ID de Contribution: **41** Type: **Non spécifié**

# Covariant Quantization of Quadratic Gravity: A New Perspective on the Ghost Problem

We perform a quantization of globally scale-invariant quadratic gravity by means of the covariant operator formalism and arrive at a fresh perspective on the ghost problem in fourth order theories of gravity. After reducing the originally fourth order theory to second order in time derivatives via the introduction of an auxiliary tensor field, we identify the full Fock space of quantum states using the BRST construction. Next, using the Kugo-Ojima quartet mechanism, we identify the physical subspace of these states and find that the subspace containing the transverse spin-2 states comes equipped with an indefinite inner product metric and a one-particle Hamiltonian that possesses only a single eigenstate. We analyze this spin-2 subspace in detail and encounter a violation of energy conservation in scattering processes that arises from the presence of dipole wave functions when the S-matrix is constructed using the standard LSZ reduction formula. Finally, we speculate on a simple modification to the S-matrix that, if shown to be consistent, restores energy conservation and renders the quantum theory unitary.

**Auteurs principaux:** KUNTZ, Jeffrey (Max-Planck-Institut für Kernphysik); KUBO, Jisuke

**Classification de Session:** Parallel session 4

**Classification de thématique:** HEP-TH