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An improved Zeldovich formula for the Cosmological Constant from Precanonical Quantum Gravity

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Within the precanonical quantization, which we will outline, the dynamics of quantum fields is controlled by the operator of the De Donder-Weyl Hamiltonian (DWH) whose classical version is derived from the Lagrangian. The operator ordering in the DWH operators of GR and its teleparallel equivalent, which is consistent with the diffeomorphism-invariant measure in the scalar product and the required (pseudo-)Hermicity, produces an exactly calculable constant addition, which is identified with the cosmological constant Λ . Its value corresponds to the Zeldovich-1968 formula in which the 6th degree of the proton mass is replaced by the square of the ultraviolet (inverse volume) scale \aleph introduced by the precanonical quantization. This scale can be related to the scale of the mass gap of the quantum pure gauge theories of the Standard Model (IK-2017). This identification yields the observable value of Λ up to approximately 3² orders of magnitude error which is due to an error in the estimation of \aleph from its relation to the mass gap. We also discuss how this error can be improved and how our approach leads to the "minimal acceleration" and derives its relation with $\sqrt{\Lambda}$ as anticipated in Milgrom's MOND.

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