

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Evanescent Photon Induced Surface Plasmons in Multiwalled Carbon Nanotubes** QI LU, RAHUL RAO, APPARAO RAO, PU-CHUN KE, Clemson University, LABORATORY OF SINGLE-MOLECULE BIOPHYSICS AND POLYMER PHYSICS TEAM, NANOMATERIALS LABORATORY TEAM — Surface plasmons (SPs) are collective excitations of charges running as longitudinal density fluctuations along the surface of a solid. Conventionally SPs have been created through the coupling of evanescent waves via metallic thin films or small metallic particles or nanoshells. Here we show the generation of SPs excited with evanescent photons at the interface between a quartz slide and a MWNT array (2 microns) under the total-internal-reflection condition. The evanescent wave generated at this interface induced plasmons in the MWNT array which in turn excited the fluorescence of the sky blue beads immobilized on the array. The propagation of SPs in the nanotube array, whose thickness is two orders of magnitude greater compared with metallic thin film for SP generation, is attributed to the confinement of the electrons in the outermost tube shells and ballistic transport. Our finding suggests MWNT array can be used as tuneable plasmon waveguide for imaging illumination and biological and nano-optoelectronic sensing. -

Pu-Chun Ke  
Clemson University

Date submitted: 06 Dec 2004

Electronic form version 1.4