

Abstract Submitted
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Phase Transitions and Collective Modes in Spin-Orbit Coupled Bose-Einstein Condensates¹ QIN-QIN LU, DANIEL E. SHEEHY, Louisiana State University — Recent experiments on trapped bosonic atomic gases interacting with Raman lasers have realized an artificial spin-orbit coupling (SOC) among two dressed spin states of bosons. The phase diagram of this system, as a function of the interaction parameters, strength of SOC, and the densities of the two species of bosons, possesses regimes of mixed superfluid (featuring two interpenetrating dressed-state condensates), and phase separation (between regions of single dressed-state condensate). We present our results on the Bogoliubov sound velocity in the mixed phase, and propose that it can be used as a probe of the spatially-varying density (i.e. stripe order) of the mixed phase as well as of the phase transition to the phase separation regime. The effects of the trapping potential are also discussed.

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