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Entropy driven patterning in vibrofluidized granular materials

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We investigate pattern formation in vertically vibrofluidized rod and sphere granular mixtures confined to quasi-2D containers. In a pure rod system, crowding induces an isotropic-to-nematic phase transition. The inclusion of spheres destabilizes both the isotropic and nematic states. Instead, small independent rod bundles form, where the long axes of rods are closely approximated. To investigate the role of entropy maximization in the granular experiments, we performed strict-2D equilibrium Monte Carlo simulations of hard rods and spheres and found analogous patterning. Similarities and differences between the steady state experiments and equilibrium simulations will be discussed. In collaboration with Daniel Harries, The Hebrew University of Jerusalem.