Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Nanoscale Effects on Charge Transport due to Surface-Plasmon Induced Quantum Image Forces** CHARLES CHERQUI, CNLS, Theoretical Division, Los Alamos National Laboratory, and Department of Physics & Astronomy, University of Mew Mexico, ANDREI PIRYATINSKI, Theoretical Division, Los Alamos National Laboratory, DAVID DUNLAP, Department of Physics and Astronomy, University of New Mexico — We examine the motion of a charge carrier in a carbon nanotube in the presence of a metal nanosphere. We show that the system can be reduced to that of a free particle moving in an effective potential consisting of a classical attractive image potential and a repulsive quantum correction. Charge carrier transport in this representation results in a resonance tunneling through the effective potential. We analyze the transmtion coefficent as a function of distance from the surface of the metal nanoparticle to the nanotube. This device setup could be used as the basis for a nanoscale filed effect transitor.

Charles Cherqui
CNLS, Theoretical Division, Los Alamos National Laboratory, and
Department of Physics & Astronomy, University of Mew Mexico

Date submitted: 29 Nov 2012 Electronic form version 1.4