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Self-Organized Criticality in Periodically-Sheared Sedimenting Suspensions EMMANOUELA FILIPPIDI, Center for Soft Matter Research, New York University, LAURENT CORTE, Centre des Matériaux Mines, Paris, France, PAUL CHAIKIN, Center for Soft Matter Research, New York University, LAURENCE RAMOS, Universite Montpellier II and CNRS, France, DAVID PINE, Center for Soft Matter Research, New York University — Suspensions of non-colloidal particles under slow periodic strain can undergo a dynamical phase transition from an active fluctuating state to an absorbing steady state at a critical volume fraction In the case of density-mismatched particles, sedimentation and shear-induced diffusion drive the system towards a self-organized critical state. The lengthscales and timescales associated with the dynamics of the active particle clusters sustained near the critical point are shown to follow power-law behavior via simulation of activated random walkers. Finite-size effects and excluded volume interactions are explored for sedimenting and neutrally buoyant, mono- and bi-disperse suspensions both by simulation and experiment.

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