Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Two-photon absorption measurements in graphene fragments: Role of electron-electron interactions[1] A. SANDHU, Dept of Physics and OSC, Univ of Arizona, A. ROBERTS, OSC, Univ of Arizona, K. ARYANPOUR, Dept of Physics, Univ of Arizona, A. SHUKLA, Dept of Physics, IIT Bombay, S. MAZUMDAR, Dept of Physics, Univ of Arizona — Many-body interactions in graphene are an active field of research. There is a clear evidence of strong electron correlation effects in other carbon based materials which have the same sp^2 hybridization as graphene. For example, in linear-polyenes, the electron-electron interactions are considered responsible for the occurrence of lowest two-photon state below the optical one-photon state. The electronic correlation in these linear systems is a strong function of the chain length. Thus, it is pertinent to question if the two-dimensional graphene fragments also exhibit strong correlation effects and how these effects scale with fragment size. Using a white light super-continuum source, we perform z-scan measurements to extract frequency-dependent two-photon absorption coefficients in symmetric molecular fragments of graphene, e.g. coronene and hexabenzocoronene. A comparison of one-photon and two-photon absorption coefficients is then used to uncover the extent of correlation effects. In the smallest fragment, coronene, our results indicate a strong signature of the Coulomb interactions. We will discuss how the importance of electron-electron interaction varies with system size and its implication for the correlation effects in graphene.

[1]Supported by the DoD SMART Fellowship.

K. Aryanpour
Dept of Physics, Univ of Arizona

Date submitted: 08 Nov 2011 Electronic form version 1.4