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## First-Order Quantum Correction in Coherent State Expectation Value of Loop-Quantum-Gravity Hamiltonian

*Wednesday, 7 July 2021 11:00 (25 minutes)*

Given the Loop-Quantum-Gravity (LQG) non-graph-changing Hamiltonian  $\widehat{H}[N]$ , the coherent state expectation value  $\langle \widehat{H}[N] \rangle$  admits a semiclassical expansion in  $\ell_p^2$ . In this paper, we compute explicitly the expansion of  $\langle \widehat{H}[N] \rangle$  on the cubic graph to the linear order in  $\ell_p^2$ , when the coherent state is peaked at the homogeneous and isotropic data of cosmology. In our computation, a powerful algorithm is developed to overcome the complexity in computing  $\langle \widehat{H}[N] \rangle$ . In particular, some key innovations in our algorithm substantially reduce the computational complexity in the Lorentzian part of  $\langle \widehat{H}[N] \rangle$ . In addition, some effects in cosmology from the quantum correction in  $\langle \widehat{H}[N] \rangle$  are discussed.

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