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Self-organized criticality of slowly sedimenting sheared suspensions WEINING MAN, LAURENT CORTE, Physics Department, New York University, SHARON GERBODE, Department of Physics, Cornell University, DAVID PINE, PAUL CHAIKIN, Physics Department, New York University — Suspensions of neutrally buoyant particles driven by slow periodic shear can undergo a dynamical phase transition from an absorbing reversible steady state to a fluctuating irreversible state. For a given strain amplitude γ, this transition occurs at a specific critical volume fraction Φ_c. However, if the particles are not neutrally buoyant, they either sink to the bottom or float to the top of the container. New experiments and simulations show that under periodic shear, the particles resuspend, however, and that for a given strain amplitude γ, the particles evolve towards the critical concentration Φ_c without any external intervention. In that case, particle collisions nucleated at the bottom of the shear cell propagate through the sample and keep the system suspended close to the critical volume fraction $\Phi_c(\gamma)$. Hence, slowly sedimenting particles under oscillatory shear appear as a new class of self-organized critical systems hitherto unreported.

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