

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Superfluid transition temperature across the BCS-BEC crossover induced by a synthetic non-Abelian gauge field¹ JAYANTH P. VYASANAKERE, VIJAY B. SHENOY, Indian Institute of Science — A non-Abelian gauge field that induces a spin-orbit coupling on the motion of fermions engenders a BCS-BEC crossover even for weakly attracting fermions. The transition temperature at large spin-orbit coupling is known to be determined by the mass of the emergent boson – the rashbon. We obtain the transition temperature of the system as a function of the spin-orbit coupling by constructing and studying a Gaussian fluctuation (Noziers-Schmitt-Rink) theory. These results will help guide the upcoming experiments on spin-orbit coupled fermions. In addition, this work suggests a route to enhance the transition temperature of a weakly attracting fermionic system by tuning the spin-orbit coupling.

¹Work supported by CSIR, DST, DAE India

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Date submitted: 05 Nov 2012

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