

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Induced Ferromagnetism at Interfaces between BiFeO_3 and $\text{YBa}_2\text{Cu}_3\text{O}_7$ ¹ JIAN-XIN ZHU, XIAO-DONG WEN, Los Alamos National Laboratory, J.T. HARALDSEN, Los Alamos National Laboratory and James Madison University, C. PANAGOPOULOS, E.E.M. CHIA, Nanyang Technological University — Transition metal oxides (TMOs) exhibit many emergent phenomena ranging from high-temperature superconductivity and giant magnetoresistance to magnetism and ferroelectricity. In addition, when TMOs are interfaced with each other, new functionalities can arise, which are absent in individual components. Here, we report results from first-principles calculations on the magnetism at the $\text{BiFeO}_3/\text{YBa}_2\text{Cu}_3\text{O}_7$ interfaces. By comparing the total energy for various magnetic spin configurations inside BiFeO_3 , we are able to show that the ferromagnetism is induced near the interface. We further develop an interface exchange-coupling model and place the extracted exchange coupling interaction strengths from the first-principles calculations, into a resultant generic phase diagram. The emergence of interfacial ferromagnetism should have implications to electronic and transport properties.

¹This work was supported by U.S. DOE at LANL under Contract No. DE-AC52-06NA25396, LANL LDRD-DR Program, and in part by the Center for Integrated Nanotechnologies, a U.S. DOE Office of Basic Energy Sciences user facility.

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Date submitted: 15 Nov 2013

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