

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**Determining the Magnetism of Single Atoms on a Semiconductor Surface** ALEXANDER KHAJETOORIANS, BRUNO CHILIAN, JENS WIEBE, ROLAND WIESENDANGER, Institute for Applied Physics, University of Hamburg, Hamburg, Germany — We demonstrate a method in which we combine spin-resolved Landau level spectroscopy and inelastic tunneling spectroscopy (IETS) to determine the magnetization and anisotropy of single Fe atoms coupled to a 2D electron gas on a III-V (110) semiconductor surface. We show here, using ultra-low temperature (300mK) scanning tunneling spectroscopy in high magnetic fields (12T) that the states of the Fe atom couple to the spin-split Landau levels thereby producing an overall asymmetry in the local density of states (LDOS) for a given Landau level. By probing the LDOS with changing magnetic field, we determine the magnetization of the atom. Furthermore, we observe spin excitations of the Fe atom by IETS. From these excitations, we observe a zero-field splitting of the Fe spin which we attribute to magnetic anisotropy. We relate these two measurements using a simple quantum magnetic Hamiltonian which suitably describes both experimental observations.

Alexander Khajetoorians  
Institute for Applied Physics, University of Hamburg, Hamburg, Germany

Date submitted: 17 Nov 2009

Electronic form version 1.4