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Stable longitudinal spin domains in a non-degenerate gas S. D. GRAHAM, D. NIROOMAND, Simon Fraser University, R. J. RAGAN, University of Wisconsin - La Crosse, J. M. MCGUIRK, Simon Fraser University — We demonstrate that linear effective magnetic fields can stabilize longitudinal spin domains in a weakly-interacting gas of ^{87}Rb atoms above quantum degeneracy. Coherent spin-rotating interactions are modified by applying a small linear effective magnetic field that varies the local Larmor precession. Adding small effective magnetic fields with gradients that oppose the initial spin gradient in the domain wall stabilizes the spin domains. Experimental results over a range of cloud temperatures, densities, and linear effective magnetic fields are compared to solutions of a quantum Boltzmann equation in the hydrodynamic and collisionless regimes. In the hydrodynamic regime, the measured stabilizing gradients agree well with the quantum Boltzmann theory. However, the stabilizing gradients in the collisionless regime deviate from the quantum Boltzmann theory as the mean free path becomes comparable to the domain-wall width. To better study both regimes, finer control over the initial domain-wall width is attained using a digital micromirror device.

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