GR 11: Relativistic Astrophysics

Time: Tuesday 14:45–15:25 Location: SPA SR220

GR 11.1 Tue 14:45 SPA SR220

Rapidly rotating neutron stars in Einstein-Gauss-Bonnet-dilaton theory — Burkhard Kleihaus, Jutta Kunz, and •Sindy Mojica — University of Oldenburg

Compact astrophysical objects like neutron stars are good natural laboratories for testing general relativity. Here we consider neutron stars in Einstein-Gauss-Bonnet-dilaton theory, which is a generalized model of gravity, motivated by String Theory. Similar to studies of black holes in this theory, our goal is to identify observable corrections to the properties of neutron stars. We here present our results for rapidly rotating neutron stars, and discuss the dependence of obervables like mass, angular momentum, moment of inertia and energy density on the angular velocity. We find that the mass and energy density decrease in Einstein-Gauss-Bonnet-dilaton theory.

GR 11.2 Tue 15:05 SPA SR220

The I-Q relation for rapidly rotating neutron stars — •Norman Gürlebeck[1], Sayan Chakrabarti[2], Térence Delsate[3], and Jan Steinhoff[4] — [1]ZARM, University of Bremen, Am Fallturm, 28359 Bremen, Germany — [2]Department of Physics, Indian Institute of Technology Guwahati, North Guwahati, 781039, Assam, India — [3]Université de Mons, Place du Parc 20, 7000 Mons, Belgium — [4]CENTRA, Departamento de Física, Instituto Superior Técnico, Universidade de Lisboa, Avenida Rovisco Pais 1, 1049-001 Lisboa, Portugal

We discuss universal relations between the moment of inertia and the quadrupole moment of arbitrarily fast rotating neutron stars. These relations are independent of the equation of state and they were first discussed in a slow rotation approximation. However, recent studies suggested that these relations break down for fast rotations. Nonetheless, we consider the dependence of the relation on different dimensionless parameters characterizing the magnitude of rotation, thereby, restoring their universality among various suggested equations of state.