



EINLADUNG

Lunchseminar

zum Vortrag

von

Maria Irakleidou

(TU Wien)

über

“Aspects of conformal gravity”

Abstract:

Conformal gravity is a higher derivative gravitational theory that is conformally invariant, in addition to its diffeomorphism invariance. In four dimensions the conformal gravity Lagrangian contains up to four derivatives of the metric. Like most higher derivative theories, a naive analysis yields that conformal gravity is power-counting renormalizable at the prize of introducing ghost degrees of freedom, in contrast to general relativity, which is power-counting non-renormalizable but has no ghosts. The theory has been considered in several contexts in the literature, such as a quantum gravity, cosmology and holography. Throughout our work, conformal gravity is examined in holographic, classical and semi-classical contents. At first, in order to establish the structure of a possible holographic dual the theory is considered in the holographic approach. In particular, conformal gravity is formulated with new, generalized asymptotic boundary conditions which allow for a term compatible with the most general spherically symmetric solution of the theory, namely an asymptotically subleading Rindler term. The conformal gravity action with the proposed asymptotic boundary conditions is proven to constitute a well-defined variational principle and the corresponding response functions are shown to be finite. Therefore, no additional boundary terms or holographic counterterms are required to be added at the level of the action. The obtained results for the response functions are applied to phenomenologically interesting examples. Furthermore, the asymptotic symmetry algebras of the dual field theory are constructed and they are classified according to their number of generators. It turns out that the highest-dimensional subalgebra consists of 5 generators. Then, classical aspects of conformal gravity are examined via the Hamiltonian formulation of the theory. Namely, exploiting the constraint analysis, the generator of gauge symmetries is derived and then, using slightly more generalized boundary conditions compared to the ones of the holographic analysis, the canonical charges associated with asymptotic symmetries are constructed. No charges associated with local Weyl rescalings are found. Thus, the obtained charges are associated with asymptotic spacetime diffeomorphisms and their asymptotic symmetry algebra is the algebra of boundary conditions preserving diffeomorphisms. Finally, conformal gravity is considered in the semi-classical approximation. This is done by analytically evaluating the 1-loop partition function of the theory, using heat kernel techniques.

Zeit: Mittwoch, 14.11.2018, 13.00

Ort: Arbeitsgruppe: Gravitation, Währinger Straße 17,
common room 1. Stock

gez.: P. T. Chrusciel