

Abstract Submitted
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Antiferromagnetic spinor condensates in a two-dimensional optical lattice LICHAO ZHAO, JIE JIANG, TAO TANG, MICAH WEBB, YINGMEI LIU, Oklahoma State Univ — We experimentally demonstrate that spin dynamics and the phase diagram of spinor condensates can be conveniently tuned by a two-dimensional optical lattice. Spin population oscillations and a lattice-tuned separatrix in phase space are observed in every lattice where a substantial superfluid fraction exists. In a sufficiently deep lattice, we observe a phase transition from a longitudinal polar phase to a broken-axisymmetry phase in steady states of lattice-confined spinor condensates. The steady states are found to depend sigmoidally on the lattice depth and exponentially on the magnetic field. We also introduce a phenomenological model that semi-quantitatively describes our data without adjustable parameters.

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