

Geometry, Topology and Dynamics Seminar

Upper Density Bounds for Two-radius Packings of Disks in the Plane

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Abstract: Define the homogeneity of a packing of disks in the plane to be the infimum of the ratio of radii of disks in the packing. It has been known since 1953 (L. Fejes-Toth) that if the homogeneity of a packing is close enough to 1, the density of that packing cannot exceed $\frac{\pi}{2\sqrt{3}}$, the upper bound on the density of a single-radius packing. "Close enough" was refined in 1963 by August Florian to mean a homogeneity in the interval $(0.902\dots, 1]$, and in 1969, Gerd Blind extended the left bound of this interval to approximately 0.742.

In 2003, sharp upper density bounds were established by Aladar Heppes for a handful of two-radius packings at homogeneities which admit arrangements wherein each disk is tangent to a ring of disks, each of which is tangent to its two cyclic neighbors. In this talk we will develop methods for establishing upper density bounds for saturated two-radius packings of disks when no such regularity exists, and discuss recent progress in establishing a bound sharper than the best one known for a specific ratio of radii.

Monday, April 30 at 3:00 PM in SEO 636
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