Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Non-equilibrium self-assembly of "sticky" colloidal particles under alternating electric field ALEXEY SNEZHKO, ARNAUD DEMORTIERE, IGOR ARANSON, Argonne National Laboratory — Ensembles of interacting colloidal particles subject to an external periodic forcing often develop nontrivial self-assembled phases. We study emergent phenomena in partially cross-linked colloidal ensembles of epoxy particles driven out of equilibrium by alternating magnetic fields in a nonpolar solvent. We report on the discovery of self-assembled tunable networks of microscopic polymer fibers ranging from wavy colloidal "fur" to highly interconnected networks. The networks emerge via dynamic self-assembly in an alternating (ac) electric field from a non-aqueous suspension of "sticky" polymeric colloidal particles with a controlled degree of polymerization. The resulting architectures are tuned by the frequency and amplitude of the electric field and surface properties of the particles. The research was supported by the U.S. DOE, Office of Basic Energy Sciences, Division of Materials Science and Engineering, under the Contract No. DE AC02-06CH11357

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Date submitted: 15 Nov 2013 Electronic form version 1.4