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### **Nature of the cosmological constant and geometrical origin of quantization**

In this paper, we prove that the cosmological constant is directly related to the geometry of the universe and appears naturally if we remove the artificial quadratic restriction on the metric applied in Riemannian geometry, going over to the more natural Finslerian geometry. As a direct confirmation of this fact, the Planck constant was calculated from the first principles (i.e. from the geometry). The calculation realized with observed values of the cosmological parameters (Hubble constant and Cosmological constant) gives value  $h=6 \times 10^{-27}$  (erg s). It is stressed that in the framework of the Riemannian manifold, the value of the calculated Planck constant differ from the exact one by factor  $3/2$  due to difference in geometry. As another confirmation of the geometrical origin of the Cosmological constant, we have obtained the equations of electrodynamics on the Finslerian manifold. It is stressed that quantization naturally appears from these equations and is provoked by adiabatically changed geometry of manifold. We consider in detail two direct consequences of the equations: i) cosmological redshift of photons and ii) the Aharonov – Bohm effect, that immediately follow from obtained equations. It is shown that quantization of system consists of electromagnetic field and baryonic components (like atoms) is obvious and has clear explanation. To illustrate this fact, we calculated the energy of the ground state of the hydrogen atom within the framework of the Finslerian geometry with cosmological constant.

### **Biography**

Anton Lipovka has his expertise in astrophysics, cosmology, molecular spectroscopy, theoretical physics and solid-state physics as well. Since 2013, he is working on the fundamentals of quantum physics and the problem of unification of gravity with quantum theory.

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