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Large scale surface flow generation in driven suspensions of magnetic microparticles. MAXIM BELKIN, ALEXEY SNEZHKO, IGOR ARANSON, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne IL 60439 — Nontrivially ordered dynamic self-assembled snake-like structures are formed in an ensemble of magnetic microparticles suspended over a fluid surface and energized by an external alternating magnetic field. These self-assembled multi-segment structures emerge as a result of the collective interaction between the particles oscillations induced by an external magnetic field and the standing waves on the surface of fluid. Surprising large-scale vortex flows are generated by these snake-like structures. The flows can be as fast as 2 cm/sec and strongly depend on the driving magnetic field parameters. We report on systematical experimental study of the vortex flow properties and generation mechanisms.

Oleksiy snezhko
Argonne National Laboratory

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