GR 11: Hauptvorträge: Relativistische Astrophysik

Zeit: Donnerstag 11:15–12:45 Raum: HS 6

Hauptvortrag GR 11.1 Do 11:15 HS 6

Geodesics and their observation in General Relativity — •Eva Hackmann[1], Victor Enolski[2], Valeria Kagramanova[3], Jutta Kunz[3], and Claus Lämmerzahl[1,3] — [1]ZARM, Universität Bremen, Germany — [2]Institute of Magnetism, NAS Kyiv, Ukraine — [3]Institut für Physik, Universität Oldenburg, Germany

The geodesic equation for the motion of test-particles in General Relativity can be solved by using algebro-geometric methods in a wide range of space-times. In particular, the geodesic equation in the two most basic space-times given by the Schwarzschild and the Kerr metric can be solved in terms of elliptic functions, whereas some more general type D space-times require hyperelliptic functions. Directly related observable effects like the perihelion shift or the bending of light, but also the timing of pulsars, can be expressed in terms of (hyper-)elliptic integrals and functions. Also, the calculation of observational effects in the more general Hořava-Lifshitz gravity benefits from such a description. In this talk, we will present analytic expressions and address computational problems for geodesics and related observations.

Hauptvortrag GR 11.2 Do 12:00 HS 6

Exploring physics close to the Galactic Center black hole with infrared and submillimeter interferometry — •Frank Eisenhauer — Max Planck Institute for extraterrestrial Physics, PO Box 1312, Giessenbachstr., 85741 Garching, Germany

Infrared observations of stellar orbits and the extreme compactness of the central radio source provide compelling evidence that the Galactic Center harbors a supermassive black hole. Given its relative proximity, the Galactic Center is the ideal laboratory for studying the details of such an extreme object. Flares from the black hole have already given first insights to the physical processes close to the last stable orbit. Currently we are witnessing a gas cloud on its way towards the supermassive black hole. The cloud's dynamic evolution and radiation after its peri-passage in 2013 will shed light on the feeding processes and will probe the properties of the accretion flow. Infrared and submillimeter interferometry will soon take the next steps in the Galactic Center research by providing event-horizon scale astrometry and imaging resolution. While the submillimeter interferometry aims at imaging the shadow of the black hole against the surrounding accretion flow, the infrared interferometry with GRAVITY - a new instrument combining the four 8m ESO Very Large Telescopes in Chile - will focus on measuring the motion of matter close to the last stable orbit and on detecting general relativistic effects in the stellar orbits at larger distance.