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Spin instabilities in an ultra-cold gas JEFFREY MCGUIRK, DORNA NIROOMAND, LYDIA ZAJICZEK, Simon Fraser University — We study spin dynamics and instabilities in an out-of-equilibrium quantum gas. Using an optical technique, we imprint arbitrary one-dimensional spin structures in a trapped gas of ^{87}Rb atoms near quantum degeneracy. These spin structures can exhibit instabilities, such as the Castaing instability, in which a strong longitudinal spin gradient is unstable to transverse perturbations. This instability can lead to large-amplitude spontaneous transverse magnetization oscillations. We report on progress towards driving and observing these instabilities.

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