

GR 14: Hauptvorträge Schwarze Löcher II

Zeit: Donnerstag 14:00–16:15

Raum: ZHG 002

Hauptvortrag GR 14.1 Do 14:00 ZHG 002
Black Holes in Higher Dimensions — •EUGEN RADU — Institut für Physik, Oldenburg University, Germany

We review recent progress in understanding black hole solutions of higher-dimensional vacuum gravity. The properties of these solutions can differ significantly from those of black holes in four dimensions, since neither the uniqueness theorem, nor the staticity theorem or the topological censorship theorem generalize to higher dimensions. General results and open problems are discussed throughout. Special attention is paid to solutions with non-spherical event horizon topologies. The properties of the recently discovered non-perturbative black ring solutions in more than five dimensions are also discussed.

Hauptvortrag GR 14.2 Do 14:45 ZHG 002
Stable Wormhole Solutions in Dilatonic Einstein-Gauss-Bonnet Theory — •PANAGIOTA KANTI¹, BURKHARD KLEIHAUS², and JUTTA KUNZ² — ¹University of Ioannina, Physics Department, Division of Theoretical Physics, Ioannina, GR 45110, Greece — ²Institut für Physik, Universität Oldenburg, D-26111 Oldenburg, Germany

As is well-known, wormhole solutions arising in the context of General Relativity, are non-traversable: they are unstable under small perturbations, and their ‘throat’ opens and closes so quickly that not even a light signal can pass through. In this talk, we present wormhole solutions that arise in the context of the four-dimensional dilatonic

Einstein-Gauss-Bonnet theory, a simple gravitational theory that follows from superstring theory. These solutions have their throat kept open by a localised matter distribution that respects all energy conditions imposed by physics, and admit particle trajectories that start from one side of the wormhole spacetime and exit from the other. In addition, our solutions do not possess any horizons, are stable under small radial perturbations and their throat can be arbitrarily large. We discuss additional properties of these solutions such as their domain of existence, the generalised Smarr relation they satisfy and the magnitude of the acceleration and tidal forces that a traveler crossing the wormhole would feel.

Hauptvortrag GR 14.3 Do 15:30 ZHG 002
Blackfolds as fluids and materials — •NIELS OBERS — Niels Bohr Institute, University of Copenhagen, Denmark

I will review the blackfold approach, which is an effective worldvolume theory capturing the dynamics of thin black branes. I will show how the method can be applied to construct, in the blackfold limit, numerous novel stationary, possibly charged, black holes in higher dimensions, both in vacuum gravity as well as supergravities. It furthermore provides insights into the dynamical stability of black objects under long wavelength perturbations. In particular, the approach shows that black branes possess both fluid as well as material properties, corresponding to intrinsic and extrinsic perturbations respectively, and I will discuss the associated response coefficients.