Universität Hamburg
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CHAMPP
CENTER IN HAMBURG FOR ASTRO-, MATHEMATICAL AND PARTICLE PHYSICS

LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

Winter Term 2021/2022

Introduction to General Relativity and Astrophysical Applications

Robi Banerjee

Course Description:

This is an introductory course to the theory of *General Relativity* where we will focus on the physical basics (e.g., space-time, equivalence principle, curved space and space-time, geodesics) and astrophysical applications (e.g., perihelion drift, black holes, accretion discs, gravitational lensing, gravitational waves).

The course is based on James Hartle's book "GRAVITY: An Introduction to Einstein's General Relativity".

Prerequisites:

Theoretical mechanics, basics in astronomy and astrophysics.

Literature:

- James Hartle, *GRAVITY: An Introduction to Einstein's General Relativity* (2003)
- Misner,Thorne & Wheeler, *GRAVITATION* (1973, "the brick")
- Padmanabhan, *Gravitation: Foundations and Frontiers* (2010)
- Bernard Schutz, *A first course in General Relativity* (2009)
- Michele Maggiore, *Gravitational Waves, Volume 1: Theory and Experiment, Volume 2: Astrophysics and Cosmology* (2018)

Date and Place:	Mon, 13:30–15:00, Online via Zoom, see STINE Tue, 10:15–11:45, Online via Zoom, see STINE
Problem Classes:	Mon, 15:15–16:45, Online via Zoom, see STINE
Starting on:	11 October 2021