

MAR09-2008-003968

Abstract for an Invited Paper
for the MAR09 Meeting of
the American Physical Society

First-Principles Approach to Lattice-Mediated Magnetoelectric Effects¹

JORGE IÑIGUEZ, Institut de Ciencia de Materials de Barcelona (CSIC)

I will present a microscopic theory of the magnetoelectric response of an insulator, and derive from it an analytical expression for the lattice-mediated part of the effect. As I will show, such a result provides us with distinct hints at strategies to increase the magnitude of the response, as well as with a convenient method for performing first-principles calculations. I will illustrate the usefulness of the proposed approach with applications to Cr_2O_3 , a model magnetoelectric crystal, and BiFeO_3 and related compounds, the best studied, and arguably most technologically promising, family of multiferroics.

Ref.: J. Iñiguez, Phys. Rev. Lett. 101, 117201 (2008).

¹Work funded by FP6-STREP MaCoMuFi.