Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electrically Tunable Magnetic Properties of Defective Metallic Carbon Nanotubes[1] YOUNG-WOO SON, MARVIN L. COHEN, STEVEN G. LOUIE, Department of Physics, University of California at Berkeley and Materials Sciences Divisions, LBNL — We present a first-principles study of the magnetic properties of metallic carbon nanotubes with various defects under a homogeneous transverse electric field. Single carbon adatoms, hydrogen passivated single carbon adatoms, and the various vacancies in (10,10) nanotubes are shown to play the role of magnetic impurities. The relative energy levels of quazi-localized states of such magnetic impurities with respect to the Fermi level are changeable with the application of a transverse electric field so that the corresponding magnetic ground states are shown to be tunable. Our results suggest that a pure organic nanomagnet could be realizable and their magnetic properties are controllable by electric fields.

[1]This work was supported by NSF Grant No. DMR04-39768 and DOE Contract No. DE-AC03-76SF00098. Computational resources have been provided by NSF at the NPACI and DOE at the NERSC.

Young-Woo Son
Dept. of Physics, UC Berkeley

Date submitted: 29 Nov 2005 Electronic form version 1.4