SALZBURG MATHEMATICS COLLOQUIUM
Summer 2023

Frank Vallentin (Köln)
„Optimization in discrete geometry"
May 25, 2023

Abstract:

How densely can one pack given objects into a given container? Such packing problems are fundamental problems in discrete geometry. Next to being classical mathematical challenges there are many applications in diverse areas such as information theory, materials science, physics, logistics, approximation theory.

Studying packing problems, one is facing two basic tasks: Constructions: How to construct packings which are conjecturally optimal? Obstructions: How to prove that a given packing is indeed optimal?

For the first basic task researchers in mathematics and engineering found many heuristics which often work well in practice. In the talk I want to explain computational tools for the second basic task. These tools are a blend of tools coming from infinite-dimensional semidefinite optimization and harmonic analysis, together with computational techniques coming from real algebraic geometry and polynomial optimization. I will report on computational results, which are frequently the best-known.

Thursday, **15:00-15:45**
Hörsaal 414, 1. Stock