

Abstract for an Invited Paper  
for the APR07 Meeting of  
The American Physical Society

**The Asymptotic Safety Scenario in Quantum Gravity**

MAX NIEDERMAIER, CNRS UMR 6083, Univ. Tours, Parc de Grandmont, 37200 Tours

The Asymptotic Safety Scenario in quantum gravity is reviewed, according to which a renormalizable quantum theory of the gravitational field is feasible which reconciles asymptotically safe couplings with unitarity. All presently known evidence is surveyed: (a) from the  $2 + \epsilon$  expansion, (b) from renormalizable higher derivative gravity theories and a ‘large  $N$ ’ expansion in the number of matter fields, (c) from symmetry reductions modeling the residual selfinteractions in the ultraviolet, and (d) from truncated flow equations for the effective average action. Special emphasis is given to the role of perturbation theory as a guide to ‘asymptotic safety’. Further it is argued that as a consequence of the scenario the selfinteractions appear two-dimensional in the extreme ultraviolet.