Gravitational Physics
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I N V I T A T I O N

as part of the Gravitational Physics Literature Seminar

to the talk by

Carl ROSSDEUTSCHER

(University of Vienna)

on

"Topology and singularities in cosmological spacetimes satisfying the null energy condition, part II"

Abstract:
In last week's talk, Walter Simon presented singularity theorems for manifolds with spacelike Cauchy surfaces satifying certain convexity conditions.

The main theorem read:

If a globally hyperbolic spacetime admitting a closed, spacelike, 2-convex Cauchy surface is geodesically complete, then the Cauchy surface is either a spherical space or finitely covered by a surface bundle over the circle with totally geodesic fibres.

We will recall these results and focus on the proof of the main theorem.

The proof is divided into three parts. First, we identify a suitably embedded minimal surface. Second, assuming geodesic completeness, we construct a neighborhood foliated by minimal surfaces. Finally, we apply compactness theorems to extend this foliation to the entire manifold.

Our approach relies on several recent developments, including the positive resolution of the virtually Haken conjecture. In particular, we will observe that in certain special cases - such as when the Cauchy surface is Haken - our result admits a natural strengthening.

Time: **Wednesday, 21 May 2025, 2:15 p.m.**

Location: **Seminarraum A, Währinger Straße 17, 1090 Vienna, 2nd floor**

sgd.: D. Fajman