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**Weak Localization of Dirac Fermions in Graphene** XIN-ZHONG YAN, C. S. TING, TCS, University of Houston — In the presence of the charged impurities with screened Coulomb potentials, we study the weak localization (WL) effect by evaluating the quantum interference correction (QIC) to the conductivity of Dirac fermions in graphene. With the inelastic scattering rate due to electron-electron interactions obtained from our previous calculation, we investigate the dependence of QIC on the carrier concentration, the temperature and the size of the sample. It is found that WL is present in large size samples at finite carrier doping where the strength of the intervalley scatterings due to the charged impurities is not weak. In addition, we argue that the system is delocalized at very low doping. We also analyze the absence of WL in experiment. It is found that WL is quenched at low temperature for small size samples as studied in the experiments.

Xin-Zhong Yan
TCS, University of Houston

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