

Abstract Submitted
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Detecting stripe phase in spin-orbit coupled condensates via optical Bragg scattering ANDIKA PUTRA, FRANCISCO SALCES CARCOBA, YUCHEN YUE, SEIJI SUGAWA, IAN SPIELMAN, JQI, NIST and University of Maryland — The stripe phase in spin-orbit coupled condensates has been predicted theoretically [1] but not yet been observed. This peculiar feature, analogue to super-solidity, originates from the interaction effects and spin-momentum locking between different spin states. Motivated by recent observation of antiferromagnetic correlations in cold atoms [2], we explore the feasibility of Bragg diffraction to observe the stripe phase. Here, we create spin-orbit coupled condensates in $f=1$ ground state manifold of Rb87 using a pair of cross-polarized 790.02 nm counter-propagating laser beams. Using similar setup, we make a spin-dependent one dimensional lattice and demonstrate Bragg scattering of light to calibrate the atomic density distribution. This enables us to do a direct measure of the stripe phase. [1] Martone et al., Phys Rev A 90, 041604 (2014) [2] Hart et al., Nature 519, 211 (2015)

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