Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Surface plasmon microscopy with low-cost metallic nanostructures for biosensing II LAUREN OTTO, Bethel University, SANG-HYUN OH, University of Minnesota, NATHAN LINDQUIST, Bethel University — Due to diffraction, traditional far-field optical microscopy cannot achieve the resolution necessary for applications in nano-scale imaging, sensing, and spectroscopy. However, the manipulation of surface plasmon waves in metallic nanostructures offers a solution. Surface plasmons are evanescent electromagnetic waves sustained by the oscillations of free electrons at the surface of a metal film. As plasmons propagate on the surface, they will probe the surface with high sensitivity and large field intensities. Furthermore, since plasmons are sensitive to within only 10-100 nm from the metallic surface and exhibit large electric field intensities, they have been explored for applications in biosensing and surface-enhanced Raman spectroscopy. We present the development of a microscopy setup for surface plasmon biosensing and the use of reliable, repeatable, low-cost nanofabrication techniques based on template stripping. High-quality nanopatterns are fabricated and used for proof-of-concept biosensing and surface-enhanced Raman spectroscopy experiments. In our customized microscopy setup, holographic illumination with arbitrary laser patterns is made possible by a spatial light modulator. This aids in the careful optical characterization of our nanofabricated samples.

Lauren Otto
Bethel University

Date submitted: 15 Nov 2011 Electronic form version 1.4