GR 4: Klassische Allgemeine Relativitätstheorie I

Zeit: Dienstag 15:40–16:20 Raum: 30.45: 101

GR 4.1 Di 15:40 30.45: 101

Linearized gravity on type D backgrounds — Steffen Aksteiner[1,2] and •Lars Andersson[3] — [1]Quest Uni Hannover, Deutschland — [2]Zarm Uni Bremen, Deutschland — [3]MPI, Golm, Deutschland

In this talk I present joint work with Lars Andersson about the field equations of linearized gravity on a Petrov type D background, which includes Kerr spacetime. The Geroch Held Penrose (GHP) formalism is used to derive decoupled equations for all linearized Weyl scalars. The identification of gauge source functions leads to a generalized Regge-Wheeler equation. On Schwarzschild, a derivation of the gauge invariant Regge-Wheeler and Zerilli equation directly from the equation for the spin 0 scalar will be presented.

GR 4.2 Di 16:00 30.45: 101

Properties of the 1-PN Dedekind ellipsoids — •Norman Gürlebeck[1] and David Petroff[2] — [1]Institute of Theoretical Physics, Charles University, Prague, Czech Republic — [2]Institute of Theoretical Physics, Friedrich-Schiller-University, Jena, Germany

A changing quadrupole moment leads to gravitational radiation in General Relativity. Does this imply that stationary but non-axisymmetric, isolated systems cannot exist? To learn something about the answer to this question, a post-Newtonian (PN) approximation of the Newtonian triaxial and homogeneous Dedekind ellipsoids is investigated. We shall discuss a generalization of the ansatz used by Chandrasekhar and Elbert (1978), in particular its axisymmetric limit. Contrary to Chandrasekhar & Elbert's ansatz this generalization permits an axially symmetric and rigidly rotating limit (PN Maclaurin spheroids). The additional freedom in the generalized solution can also be used to remove a singularity which occurs in their work. A limit where the Dedekind ellipsoids degenerate to a line mass distribution is also discussed.