

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Swirling in a Vibrated Monolayer of Rods VIJAY NARAYAN, SRIRAM RAMASWAMY, Indian Institute of Science, Bangalore, NARAYANAN MENON, U. of Massachusetts, Amherst — We report observations of the spatiotemporal behaviour of a vertically vibrated horizontal monolayer of copper rods (aspect ratio ≈ 5) etched to a rolling-pin-like shape. The spatial organization of the rods resembles a highly-defected nematic state with large, coherently moving swirls. We measure spatiotemporal correlations of the single-particle and collective velocities, and study the structure and dynamics of the system as a function of density and vibration amplitude. We analyze the observed patterns in the light of theories¹ of orientational ordering, dynamics, and topological defects in systems of driven particles. We make comparisons to related but different experiments², as well as to our earlier measurements³ on similar particles with higher aspect ratio.

¹J. Toner, Y. Tu and S. Ramaswamy, *Ann. Phys.* 318 (2005) 170.

²D.L. Blair, T. Neicu, and A. Kudrolli, *Phys. Rev. E* 67, 031303 (2003).

³V. Narayan, N. Menon and S. Ramaswamy, *J. Stat. Mech.* (2005) in press; cond-mat/0510082.

Narayanan Menon
U. of Massachusetts, Amherst

Date submitted: 03 Dec 2005

Electronic form version 1.4