Contribution ID: **108**   Type: **Cosmology, Black Holes, and other applications/phenomenology**

Nonsingular spherical black holes with holonomy corrections

Monday 6 May 2024 16:45 (15 minutes)

We explore spherically symmetric black-hole models with corrections motivated by loop quantum gravity. We derive a general family of Hamiltonians satisfying specific covariance conditions so that the dynamics generated by such families define a spacetime geometry independently of gauge or coordinate choices. By construction, there are no propagating degrees of freedom, but we show that the usual minimal coupling is still covariant within the modified geometric models. We apply these results to effective Lemaître-Tolman-Bondi spacetimes and show how holonomy corrections can resolve black-hole singularities.

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Session Classification: Black Holes