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**Flocking at a distance in active granular matter** HARSH SONI, NITIN KUMAR, Indian Institute of Science, India, SRIRAM RAMASWAMY, TIFR Centre for Interdisciplinary Sciences, India, AJAY SOOD, Indian Institute of Science, India — Flocking, the self-organised motion of vast numbers of living creatures in a single direction, relies on organisms sensing each other's presence, orientation and direction of movement. We have attempted to emulate these properties in experiments of fore-aft asymmetric particles energised by a vertically vibrated horizontal surface, and validate and extend our results using computer simulations and a simple hydrodynamic theory. In these studies the asymmetric rods communicate their orientation and directed motion over several rod lengths through a medium of spherical beads. This results in a phase transition from an isotropic state to a coherently moving flock at exceptionally low rod concentrations, an observation reinforced by large-scale numerical simulations. Our findings include a phase diagram in the plane of rod and bead concentrations, power-law spatial correlations upon approaching the phase boundary, and insights into the underlying mechanisms.

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