

Theorie-Palaver

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Lorentz room (Staudingerweg 7, 5th floor)

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Hamiltonian renormalisation of quantum gravity

The Hamiltonian approach to quantum gravity initiated by Bergman, Dirac, DeWitt, Komar, Wheeler et al has a long tradition and many quantum gravity programmes rest on it. While there has been progress in the past, the current theory is still not predictive because the Einstein-Hilbert Lagrangian is not even polynomial in the metric field which triggers many quantisation ambiguities. To eliminate those, renormalisation methods suggest themselves, preferably directly in the Hamiltonian rather than the path integral language. After an introduction to those concepts, in this talk we present such a Hamiltonian renormalisation scheme which is derived from Wilson's notion of non-perturbative renormalisation of path integrals together with methods from constructive QFT. As a test we study Hamiltonian renormalisation of parametrised field theory in 2D which is a toy model for 4D quantum gravity in the sense that both theories are subject to the hypersurface deformation algebroid shared by all generally covariant field theories.