as internal spectra of spin and mass, an anomalous magnetic moment, electric dipole moment, electric quadrupole moment, and an additional Cox parameter related to the test particle's charge distribution over a finite volume.

In a paradigm that describes the dynamic consequences of interaction in a system as effects of non-Euclidean geometry—which acts as the physical system's backdrop—geometric techniques are employed. Such geometric approaches tend to be quite beneficial for geometry-specialist mathematicians, since they enable them to tackle fairly general fundamental problems and produce precise analytical solutions that may be applied to other areas of mathematics and physics. Therefore, I believe that the dissertation's issue is significant and pertinent to solid state physics, nanophysics, mathematics, optics, and the physics of elementary particles as well as cosmology.The dissertation develops a unified approach based on the use of a generally covariant tetrad formalism to describe particles with different integer and half-integer spins in external electromagnetic and gravitational fields.

Being well aware of the numerous works published on the subject, I can confirm the accuracy of the developments and results of the present dissertation.

I have had the pleasure of meeting Professor Elena M. Ovsiyuk on multiple occasions and have also attended her presentations at international scientific conferences in Romania and the Republic of Belarus. Her operational efficiency and scientific qualifications are highly praised. We collaborated on several joint projects between the BRFFR and the Romanian Academy of Sciences. Several of our cooperative monographs have been released in English.

Given the foregoing, I am confident that Elena M. Ovsiyuk's dissertation, "Quantum mechanics of particles with internal structure in external electromagnetic and gravitational fields" represents a notable advancement in the field of theoretical physics and that its author is deserving of the Doctor of Physical and Mathematical Sciences degree with a specialization in theoretical physics (01.04.02).

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