Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Analytical Description of Asymmetric Reflectance in Percolation Films NICHOLAS KUHTA, VIKTOR PODOLSKIY, Oregon State University, AIQING CHEN, University of California Santa Cruz, KEISUKE HASEGAWA, NIH, MIRIAM DEUTSCH, University of Oregon — We develop a quantitative description of giant asymmetry in reflectance, recently observed in semicontinuous metal films. The developed scaling-theory-based technique adequately explains the spectral properties of semicontinuous composites, as well as provides insight into the origin of an experimentally observed absorbance anomaly in the vicinity of percolation threshold. Scaling theory suggests that the origin of the anomalous minimum in absorbance at the percolation threshold lies in the dramatically reduced correlation length in our solution-derived films as compared to their vacuum-deposited counterparts. The latter phenomenon is consistent with the restriction of the electron mean free path, often observed in solution-derived plasmonic nanostructures.

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Date submitted: 16 Nov 2009 Electronic form version 1.4