

Festliches Mathematisches Kolloquium

am 27.11.2023 um 16.30 Uhr

im Mathematikgebäude, Hörsaal E 28

Begrüßung:

Prof. Dr. Stefan Turek
Dekan der Fakultät für Mathematik

Wissenschaftlicher Vortrag:

Prof. Dr. Edward B. Saff
Vanderbilt University, USA

Sampling with Minimal Energy

Minimal discrete energy problems arise in a variety of scientific contexts – such as crystallography, nanotechnology, information theory, and viral morphology, to name but a few. Our goal is to analyze the structure of configurations generated by optimal (and near optimal)-point configurations that minimize the Riesz s -energy over a sphere in Euclidean space \mathbb{R}^d and, more generally, over a bounded manifold. The Riesz s -energy potential, which is a generalization of the Coulomb potential, is simply given by $1/r^s$, where r denotes the distance between pairs of points. We show how such potentials for $s > d$ and their minimizing point configurations are ideal for use in sampling surfaces.

Connections to the breakthrough results by Field's medalist M. Viazovska and her collaborators on best-packing and universal optimality in 8 and 24 dimensions will be discussed. Finally we analyze the minimization of a "k-nearest neighbor" truncated version of Riesz energy that reduces the order N^2 computation for energy minimization to order $N \log N$, while preserving global and local properties.

**Mit dem Kolloquium feiern wir den 90. Geburtstag
von Professor em. Dr. Manfred Reimer**

*Um Anmeldung bis zum 03.11.2023 wird gebeten.
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**Zu diesem Kolloquium laden die Dozentinnen und Dozenten
der Fakultät für Mathematik sowie der Freundesverein der Fakultät herzlich ein.**