Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Enhanced Electroluminescence from A Nanocavity Due to Dynamical Coupling of Plasmonic and Molecular Emissions[1] XIAOGUANG LI, Fudan University, GONG CHEN, ZHENCHAO DONG, Univ. of Sci. and Tech. of China, JIAN SHEN, Fudan University, ZHENYU ZHANG, Univ. of Sci. and Tech. of China — We investigate the electroluminescence from a nanocavity formed by a luminescent molecule within the tip-substrate junction of a scanning tunneling microscope. The light emissions from the molecular luminescence and plasmonic radiation are evaluated using respectively a density matrix approach and classical electromagnetic theory. The molecular luminescence is described in two different components: the radiation associated with the excited states effectively pumped by the tunneling electrons and the spontaneous emission enhanced by the plasmonic field. In particular, by explicitly treating the near field of the plasmons, we explore in detail the dynamical coupling between the plasmonic and molecular emissions, and identify conditions for enhanced electroluminescence. We discuss these results in comparison with experiments.

[1]Supported by NSF and MOST of China

Xiaoguang Li
Fudan University, Univ. of Sci. and Tech. of China

Date submitted: 08 Nov 2012 Electronic form version 1.4