Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Electromagnetic Wave Transmission Through a Nano-Hole NORMAN HORING, DESIRE MIESSEIN, Stevens Institute of Technology, GODFREY GUMBS, Hunter College, CUNY, HUNTER COLLEGE-CUNY COLLABORATION, STEVENS INSTITUTE OF TECHNOLOGY COLLABORATION — An integral equation formalism is presented to describe electromagnetic wave transmission through a subwavelength nano-hole in a thin plasmonic sheet. The dyadic Green's function forthe associated Helmholtz problem is employed. Taking the subwavelength radius of the nano-hole to be the smallest length of the system, we have obtained an exact solution of the integral equation forthe dyadic Green's function analytically. This dyadic Green's function is then used in the numerical calculations of EM wave transmission through the nano-hole for normal incidence of the incoming wave train. The EM transmission involves two distinct contributions, one emanating from the nano-hole and the other is directly transmitted through the thin plasmonic layer itself. The transmitted radiation exhibits interference fringes in the vicinity of the nano-hole, and they tend to flatten as a function of increasing lateral separation from the hole.

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Date submitted: 07 Nov 2014 Electronic form version 1.4