GR 9: Quantengravitation und Quantenkosmologie

Zeit: Mittwoch 18:05–19:05 Raum: KGI-HS 1010

GR 9.1 Mi 18:05 KGI-HS 1010

Brechung der Lorentz-Invarianz in INTEGRAL gamma-ray bursts — •Raphael Lamon[1], Nicolas Produit[2] und Frank Steiner[1] — [1]Institut für Theoretische Physik, Universität Ulm, Deutschland — [2]INTEGRAL Science Data Center, Versoix, Schweiz

Wir suchen mögliche energieabhängige Zeitverzögerungen in den Ankunftszeiten der Photonen von gamma-ray bursts, die von INTEGRAL entdeckt wurden. Wir schlagen eine neue Methode vor, um Information aus ungebinnten Daten zu gewinnen und stützen diese mit Hilfe von Monte Carlo Simulationen. Die Analyse erlaubt uns, eine konservative untere Schranke für die Brechung der Lorentz-Invarianz anzugeben.

GR 9.2 Mi 18:25 KGI-HS 1010

Boundary Terms in Two-Dimensional Dilaton Gravity — •René Meyer[1], Luzi Bergamin[2], Daniel Grumiller[3], and Robert McNees[4] — [1]Max-Planck-Institut für Physik, München, Germany — [2]ESA Advanced Concepts Team, ESTEC, The Netherlands — [3]Massachusetts Institute of Technology, Cambridge, MA, USA — [4]Perimeter Institute for Theoretical Physics, Waterloo, Canada

We present recent results concerning the role of boundary terms in two-dimensional dilaton gravity (see hep-th/0703230, 0710.4140, 0711.3595). In the first part of this talk we construct the essentially unique Hamilton-Jacobi counterterm, which is necessary to ensure a well-defined semiclassical approximation and has applications in black hole thermodynamics as well as in holographic renormalization in the AdS/CFT correspondence. In the second part we outline the proof of quantum triviality of dilaton gravity models in two dimensions with a spacelike boundary, applying the path integral quantization method first developed by the "Vienna School" around Wolfgang Kummer.

GR 9.3 Mi 18:45 KGI-HS 1010

Metrical fluctuations and the Weak Equivalence Principle — •Ertan Göklü und Claus Lämmerzahl — ZARM - Universität Bremen, Am Fallturm, 28359 Bremen

We describe space-time fluctuations by means of small fluctuations of the metric on a given background metric. From a minimally coupled quantum field equation we obtain within a weak-field approximation up to second order and an averaging procedure over a finite space-time scale given by the quantum particle in the non-relativistic limit a modified Schrödinger equation. The dominant modification consists in an anomalous inertial mass tensor which depends on the type of particle and on the fluctuation scenario. This necessarily leads to a violation of the weak equivalence principle and, in general, to a violation of Lorentz invariance.