

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Electric-field control of magnetic orderings in the tetragonal BiFeO<sub>3</sub>**<sup>1</sup> CHUN-GANG DUAN, East China Normal University — We present a systematic first-principles study on the magnetic properties of the tetragonal BiFeO<sub>3</sub> (P4mm) with various in-plane lattice constants. The Heisenberg model is applied to study the behaviors of exchange constants ( $J_{1a}$ ,  $J_{1c}$ ,  $J_{2a}$ ,  $J_{2c}$ ) under the influence of the in-plane strain. We find that in certain region of the in-plane lattice constant, switching the direction of polarization from out of plane to in-plane by electric field could result in transition of magnetic orderings, e.g., from G-type to C-type antiferromagnetic states in tetragonal BiFeO<sub>3</sub>. This may open a new avenue to controlling magnetoresistance using electric field.

<sup>1</sup>Supported by the NSF of China (Grant No. 50771072 and 50832003).

Shiyu Chen  
East China Normal University

Date submitted: 17 Nov 2010

Electronic form version 1.4