Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Probing Chiral Quasiparticles using Local-Density-of-States Measurements in Graphene TAMAR PEREG-BARNEA, ALLAN H. MACDONALD, University of Texas at Austin — We show that STM local-density-of-states (LDOS) measurements in weakly disordered graphene sheets probe the pseudospin chirality of states near Dirac points. The Fourier transformed LDOS $N(q,\omega)$ has both intravalley contributions centered near reciprocal lattice vectors and intervalley contributions displaced by the wavevector Q which connects graphene's two distinct Dirac points. We explain the qualitative differences between these two features in $N(q,\omega)$ on the basis of analytic calculations starting from graphene's continuum model Dirac equation, and comment on the sensitivity of both $N(q,\omega)$ features to the mix of atomic length scale and smooth disorder sources. For on-site disorder, the LDOS $N(q,\omega)$ measured on A sites due to an A site potential has the periodicity of the Brillouin zone, whereas the pattern produced by a B site potential is periodic with a primitive cell three times larger.

Tamar Pereg-Barnea
University of Texas at Austin

Date submitted: 04 Dec 2007 Electronic form version 1.4