Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Observation of vacancy-induced suppression of electronic cooling in defected graphene[1] XIAOSONG WU, QI HAN, YI CHEN, GERUI LIU, DAPENG YU, Peking Univ — Previous studies of electron-phonon interaction in impure graphene have found that static disorder can give rise to an enhancement of electronic cooling. We investigate the effect of dynamic disorder and observe over an order of magnitude suppression of electronic cooling compared with clean graphene. The effect is stronger in graphene with more vacancies, confirming its vacancy-induced nature. The dependence of the coupling constant on the phonon temperature implies its link to the dynamics of disorder. Our study highlights the effect of disorder on electron-phonon interaction in graphene. In addition, the suppression of electronic cooling holds great promise for improving the performance of graphene-based bolometer and photo-detector devices.

[1]This work was supported by National Key Basic Research Program of China (No. 2012CB933404, 2013CBA01603) and NSFC (project No. 11074007, 11222436, 11234001).

Xiaosong Wu
Peking Univ

Date submitted: 14 Nov 2014 Electronic form version 1.4