Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Vortex line of spin-orbit coupled Fermi superfluid through BCS to BEC Crossover[1] JUAN YAO, SHIZHONG ZHANG, The Univ of Hong Kong — Superfluid Fermi gases with spin-orbit interaction provides a unique opportunity to investigate possible effects of strong interaction in a topological superfluid. It has been suggested that with addition of Rashba-type spin-orbit coupling, a two-component Fermi gas with strong s-wave interaction can become a topological superfluid with zero-energy bound state at the core of the vortex. In this talk, I discuss the evolution of vortex structure in a spin-orbit coupled Fermi gas through the BCS-BEC crossover within Bogoliubov-de Genne formalism. We find that the largest critical current occurs in the BEC side of the resonance, in contradiction to the usual crossover without spin-orbit coupling where it occurs at unitarity. Furthermore, we discuss the core structure of the vortex by calculating the spin and density distribution around the vortex.

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Date submitted: 02 Nov 2015 Electronic form version 1.4