

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Swirling Motion in the System of Vibrated Elongated Particles¹

IGOR ARANSON, Argonne National Laboratory, DMITRII VOLFSO, LEV TSIMRING, University of California, San Diego — We study large-scale collective motion emerging in a monolayer of vertically vibrated elongated particles. The motion is characterized by recurring swirls with the characteristic scale exceeding several times the size of individual particle. Our experiments identified small horizontal component of the oscillatory acceleration of the vibrating plate in a combination with orientation-dependent bottom friction as a source for the swirls formation. We developed a continuum model operating with velocity field and local alignment tensor which is in a qualitative agreement with the experiment.

¹This work was supported by U. S. DOE grants DE-AC02-06CH11357 (IA) and DE-FG02-04ER46135 (DV,LT)

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Date submitted: 16 Nov 2006

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