41. SÜDDEUTSCHES KOLLOQUIUM ÜBER DIFFERENTIALGEOMETRIE

ABSTRACTS

José Balado-Alves

Annegret Burtscher

Tobias Dott

Nadine Grosse

Jonas Henkel

Yingxiang Hu

Curvature flows and their applications to geometric inequalities

In this talk, we will first review the isoperimetric type inequalities, in particular, the Alexandrov-Fenchel type inequalities in Riemannian space forms. Then we will talk about the curvature flows with capillary boundary and their applications to isoperimetric type inequalities.

Mohammad N. Ivaki

Christian Ketterer

Stability of a Scalar curvature rigidity theorem for Riemannian tori

One goal of this talk is to establish a nonlinear analogue of a splitting map to Euclidean space, as a harmonic map to a flat torus. Existence of such a map implies Gromov-Hausdorff closeness to a flat torus in any dimension. Furthermore, Gromov-Hausdorff closeness to a flat torus and a curvature bound imply the existence of a harmonic splitting map. Combining these results with Stern's inequality yields a new Gromov-Hausdorff stability theorem for Riemannian 3-tori under almost non-negative Scalar curvature. This is a joint work with Shouhei Honda, Ilaria Mondello, Raquel Perales and Chiara Rigoni.

Tobias König

Rob Kusner

On Eigenspaces and Minimal Surfaces

Sharp dimension bounds for (Steklov and Laplacian) eigenspaces on Riemannian surfaces are used to study existence and classification problems for embedded minimal surfaces in the round ball B^n (with free boundary) and sphere $\mathbb{S}^n$ (compact without boundary). For instance, we prove the uniqueness of the critical catenoid in B^3 and the critical Möbius band in B^4 under the modest symmetry assumptions. Our main result constructs orientable free boundary minimal surfaces embedded in B^3 of every topological type, whose analog for closed minimal surfaces in $\mathbb{S}^3$ was settled by Lawson in 1970. Our construction is based on equivariant optimization of Steklov or Laplace eigenvalues on surfaces, normalized by their boundary length or surface area, respectively. Our free boundary surfaces in B^n have area below 2π, and if we fix the number of boundary components, the number of such surfaces grows at least linearly with respect to their genus; we prove analogous results for the number of embedded minimal surfaces in $\mathbb{S}^n$ with area below 8π. Geometrically, our surfaces are "doublings" of the equatorial B^2 and $\mathbb{S}^2$ respectively, in a precise sense to be described in the talk. Though we focus on the orientable case, if time permits we may also discuss the situation for nonorientable surfaces minimally embedded in B^4 and $\mathbb{S}^4$ (joint work with Peter McGrath and also with Misha Karpukhin, Peter McGrath, and Daniel Stern).

Elena Mäder-Baumdicker

Artem Nepechiy