Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Theoretical and experimental study of surface plasmon enhanced transmission of subwavelength apertures IAN SCHICK, JOHN YARBROUGH, REUBEN COLLINS, Colorado School of Mines, RUSSELL HOLLINGSWORTH, GREG NUEBEL, ITN Energy Systems Inc. — We present a study of surface plasmon (SP) enhanced transmission through subwavelength apertures in Au films on glass. Samples consisting of 100-500nm linear apertures flanked by periodic corrugations were prepared using e-beam lithography with subsequent ion milling. Transmission through these structures were studied experimentally and modeled numerically. Geometric parameters were varied in the numerical simulation which used a 2D Green's function approach and a frequency dependent Au dielectric function. Transmission with flanking corrugations was significantly enhanced related to an isolated aperture, at the wavelengths corresponding to SP resonance in the structure in agreement with the literature. Periodic corrugation also affected the spatial dependence of the transmitted field. Transmission through these structures was spectrally and spatially mapped using near-field scanning optical microscopy which revealed field intensity distributions consistent with those observed in the simulations. The authors acknowledge financial support from the NSF.

Reuben Collins
Colorado School of Mines

Date submitted: 01 Dec 2004 Electronic form version 1.4