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*On Hadwiger's covering problem*

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.

In this talk, I will present a recent work in which we prove a new upper bound for $N(n)$. This bound improves Rogers' previous best bound, which is of the order of $\binom{2n}{n} n \ln n$, 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