Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Plasmonic superfocusing on metallic tips for near-field optical imaging and spectroscopy CATALIN C. NEACSU, ROB OLMON, SAMUEL BERWEGER, ALEXANDRIA KAPPUS, FRIEDRICH KIRCHNER, Department of Chemistry, University of Washington, Seattle, USA, CLAUS ROPERS, Max-Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany, LAX SARAF, Pacific Northwest National Laboratory, Richland, WA, USA, MARKUS B. RASCHKE, Department of Chemistry, University of Washington, Seattle, USA —
Realization of localized light sources through nonlocal excitation is important in the context of plasmon photonics, molecular sensing, and in particular near-field optical techniques. Here, the efficient conversion of propagating surface plasmons, launched on the shaft of a scanning probe tip, into localized plasmon at the apex provides a true nanoconfined light source. Focused ion beam milling is used to generate periodic surface nanostructures on the tip shaft that allow for tailoring the plasmon excitation. Using ultrashort visible and mid-IR transients the dynamics of the propagation and subsequent scattered emission is characterized. The strong field enhancement and spatial field confinement at the apex is demonstrated studying the coupling of the tip in near-field interaction with a flat sample surface. It is used in scattering near-field spectroscopic imaging (s-SNOM) to probe surface nanostructures with spatial resolution down to 10 nm.

Catalin C. Neacsu
Department of Chemistry, University of Washington, Seattle, USA

Date submitted: 26 Nov 2007 Electronic form version 1.4