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Equilibrium-like phase transition of a dynamic system MING HAN, Northwestern University, JING YAN, STEVE GRANICK, University of Illinois at Urbana-Champaign, ERIK LUIJTEN, Northwestern University — Dynamic systems are considered to be intrinsically different from systems in thermal equilibrium. Despite this fundamental dichotomy, here we demonstrate that a non-equilibrium, fully dynamical system can display behavior that constitutes a complete analogy to thermal equilibrium phase behavior. This dynamical system, consisting of Janus colloids strongly controlled by external fields and over-damped by a viscous solvent, phase separates like a binary fluid mixture, with a coexistence curve separating mixed and demixed regimes and a critical point that we demonstrate to belong to the 2D Ising universality class. Within the coexistence curve, we locate the spinodal curve that separates spinodal decomposition from nucleation and growth.

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