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Exploring gravitational interaction of particles based on quantum mechanical principles: an oscillator approach

A. Krot

United Institute of Informatics Problems of National Academy of Sciences of Belarus, Minsk, Belarus (alxkrot@newman.bas-net.by / Fax: (375 17) 231 84 03) / Phone: (375 17) 284 20 86)

Numerous attempts to connect physics at the most microscopic scale to the properties of the Universe and its contents on the largest physical scales are developed in the recent years. This work is devoted to the development of a quantum mechanical description of the gravitational interaction of bodies. An approach to describe the gravitational effect of particles based on the statistical theory has been proposed in [1] -[5]. In this model, bodies are shown to have fuzzy contours and are represented by spheroidal forms. It has been pointed out that the spheroidal body has a clearly outlined form if the potential energy of gravitational interaction of its particles is sufficiently great and the body's mass itself is relatively small. A model of the slow flowing in time gravitational compression of the spheroidal body has been considered [4]. Time equations have been derived for a slow-flowing gravitational compression of spheroidal body in the vicinity of unstable equilibrium (initial and quasi-equilibrium) state [3].

A new quantum mechanical model for description of gravitating spheroidal body has been proposed in [6]. This work considers the slow-flowing process of weak gravitational contraction of the spheroidal body based on proposed model of "vibrating strainer". The process of quasi-equilibrium gravitational compression of a spheroidal body in space within framework of "vibrating strainer" model can be interpreted on the basis of Wiener process model in a space-frequency domain. It has been shown that interactions of oscillations of particles of spheroidal body lead to resonance increase of parameter of gravitational compression under carrying out special quantum mechanical conditions. The proposed model is analyzed on the basis of Bose-Einstein

condensation process.

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