מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Geometric Functional Analysis and Probability Seminar

Room 155 ,Ziskind Building
on Thursday, Dec 06, 2018
at 13:30

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Improved bounds for Hadwiger’s covering problem via thin-shell estimates

Abstract:

A long-standing open problem, known as Hadwiger's covering problem, asks what is the smallest natural number $N(n)$ such that every convex body in $\mathbb{R}^n$ can be covered by a union of the interiors of at most $N(n)$ of its translates. Despite continuous efforts, the best general upper bound known for this number remains as it was more than sixty years ago, of the order of ${2n \choose n} \ln n$.

In this talk, I will discuss some history of this problem and present a new result in which we improve this bound by a sub-exponential factor. Our approach combines ideas from previous work, with tools from Asymptotic Geometric Analysis. As a key step, we use thin-shell estimates for isotropic log-concave measures to prove a new lower bound for the maximum volume of the intersection of a convex body K with a translate of $-K$. We further show that the same bound holds for the volume of $K\cap(-K)$ if the center of mass of K is at the origin.

If time permits we shall discuss some other methods and results concerning this problem and its relatives.

Joint work with H. Huang, B. Vritsiou, and T. Tkocz