Sven Zschocke (TU Dresden)

Light propagation in the Solar System for high-precision astrometry on the sub-micro-arcsecond level

Abstract

One of the most fundamental issues in astrometry concerns the problem about how to trace the light rays received by an observer back to the celestial light sources. In order to answer this question, one needs to determine the trajectories of light signals in the curved space-time of the Solar System. The talk reports on recent advancement in the theory of light propagation aiming at the sub-micro-arcsecond level of astrometric accuracy. In particular, trajectories of light signals in the gravitational field of N Solar System bodies in arbitrary motion are determined in the post-Newtonian approach. In line with the recommendations of the International Astronomical Union, harmonic coordinates are used and the gravitational fields of the Solar System bodies are expressed in terms of their intrinsic mass-multipoles and spin-multipoles, allowing for arbitrary shape, inner structure, oscillations, and rotational motions of these bodies.