Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Intrinsic triplet p+ip topological superconductivity in low filled graphene TIANXING MA, Department of Physics, Beijing Normal University, FAN YANG, School of Physics, Beijing Institute of Technology, Beijing, 100081, China, HONG YAO, Institute of Advanced Study of Tsinghua University, 100081, China, HAI-QING LIN, Beijing Computational Science Research Center, Beijing 100084, China — Inspired by the continuously distributed Van-Hove saddle points at the band bottom, we studied the low filled Hubbard-model on the Honeycomb-lattice with negative next-nearest-neighbor hopping integrals, which represents the graphene system. Within different parameter regimes, our combined weak coupling random phase approximation and strong coupling determinant quantum Monte-Carlo approaches consistently reveal the triplet p+ip topological superconductivity in the ground state of the system. Further more, when a weak Kane-Mele spin-orbit coupling is included, the time-reversal invariant Z2 weak topological superconductivity will be realized in the system. Our unbiased numerical results provide basis to realize the intrinsic exotic topological superconductivity in the graphene and similar systems.

Tianxing Ma
Department of Physics, Beijing Normal University/
Beijing Computational Science Research Center

Date submitted: 04 Nov 2013 Electronic form version 1.4