

## Diffusive charge transport in graphene

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I'm going to summarize the recent results from our electrical transport experiments on graphene that revealed a wealth of information about the interaction of conduction electrons with impurities in the diffusive regime. By controllably tuning Coulomb potential scattering<sup>1</sup>, lattice defect scattering<sup>2,3</sup>, phonon scattering<sup>4</sup> as well as the electron-electron interactions<sup>5</sup> with in-situ electrical measurement, we mapped out ways to get around the major road-blocks to higher mobility graphene devices<sup>6</sup> and, in some cases, the possibility to engineer new functionalities into graphene using specific types of impurity<sup>7</sup>.

Work performed while the author was at the University of Maryland, College Park

<sup>1</sup>J. -H. Chen et al., "Charged Impurity Scattering in Graphene", Nat. Phys. 4, 377 (2008)

<sup>2</sup>J. -H. Chen et al., "Defect Scattering in Graphene", Phys. Rev. Lett. 102, 236805 (2009)

<sup>3</sup>J. -H. Chen et al., "Tunable Kondo Effect in Graphene with Defects", Nat. Phys. 7, 535 (2011)

<sup>4</sup>J. -H. Chen et al., "Intrinsic and Extrinsic Performance Limits of Graphene Devices on SiO<sub>2</sub>", Nat. Nanotech. 3, 206 (2008)

<sup>5</sup>C. Jang et al., "Tuning the Effective Fine Structure Constant in Graphene", PRL. 101, 146805 (2008)

<sup>6</sup>J. -H. Chen et al., "Diffusive Charge Transport in Graphene on SiO<sub>2</sub>", Solid State Commun. 149, 1080 (2009)

<sup>7</sup>J. -H. Chen et al., "Tunable Kondo Effect in Graphene with Defects", Nat. Phys. 7, 535 (2011)

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