

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**“Live” Surface Ferromagnetism in Fe Dot Multilayers on Cu(111)**<sup>1</sup> MARIA TORIJA, Univ. of Tenn. Knoxville/ Oak Ridge National Laboratory, AN PING LI, CHARLES GUAN, Oak Ridge National Laboratory, WARD PLUMMER, JIAN SHEN, Univ. of Tenn. Knoxville/ Oak Ridge National Laboratory — We investigate the crossover behavior from two-dimensional (2D) to three dimensional (3D) in multilayers of magnetic nanodots grown by stacking 2D Fe nanodot assemblies on Cu(111) single crystal substrate with a Cu spacing layer. Using in-situ magneto-optical Kerr effect, we have observed a striking ferromagnetic to spin-glass phase transition with increasing number of Fe dot layers. The topmost layer of the Fe dots survives the phase transition and remains ferromagnetic. This unusual surface ferromagnetism is likely caused by a stronger surface state-mediated intralayer dot coupling which is stronger than the interlayer dot coupling, as confirmed by the fact that the critical temperature of the surface ferromagnetism is considerably higher than that of the bulk spin glass phase in the system.

<sup>1</sup>Supported by ORNL, managed by UT-Batelle, LLC for the U.S. Department of Energy (Contract No. DE-AC05-00OR227525) and by the U.S. National Science Foundation (Contract DMR 0105232)

Maria Torija  
Univ. of Tenn. Knoxville/ Oak Ridge Nat. Lab.

Date submitted: 12 Jan 2006

Electronic form version 1.4