

# 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-)Hermiticity, produces an exactly calculable constant addition, which is identified with the cosmological constant  $\Lambda$ . 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  $\Lambda$  up to approximately  $3^2$  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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