Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quenched dynamics of superconducting Dirac fermions on honeycomb lattice MING LU, X. C. XIE[1], International Center for Quantum Materials, School of Physics, Peking University, X.C. XIE'S GROUP TEAM — We study the BCS paring dynamics for the superconducting Dirac fermions on honeycomb lattice after a sudden quench of pairing strength. We observe two distinct phases, one is the synchronized phase with undamped oscillations of paring amplitude; the other phase has the paring amplitude oscillates from positive to negative. The exact phase transition point is given by investigating the integrability of the system. Different from the previous work on normal superconducting fermions, which has three distinct phases, our results shows the absence of the Landau damped phase and over damped phase. Moreover, we present a linear analysis in the weakly quenched regime, showing that in a rather long time scale, the dynamics can be approximated as the periodic oscillation with $2\Delta_\infty$ angular frequency along with the logarithmic decay of the pairing amplitude, in contrast of the $t^{-1/2}$ decay for the normal fermions, namely the Landau damped phase.

[1]The presenter's advisor

Ming Lu
International Center for Quantum Materials, School of Physics, Peking University

Date submitted: 31 Oct 2015 Electronic form version 1.4