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Loop quantization of spherically symmetric vacuum spacetimes

Abstract: We provide a quantization of spherically symmetric vacuum spacetimes within loop quantum gravity. Concretely, a modification of the classical constraints that preserves the classical constraint surface leaves us with a constraint algebra free of structure functions. We then adopt the Dirac quantization scheme together with a representation mimicking the one of loop quantum gravity. We find the solutions to the constraints and a suitable inner product. Eventually, we provide the physical Hilbert space out of them together with the quantum observables of the model, some of them without classical counterpart.

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