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Tunable miscibility and thermalization in a spin-orbit coupled BEC[1] SU-JU WANG, ROBERT J. NIFFENEGGER, YONG P. CHEN, CHRIS H. GREENE, Department of Physics, Purdue University, West Lafayette, IN — The commonly used relation for the miscible-immiscible transition for two-component Bose-Einstein condensates is reconsidered. Our study goes beyond the Thomas-Fermi approximation by considering the kinetic energy term in mean field theory [1]. Numerical solution of the time-dependent and time-independent Gross-Pitaevskii equations in the spin-orbit coupled BEC suggests a new phase boundary for the miscible-immiscible transition when kinetic energy becomes important. The possible implications of this kinetic energy effect on the thermalization of a binary BEC based on this miscibility transition are also discussed.

[1] L. Wen et al., Phys. Rev. A, 85, 043602 (2012).

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