Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Surface Plasmon Based Engineering of Semiconductor Nanowire Optics[1] CHANG-HEE CHO, CARLOS O. ASPETTI, Department of Materials Science and Engineering, University of Pennsylvania, MICHAEL E. TURK, JAMES M. KIKKAWA, Department of Physics and Astronomy, University of Pennsylvania, SUNG-WOOK NAM, RITESH AGARWAL, Department of Materials Science and Engineering, University of Pennsylvania — Emission from unthermalized (hot) excitons can be observed from high-quality crystals and quantum-well structures due to decreases in the exciton lifetimes but typically with low yields. By employing a plasmonic nanocavity, we observe efficient hot-exciton emission in core-shell CdS-SiO_2-Ag nanowires with intensities surpassing those from thermalized excitons [1]. These new spectral characteristics are mediated by whispering gallery plasmonic modes that yield highly intense electromagnetic fields. As a result, the exciton radiative lifetime is decreased by several orders of magnitude. The introduction of a high-quality hybrid plasmonic nanocavity structure significantly changes the photophysics of the host material, demonstrating an approach applicable to other material systems.

[1] Chang-Hee Cho, *et al*, Nature Materials, **10**, 669 (2011).

[1]Transient optical work supported by the Department of Energy BES Award No. DESC0002158. Remaining work supported by ARO W911NF-09-1-0477, NIH Director's New Innovator Award Program, 1-DP2-7251-01, NSF-NSEC-DMR08-32802, and NSF IGERT DGE02-21664.

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Date submitted: 12 Dec 2011 Electronic form version 1.4