Sharp stability of the planar Brunn-Minkowski inequality

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Time: Mar 11th, 16:00 - 17:00
Zoom meeting ID: 811 7217 7445   Password: 121323
Link: https://zoom.us/j/81172177445

Abstract:

We'll consider recent results concerning the stability of the classic Brunn-Minkowski inequality. In particular, we will look at the proof of sharp stability for sets in the plane. Assuming that the Brunn-Minkowski deficit $\delta = |A+B|^{\frac{1}{2}}/(|A|^{\frac{1}{2}}+|B|^{\frac{1}{2}})-1$ is sufficiently small in terms of $t = |A|^{\frac{1}{2}}/(|A|^{\frac{1}{2}}+|B|^{\frac{1}{2}})$, there exist homothetic convex sets $K_A \supset A$ and $K_B \supset B$ such that $\frac{|K_A \setminus A|}{|A|} + \frac{|K_B \setminus B|}{|B|} \leq Ct^{-\frac{1}{2}}\delta^{\frac{1}{2}}$. The key ingredient is to show for every $\epsilon, t > 0$, if δ is sufficiently small then $|\operatorname{co}(A+B) \setminus (A+B)| \leq (1+\epsilon)(|\operatorname{co}(A) \setminus A| + |\operatorname{co}(B) \setminus B|)$. This talk is based on joint work with Hunter Spink and Marius Tiba.