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Phase Space Dynamics in an Antiferromagnetic Spinor Condensate YINGMEI LIU, JQI / NIST, Gaithersburg, MD 20878, EDUARDO GOMEZ, Instituto de Fisica, Universidad Autonoma de San Luis Potosi, San Luis Potosi 78290, STEPHEN MAXWELL, JQI / NIST, Gaithersburg, MD 20878, LINCOLN TURNER, School of Physics, Monash University, Victoria 3800, Australia, EITE TIESINGA, PAUL LETT, JQI / NIST, Gaithersburg, MD 20878 — Spinor condensates of F=1 sodium atoms display rich spin dynamics due to the antiferromagnetic nature of the interactions in this system. We make a continuous and minimally destructive measurement of the spin dynamics on a single evolving spinor condensate. This technique provides a sharp signature of a magnetically tuned boundary in phase space between the oscillating and running phase solutions. In recent experiments we have been able to track and observe the time evolution of atom number fluctuations, which contains a signature of the crossing of this boundary in phase space. We also introduce a phenomenological model to describe the observed energy dissipation. This allows us to investigate phase space dynamics during spin mixing in the condensate.

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