

Experiments of S.E. Shnol and N.A. Kozyrev. Physical nature of the long-range action of Newton's gravity

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The results of experiments by S.E. Shnol [1] and N.A. Kozyrev [2], who discovered the discrete influence of the Sun, Moon, individual planets and a number of stars on the near-Earth gravitational field, are discussed. These experiments make it possible to establish the physical nature of the long-range action of Newtonian gravitation. It has been shown [3] that the carriers of the gravitational force are gravitons, which are massless virtual vector bosons that transfer the energy of gravity to bodies directly on the spot. The energy of virtual gravitons is $\sim 10^{-5} - 10^{-4}$ eV. The gravitational field is adequately described by a tensor in a vector space, the dimension of which is determined by the number of bodies creating this field at each point in space according to Newton's law of gravitation. At the same time, in many practically important cases, it is possible to limit ourselves to taking into account only the bodies of interest to us. The established mechanism of gravity is applied to the interactions of light photons with gravitational fields in space. In this case, it explains [4] the Hubble redshift law, the temperature of the cosmic microwave background, and the energy spectrum of virtual gravitons.

- [1] Shnol S E 2009 *Cosmophysical Factors in Random Processes* (Stockholm: Svenska fysikarkivet)
- [2] Kozyrev N A 1991 *Selected Works* (Leningrad: Leningrad University)
- [3] Barenbaum A A 2024 *Proceedings of VESEMPG-2024* (Moscow: Vernadsky Institute of the Russian Academy of Sciences) pp 221–226
- [4] Barenbaum A A 2021 Hubble's law and the cosmic microwave background in the absence of the big bang *Research Trends and Challenges in Physical Science* vol 4 pp 119–130