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Synchronized Dancing of Magnetic Janus Particles JING YAN, Department of Materials Science and Engineering at University of Illinois at Urbana-Champaign, MOSES BLOOM, Department of Materials Science and Engineering at Northwestern University, SUNGCHUL BAE, Department of Materials Science and Engineering at University of Illinois at Urbana-Champaign, ERIK LUIJTEN, Department of Materials Science and Engineering at Northwestern University, STEVE GRANICK, Department of Materials Science and Engineering at University of Illinois at Urbana-Champaign — With Janus particle coated with magnetic material on one side, we demonstrate here first a complicated dance of single particle under external field. Then we show various quasi-one dimensional and two dimensional assembly from synchronized motion of a collection of these microspheres. With combination of experiment and simulation, we show how they are phase-locked in motion and self-organize into unexpected structures. By exploring a range of parameters, we also demonstrate fine control of the phase behavior of such dynamic self-assembled materials. We provide an vivid example here how synchronization in both time and space could lead to a new class of responsive materials.

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