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 2024/2025

Selected topics in Lorentzian Geometry

Melanie Graf

Course Description:

This is a 2 hour/week specialized lecture course (without exercises) in Mathematics covering selected topics from Lorentzian Geometry. The topics are not fully decided yet, but could include some of the following:

- Killing vector fields and static/stationary spacetimes
- Null Geometry
- Splitting theorems

If participants have any specific wishes, I can try to accommodate them. Updated information might be found at
`https://grafmelanie.wordpress.com/selected-topics-in-lorentzian-geometry/`
in the future.

Prerequisites:

Solid knowledge of Differential Geometry (incl. at least local semi-Riemannian geometry) from a Mathematics course and basic knowledge of Lorentzian Geometry (from e.g. the course Riemannian and Lorentzian Geometry). Depending on the final selection of topics some PDE theory and global Riemannian geometry are helpful.

Literature:

- J. Beem, P. Ehrlich and K. Easley, Global Lorentzian Geometry, 2nd ed., CRC Press, 1996
- B. O'Neill, Semi-Riemannian Geometry with Applications to Relativity, Academic Press, 1983

Additional literature will be consulted as needed.

Date and Place:	Fri, 14:15–15:45, H4, Geomatikum
Starting on:	18 October 2024