

Abstract

In a perturbative approach Einstein-Hilbert gravity is quantized about a flat background. In order to render the model power counting renormalizable, higher order curvature terms are added to the action. They serve as Pauli-Villars type regulators and require an expansion in the number of fields in addition to the standard expansion in the number of loops. Renormalization is then performed within the BPHZL scheme, which provides the action principle to construct the Slavnov-Taylor identity and invariant differential operators. After removal of the regulators, the final physical state space of the Einstein-Hilbert theory is realized via the quartet mechanism of Kugo and Ojima. Renormalization group and Calla-Symanzik equation are derived for the Green functions and, formally, also for the S-matrix.