ACCELERATOR COLLOQUIUM

PUBLIC LECTURE

"The Effective Fine Structure Constant of Graphene"

Peter Abbamonte
University of Illinois, Urbana - Champaign

Electron in graphene behave like Dirac germions, permitting phenomena familiar from high energy nuclear physics to be studied in a solid state setting. A key question is whether or not these Fermions are critically influenced by Coulomb correlations. In this talk, I will describe inelastic x-ray scattering experiments on crystals of graphite, which we have used, in conjunction with new reconstruction algorithms, to image the dynamical screening of charge in a freestanding, graphene sheet. We found that the polarizability of the Dirac fermions is enhanced by excitonic effects, improving the screening of interactions between renormalized quasiparticles. The strength of interactions is characterized by a scale-dependent, effective fine structure constant, alpha (k,omega), whose value approaches ~1/7 at low energy and large distances. I will discuss the implications of this result for various phenomena, such as the screening of charged impurities, and will outline more generally how time-resolved x-ray techniques can make an impact in condensed matter physics.

Wednesday, November 17, 2010
4:00 p.m.
CEBAF Center Auditorium

Coffee & Cookies before the colloquium starting at 3:45 pm

Jefferson Lab

For further info, please contact Anne-Marie Valente at x7327