GR 13: Classical theory of General Relativity III

Time: Tuesday 16:30–17:30 Location: SPA SR220

GR 13.1 Tue 16:30 SPA SR220

The covariant description of spinning fluids in non-linear electrodynamics — •Benjamin Regler, Horst-Heino von Borzeszkowski, and Thoralf Chrobok — Technische Universität Berlin, Berlin, Germany

Spinning fluids are continuous media with intrinsic spin. In this work these fluids are coupled to the most widely known type of non-linear electrodynamics, the Born-Infeld theory.

With particular reference to the charged spinning Weyssenhoff fluid, the equations of motion in curved spacetime are studied and a generalized Lorentz force is derived. Moreover, an interpretation of each term is given and the features of such a charged spinning Born-Infeld Weyssenhoff fluid are highlighted.

GR 13.2 Tue 16:50 SPA SR220

An exact static two-mass solution using Nariai spacetime — •Michael Fennen and Domenico Giulini — ZARM, University of Bremen

If we try to construct a globally static, spherically symmetric, closed spacetime with two identical masses and the topology of a 3-sphere, it is known not to be possible by gluing together two Schwarzschild-De Sitter spacetimes without a separating horizon between the masses or non-static regions. However, in this talk we show that we can construct an exact two-mass solution by embedding two identical stars of constant density into Nariai spacetime. The resulting spacetime has all the desired properties and does not contain a horizon. A generalization to charged stars is possible, at least for low charges.

GR 13.3 Tue 17:10 SPA SR220

Boson stars with wormholes at their cores — •Christian Hoffmann, Burkhard Kleihaus, and Jutta Kunz — University of Oldenburg, Oldenburg, Germany

We consider a new type of configurations in Einstein gravity coupled to a phantom field. They represent boson stars with wormholes at their cores. These configurations are obtained with an ordinary complex scalar field, whose self-interaction includes a quartic and a sextic term. The phantom field allows for the non-trivial topology of the configurations. We study the dependence of the global charges like the mass and the particle number on the frequency of the scalar field, and on the throat size of the wormholes.