



universität  
wien

Fakultät für Mathematik

## Mathematisches Kolloquium

### ANTRITTSVORLESUNG

### EINLADUNG

**Univ.-Prof. Dr. Michael Eichmair**

(Institut für Mathematik, Universität Wien)

**“Minimal surfaces, isoperimetry, and non-negative scalar curvature in asymptotically flat manifolds”**

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It is a classical observation that a small geodesic ball at a point of positive scalar curvature has greater volume than a Euclidean ball of the same surface area. For Queen Dido's quest for the largest possible city that can be enclosed by a given amount of perimeter, this means that a round world beats a flat one - at least on small scales. The search for optimal shapes for this particular problem and related ones has a rich history, including the development of the modern geometric calculus of variations and connections with pressing questions about space-time geometry in current research.

In the first part of my talk, I will give an overview of results on the global effects of non-negative scalar curvature on the large-scale isoperimetric structure of asymptotically flat manifolds. I will then explain how these purely geometric results are tied to physical questions about the space-time evolving from such a manifold according to the Einstein equations. In the second part, I will describe the particular role of a very recent Viennese result with O. Chodosh that settles a conjecture of R. Schoen and conclude with some ideas involved in its proof: *The only asymptotically flat three-manifold with non-negative scalar curvature that admits an unbounded area-minimizing surface is flat Euclidean space.*

**Zeit: Mittwoch 9. März 2016  
15.45 Uhr Kaffeejause,  
16.15 Uhr Vortrag  
kleines Buffet im Anschluss**

**Ort: Fakultät für Mathematik,  
Oskar-Morgenstern-Platz 1,  
Sky Lounge**

Harald Rindler