

## GR 7: Schwarze Löcher – Lösungen II

Zeit: Dienstag 15:30–16:10

Raum: ZHG 002

GR 7.1 Di 15:30 ZHG 002

**Critical regions in Lovelock space-times** — ●KENO EILERS, BURKHARD KLEIHAUS, and JUTTA KUNZ — Institut für Physik, Carl-von-Ossietzky-Universität Oldenburg

Black Strings in Gauss-Bonnet theory are known to exhibit critical solutions, which limit their domain of existence. For positive Gauss-Bonnet coupling constant  $\alpha$ , the critical solution is reached for a minimal radius of the string, at a finite mass, temperature, and curvature. For negative  $\alpha$ , on the other hand, a critical solution with a curvature singularity is encountered. Black Holes in “maximal” Lovelock gravity theories exhibit analogous critical solutions.

Here we show that this behavior is typical for Gauss-Bonnet and Lovelock theories, by studying the phase diagrams of black objects for a rather big variety of such theories.

GR 7.2 Di 15:50 ZHG 002

**Two-body equilibrium configurations involving one extreme black hole in the electrovacuum case** — ●IVAN CABRERA MUNGUA and CLAUS LÄMMERZAHN — ZARM, University Bremen, Germany

The present work fills in the final gap in the search and description of different equilibrium states in the two-body systems consisting of one extreme and one non-extreme components. In the ‘extreme-non-extreme’ case of charged spinning masses we obtain, by making use of an appropriate exact solution of the Einstein-Maxwell equations and solving numerically the corresponding balance equations, the first examples of the ‘extreme-hyperextreme’ equilibrium configurations characterized by positive Komar masses of both Kerr-Newman constituents. Furthermore, we demonstrate that equilibrium in the ‘extreme-subextreme’ stationary electrovac systems is also possible, but it requires negative mass of one of the constituents. In the electrostatic case which admits a purely analytic treatment we give a rigorous proof of the non-existence of the ‘extreme-non-extreme’ equilibrium configurations in the framework of the double-Reissner-Nordström solution. At the same time, the electrostatic equilibrium between an extreme and a subextreme black holes can be achieved in the uniform external field, provided the two constituents form a specific dihole with zero net charge and the mass of the subextreme black hole greater than that of the extreme one.