Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Current decay rate due to electron–electron scattering in graphene BEN YU-KUANG HU, The University of Akron — Electron–electron scattering in graphene does not conserve electrical current, because of the linear dispersion of the bands in graphene near the Dirac point. In graphene, when two electrons with initial momenta $\mathbf{k_1}$ and $\mathbf{k_2}$ undergo electron–electron scattering to final states $\mathbf{k_1'}$ and $\mathbf{k_2'}$, in general the total current $\mathbf{v}(\mathbf{k_1}) + \mathbf{v}(\mathbf{k_2}) \neq \mathbf{v}(\mathbf{k_1'}) + \mathbf{v}(\mathbf{k_2'})$ [see *e.g.*, Li *et al.*, Appl. Phys. Lett. **97**, 082101 (2010)]. We calculate the electric current relaxation rate due to the electron–electron scattering of an electron that is injected into extrinsic graphene at low temperature. When the energy of injected electron relative to the Fermi energy is small compared to the Fermi energy, the current decay rate is small due to phase-space restrictions. The current decay rate grows monotonically as the energy of the injected electron increases.

Ben Yu-Kuang Hu
The University of Akron

Date submitted: 11 Nov 2011