Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

High magnetic anisotropy of magnetic atoms on thin MgO films on Ag(001) SUSANNE BAUMANN, ILEANA G. RAU, CHRISTOPHER P. LUTZ, ANDREAS J. HEINRICH, IBM Almaden Research Center — High quality thin films of magnesium oxide on silver (MgO/Ag(001)) are obtained by magnesium evaporation in an oxygen atmosphere. MgO is often used as insulating layer in magnetic tunnel junctions. Therefore, the interplay of magnetic atoms with MgO is of interest e.g. to the hard drive industry. We characterize the thin films by a combination of scanning tunneling microscopy (STM) and atomic force microscopy (AFM). In particular, we determine the thickness of the deposited layers by a combined use of the two tools. We find that single transition metal atoms, such as Iron and Cobalt, deposited on the thin oxide film show inelastic tunneling steps at higher voltages compared to other insulating layers. The inelastic tunneling spectroscopy (IETS) is used to detect the discrete spin excitations of these atoms. The measured IETS steps indicate high magnetic anisotropies.

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Date submitted: 25 Nov 2012 Electronic form version 1.4