

ON THE NATURE OF THE COSMOLOGICAL CONSTANT

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It is shown that the problem of the cosmological constant is connected with the problem of emergence of quantum mechanics. Both of them are principal aspects of physics at the Planck scales. It was found earlier that probability amplitudes describe non-equilibrium distributions for a harmonic oscillator in a thermal bath — the Planck constant \hbar , the Fock space and the Schroedinger equation appear in the natural way. For massless fields it leads, in particular, to appearance of masses $m^2 = \alpha^2$, where $1/\alpha$ is the relaxation time of the non-equilibrium state. Then, the cosmological constant $\Lambda = \alpha^2/2$ appears in the gravitational equations. The corresponding relativistic equations of motion give correct prescriptions for the singularities in retarded and causal propagators. The path integral for the relativistic particle propagator is presented.