

# BERNOULLIS TAFELRUNDE

GRADUATE STUDENT SEMINAR

**Monday, 17 October 2022, 12:15-13:00**  
Seminarraum 05.002, Spiegelgasse 5

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## The positive mass conjecture

### ABSTRACT

In the year 1979, Richard Schoen and Shing-Tung Yau submitted a paper with the title “On the proof of the positive mass conjecture in general relativity”. There they answered an important question concerning (3-dimensional) asymptotically flat Riemannian manifolds for a very general definition of the later. Assume a 3-dimensional Riemannian manifold  $N$  is equipped with a metric that is similar to the Schwarz-Schild metric on a plane with constant time. Furthermore let the scalar curvature on  $N$  be non-negative. Then the “mass” of the corresponding metric must be positive. This theorem basically states that if we experience gravity, there must be a positive mass causing it. The aim of the talk will be to give an understanding of the two theorems proven in Schoen and Yau’s paper and take a short look at what techniques they used.

The proof of the positive mass conjecture by Schoen and Yau is a stunning application of many different fields of mathematics, including Riemannian geometry, geometric measure theory, linear and elliptic partial differential equations as well as Calculus of variations.