



Wintersemester 2023/2024

Vorlesung

Advanced Topics in Mathematical Relativity (kurze Version)

Lecturer: Dr. Karim Mosani

Start: Wednesday, 18th October 2023

Time: Wednesdays 14:00-16:00

Ort / Place: C4H33 (C-Bau [Mathe/Physik])

Description:

We will begin by discussing causality in Lorentzian spacetime. Then we will discuss the energy conditions, Raychaudhuri equations and the focusing theorem. We will then proceed to study Penrose's and Hawking's singularity theorems. Finally, we will study the phenomena of gravitational collapse, which is the basic mechanism of the formation of singularities. We will study the Datt-Oppenheimer-Snyder collapse and other such models of gravitational collapse and discuss the cosmic censorship conjecture.

Requirements:

Basic knowledge of relativity theory.

Literature:

- 1) R. M. Wald, General Relativity, The University of Chicago Press (1984).
- 2) S. W. Hawking and G. F. R. Ellis, The large scale structure of spacetime, Cambridge Monographs on Mathematical Physics (1973).
- 3) P. S. Joshi, Gravitational collapse and spacetime singularities, Cambridge University Press (2007).
- 4) B. O. Neill, Semi-Riemannian Geometry with applications to relativity, Academic Press (1983).

Exam:

Oral examination

