T 1: Preisträgervortrag Teilchenphysik

Zeit: Montag 14:45–15:30 Raum: H01

Preisträgervortrag T 1.1 Mo 14:45 H01

Quantum gravity predictions for particle physics — •Christof Wetterich — ITP, Heidelberg University — Träger des Gentner-Kastler-Preises 2019

Contrary to general belief, quantum gravity can have important consequences for observations in present day experiments. It can predict parameters of the standard model. Functional renormalisation permits the computation of fluctuation effects of the metric. Quantum gravity can be formulated as a non-perturbatively renormalisable quantum field theory, in close analogy to the other fundamental interactions. The scale symmetry associated to the ultraviolet fixed point has far reaching implications for particle physics and cosmology. Quantum fluctuations of the metric determine important parameters of the Higgs-potential at an energy scale close to the Planck mass. Extrapolating the running couplings to the electroweak scale, the mass of the Higgs boson has been predicted in the range found later by experiment. I discuss further possible predictions for particle physics, in particular the gauge hierarchy between the Planck scale and the Fermi scale.