

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Excitation of Nanoparticle Plasmon Vortices with an Electron Beam** TYLER HARVEY, JORDAN CHESS, JORDAN PIERCE, Univ of Oregon, PETER ERCIUS, National Center for Electron Microscopy, Lawrence Berkeley National Laboratory, BENJAMIN MCMORRAN, Univ of Oregon — We observe the decay of an electron vortex beam upon interaction with a gold nanoparticle. Transmission electron micrographs and supporting electron energy loss spectra show scattering of an electron beam with an incoming orbital angular momentum  $L_z = 1\hbar$  and an outgoing  $L_z = 0\hbar$  from the nanoparticle at surface plasmon energies. By conservation of angular momentum, we conclude that we have observed excitation of surface plasmon vortices by an electron beam. Electron vortex probes therefore present a new opportunity for orbital angular momentum-selected excitation of plasmon modes with high spatial resolution.

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Date submitted: 15 Nov 2013

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