

Abstract Submitted
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Spin wave induced coherence dynamics in an ultracold gas JEF-FREY MCGUIRK, LYDIA ZAJICZEK, Simon Fraser University — We demonstrate a technique for driving spin waves with arbitrary spatial modes in a trapped gas of ^{87}Rb atoms. We study the highly nonlinear nature of these spin waves and show that they can lead to collapse and revival of coherence. In particular, we observe spatially localized collapse and revival of Ramsey fringe contrast and show how the pattern of coherence depends on the strength of the spin-wave excitation. The spatial character of the coherence dynamics is incompatible with a simple model based only on position-space overlap of wave functions, requiring a full phase-space description of the atomic spin using a quantum Boltzmann transport equation.

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