

Abstract Submitted
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Coarse-Graining of a Physical Granular System JIE ZHANG, Indiana University-Purdue University-Fort Wayne, ISAAC GOLDHIRSCH¹, Tel Aviv University, ROBERT BEHRINGER, Duke University — We present results, including particle displacements and rotations, as well as strain and stress fields, obtained by applying a resolution-controlled coarse-graining method to an experiment comprised of bidisperse disks subject to pure shear. We briefly review the experimental methods which involve determining inter-particle contact forces using the photoelastic properties of the disks. We then consider the philosophical and technical approaches of the coarse-graining methods used here. We particularly consider the emergence of shear bands, which are manifest in the displacements, rotations, and some strain fields, but not in the stress. Correlations of the displacement fluctuations decay on a very small scale, of the order of a few particle diameters, even close to jamming, which in this case, is induced by shear. We report an unexpected but simple correlation between particle rotation angles and the rotation field.

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