abstract

MEMBERS SEMINAR
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

What is the least surface area of a shape that tiles Rd under translations by Zd? Any such shape must have volume 1 and hence surface area at least that of the volume-1 ball, namely (□d). Our main result is a construction with surface area O(□d), matching the lower bound up to a constant factor of □ 3. The best previous tile known was only slightly better than the cube, having surface area on the order of d. We generalize this to give a construction that tiles Rd by translations of any full rank discrete lattice. We show that our bounds are optimal within constant factors for rectangular lattices. Our proof is via a random tessellation process, following recent ideas of Raz [11] in the discrete setting. Our construction gives an almost optimal noise-resistant rounding scheme to round points in Rd to rectangular lattice points.