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FAKULTÄT FÜR MATHEMATIK
Dekan Univ.-Prof. Dr. Radu Ioan Boţ

Einladung zur öffentlichen Defensio

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Thema der Dissertation

Marginally outer trapped surfaces in cosmological spacetimes: Examples and singularity theorems

Abstract:

This thesis explores aspects of marginally outer trapped surfaces (MOTS) in cosmological spacetimes, i.e. spacetimes with compact Cauchysurfaces. We first prove an instability result for MOTS in a class of spacetimes containing a time like conformal Killing field with a 'temporalfunction'. We then focus on de Sitter spacetime, where we establish an existence result for a family of marginally outer trapped tubes (MOTTs) with constant mean curvature sections of sufficiently high genus. In the second part, we extend a cosmological singularity result by Galloway and Ling in several respects. First, we relax their assumption on the Cauchy surface from being strictly 2-convex to 2-convex, now allowing for the important case of time-symmetric Cauchy surfaces, leading to a characterization of spacetimes whose Cauchy surfaces — or finite covers thereof —are surface bundles over S^1 with totally geodesic fibers. Next, in the presence of a $U(1)$ isometry , we further weaken the 2-convexity requirement. Finally, these results are strengthened in special cases where the Cauchy surface is Haken, non-prime, or nonorientable.

Prüfungssenat

Univ.-Prof. Mag. Dr. Andreas Cap
(Vorsitz, Universität Wien)

Univ.-Doz. Dr. Walter Simon
(Universität Wien)

Prof. Dr. Greg Galloway
(University of Miami)

Prof. Dr. Marcus Khuri
(Stony Brook University)

Zeit und Ort

Dienstag, 25. November 2025, 18:00 Uhr

Online:

> https://univienna.zoom.us/j/63450760719?pwd=Svb2nQADbwiD9JYXGk2B0AGr176JP.1
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> Meeting ID: 634 5076 0719
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> Passcode: 126380