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Energy decay constant in sodium spinor condensates JIE JIANG, YINGMEI LIU, Department of Physics, Oklahoma State University, Stillwater, OK 74078, EDUARDO GOMEZ, D.A. QUINONES , Instituto de Fisica, Universidad Autonoma de San Luis Potosi, San Luis Potosi 78290, P.D. LETT, Joint Quantum Institute, University of Maryland and National Institute of Standards and Technology, Gaithersburg, MD 20899 — Spinor condensates of F=1 sodium atoms display rich spin dynamics due to the antiferromagnetic nature of the interactions in this system. Damped spin oscillations are observed in sodium spinor condensates, which eventually lead to the mean-field ground state. In recent experiments we have been able to track and observe the time evolution of atom number fluctuations, which enables the first quantitative measure of energy dissipation in the spinor condensate. We also develop a method to extract the energy in spinor dynamics from experimental data, and characterize the energy dissipation with a decay constant. This decay constant appears to follow a power-law dependence with the energy of spinor condensates. This power-law dependence has been experimentally checked for a wide range of the spinor energy, by varying the applied magnetic field strength, the magnetization and the density of the spinor condensate.

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