Singularity theorems with weakened energy hypotheses

The original singularity theorems of Penrose and Hawking were proved for matter obeying the Null Energy Condition or Strong Energy Condition respectively. Various authors have proved versions of these results under weakened hypotheses, by considering the Riccati inequality obtained from Raychaudhuri’s equation. Here, we give a different derivation that avoids the Raychaudhuri equation but instead makes use of index form methods. We show how our results improve over existing methods and how they can be applied to hypotheses inspired by Quantum Energy Inequalities. In this last case, we make quantitative estimates of the initial conditions required for our singularity theorems to apply. The talk will be largely based on arXiv:1907.13604 (joint work with E.-A. Kontou) and will introduce index form methods from the start.

Ort: ITP, Raum 210

Interessenten sind herzlich eingeladen!

gez. Prof. R. Verch