

## Quantum Gravity as a Renormalizable Quantum Field Theory

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In a field-theory treatment of gravity with fundamental curvature-squared terms, the graviton propagator will be quartic in the momentum. As a result, one generally expects the emergence of negative-norm (ghost) states. However, due to the coupling to light particles, the ghost states are unstable and do not appear in the asymptotic spectrum. In this talk I will explore the issue concerning the unstable spin-2 ghost resonance in quadratic gravity. Explicit calculations show that unitarity is satisfied with only stable asymptotic states. I will also discuss how stability is maintained. Finally I will examine in detail the relation between the arrow of causality and quantum gravity.