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Spin and Transport Properties of Doped Graphene KATHLEEN MCCREARY, WEI HAN, ROLAND KAWAKAMI, University of California, Riverside — Graphene is an ideal system to investigate the interplay of magnetic moments and conduction electrons. Electrostatic gates are able to tune the electron and holes concentrations substantially, and localized magnetic moments can form, in principle, through a variety of methods including vacancies, edges, and adsorbed impurities. Theory predicts a coupling of the localized moments and the conduction electrons, leading to gate tunable indirect coupling between moments which can be ferromagnetic or antiferromagnetic. In this study, we perform magnetotransport measurements on graphene devices where the graphene surface is modified inside an ultrahigh vacuum chamber through a variety of methods including hydrogen adsorption, Ar sputtering, and molecular beam deposition of transition metals [1]. Both /in situ/ and /ex situ/ magnetotransport measurements are performed, where the latter involves the air-free transfer to a low temperature (1.6 - 300 K), high field (7 T) cryostat. We will report results on the temperature-dependent, high-field magnetotransport characteristics of doped graphene.

[1] K. Pi, K. M. McCreary, W. Bao, W. Han, Y. F. Chiang, Y. Li, S.-W. Tsai, C. N. Lau, and R. K. Kawakami, Phys. Rev. B 80, 075406 (2009).

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