

Abstract Submitted  
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**Flocking at a distance in granular matter** HARSH SONI, Indian Institute of Science, SRIRAM RAMASWAMY, TIFR Hyderabad — A mixture of polar granular rods and spherical beads on a vibrated plate undergoes a phase transition to an orientationally ordered state above a critical bead concentration. We study this system using large scale numerical simulations with periodic boundary conditions. We find an intermediate state with banded structures between the disordered and the globally ordered state. We observe a single band whose width increases with rod concentration. We find that at high densities the rods and the beads phase separate. We also test the various theoretical predictions of the hydrodynamic theory in the ordered state. Our results, which are in good agreement with the theory, are following: We see a highly anisotropic dispersion relation are exhibited with two sound modes in all directions except along the flock. Further the rods are super diffusive in the transverse direction and exhibit large number fluctuations.

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