Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Surface plasmon interference spectroscopy of metal films[1] VITALII VLASKO-VLASOV, Argonne National Laboratory, ULRICH WELP, Argonne National Laboratory, ANDREAS RYDH, ANL and Dept. of Physics, Stockholm University, JOHN PEARSON, Argonne National Laboratory — Circular nanoslits manufactured by focused ion beam in silver films were used to excite surface plasmon polaritons and to generate plasmon interference patterns. Changes of the plasmon interference periods at changing the excitation wavelength were imaged by a near-field scanning optical microscope and scaled by the known nanostructure dimensions allowing precise plasmon wavelength measurements. The plasmon dispersion curves for our film thickness were calculated in different approximations and a proper fitting function for the experimental data was chosen. This allowed to retrieve the frequency dependence of the dielectric function of our silver film, which is different from usually cited Johnson-Christy and Palik data but falls in the range of values reported in literature. The results of fitting indicate to the important role of losses, which can not be neglected in definition of the real part of the dielectric constant even in the Drude region. Our technique is a useful tool for the local characterization of the dielectric function sensitive to the structure of metal films potential for photonics applications.

[1]The work was supported by the U.S. Department of Energy, Basic Energy

Vitalii Vlasko-Vlasov
Argonne National Laboratory

Date submitted: 30 Nov 2005 Electronic form version 1.4