GR 17: Hauptvorträge Freitag: Dynamik ausgedehnter Körper 2

Zeit: Freitag 8:30–10:30   Raum: JUR K

Hauptvortrag   GR 17.1   Fr 8:30   JUR K
Canonical formulation of spinning objects in General Relativity — •JAN STEINHOFF — Theoretisch-Physikalisches Institut, FSU Jena

The extension of the canonical formalism of Arnowitt, Deser and Misner from point-masses to spinning objects is a long standing problem in General Relativity. Two independent approaches to a solution of this problem are given in this talk. The first is based on an explicit order-by-order construction of the canonical formalism within the post-Newtonian approximation scheme, using the pole-dipole stress-energy tensor of spinning objects. Here the global Poincaré algebra is the important consistency condition. The second approach is based on an action functional and is similar to the original derivation of Arnowitt, Deser and Misner for non-spinning objects. A comparison to the canonical formulation of the Dirac field coupled to gravity is made. As an application, spin and quadrupole contributions to next-to-leading order in the post-Newtonian approximation scheme are presented.

Hauptvortrag   GR 17.2   Fr 9:10   JUR K
Effective one body description of tidal effects in inspiralling compact binaries — •ALESSANDRO NAGAR and THIBAULT DAMOUR — Institut des Hautes Etudes Scientifiques, Bures sur Yvette, France

The late part of the gravitational wave signal of binary neutron star inspirals can in principle yield crucial information on the nuclear equation of state via its dependence on relativistic tidal parameters (relativistic Love numbers). In the hope of analytically describing the gravitational wave phasing during the late inspiral (essentially up to contact) we discuss an extension of the effective one body (EOB) formalism which includes tidal effects. We compare the prediction of this tidal-EOB formalism to i) recently computed nonconformally flat quasi-equilibrium circular sequences of binary neutron star systems and ii) complete numerical relativity binary neutron star inspiral waveforms. Our analysis suggests the importance of higher-order (post-Newtonian) corrections to tidal effects, even beyond the first post-Newtonian order, and their tendency to *significantly* increase the "effective tidal polarizability" of neutron stars. The comparison shows the strong sensitivity of the late-inspiral phasing to the choice of the analytical model, but raises the hope that a sufficiently accurate numerical–relativity–"calibrated" EOB model might give us a reliable handle on the nuclear equation of state

Hauptvortrag   GR 17.3   Fr 9:50   JUR K
Self-gravitating elastic bodies — •LARS ANDERSON — Albert Einstein Institute

I will discuss some recent results and open problems concerning self-gravitating elastic bodies in Einstein gravity. Among the topics are constructions of static and rotating bodies, multi-body configurations as well as the dynamics of self-gravitating elastic bodies.