Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Plasmonic-molecular resonance coupling JIANFANG WANG, The Chinese University of Hong Kong — Localized plamsons have been widely used to enhance optical signals. The plasmon enhancement requires optically active species to be close to the metal surface. The presence of active species can affect the plasmon resonances. Understanding the plasmon-molecule interactions is of importance for both enhancing optical signals and developing plasmon shift-based sensors. We have studied the resonance coupling between Au nanocrystals (NCs) and dyes. The coupling strength can be tuned by varying NC plasmon wavelength. The maximum plasmon shift reaches above 120 nm, which is about 10 times larger than that caused by the local index increase. The plasmon shift decays rapidly as the dye-NC spacing is increased. In addition, the coupling strength is strongly dependent on the molecular properties but independent on the NC shape and size. We have further measured the resonance coupling on single Au NCs. The resonance coupling reveals a unique three-band structure. These single-particle studies will greatly help in understanding the fundamental aspects of the resonance hybridization and designing various plasmon-enhanced spectroscopies.

Jianfang Wang
The Chinese University of Hong Kong

Date submitted: 22 Nov 2010 Electronic form version 1.4