

Seminar rotating black holes: The Kerr metric

Wintersemester 2024/25

Veranstalter: Prof. Dr. Alexander Strohmaier

The seminar looks at one of the famous exact vacuum solutions of Einstein's equations of general relativity. The Kerr metric describes a spinning black hole. Its mathematical properties are non-trivial and it provides a natural playground to look at properties of wave equations and dynamical systems on curved spacetimes. The precise choice of topics depends on the background of the participants and will be decided in the first session.

Possible topics include: Lorentzian spacetimes, stationary spacetimes, Einstein equations, Schwarzschild and Kerr metric, different coordinate systems for the Kerr metric, Killing fields, different regions in Kerr spacetime, orbit structure

Preliminary requirements: Basic knowledge of differential geometry is required.

Literature:

- The Geometry of Kerr Black Holes, Barret O'Neill, 2014
- Semi-Riemannian Geometry With Applications to Relativity, Barret O'Neill, 1983
- General Relativity, Robert M. Wald, 1984

Participants will work out a topic, give a presentation, and prepare a short write-up.

Registration: in addition to registration please write a short e-mail to a.strohmaier@math.uni-hannover.de indicating your background and, if applicable, if you have a particular topic that interests you.

First meeting is on Oct 17 2024. Communication via studip.