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A Novel Decomposition of the Structure of Jammed Packings[1]
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We use simulations of 2D bidisperse disks to determine the properties of jammed packings and investigate the statistical mechanics of these systems. We have created a novel method for classifying structural subunits of a packing, using the structures to calculate relevant physical quantities. The classification scheme is based on a 20 type decomposition of the Delaunay triangles extracted from the centers of the particles in the packing. We find that the distribution of each type has a universal form, independent of total number of particles N in the packing for N=8-10,000, and that the parameters describing this form saturate as N is increased beyond N=20. We measure the distribution of the particle connections, the area distributions of the different structures, and nearest neighbor distributions. We explore the extent to which the nearest-neighbor distributions can predict the properties of the entire packing.

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