Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electric-field control of spin waves in multiferroic BiFeO3: Theory[1] ROGÉRIO DE SOUSA, Dept. of Physics and Astronomy, University of Victoria, BC Canada, P. ROVILLAIN, Y. GALLAIS, A. SACUTO, M.A. MÉASSON, Universite Paris Diderot-Paris 7, D. COLSON, A. FORGET, Service de Physique de l'Etat Condense, CEA Saclay, M. BIBES, A. BARTHÉLÉMY, Unite Mixte de Physique CNRS/Thales, France, M. CAZAYOUS, Universite Paris Diderot-Paris 7 — Our recent experiment [1] demonstrated gigantic (30%) electric-field tuning of magnon frequencies in multiferroic BiFeO3. We demonstrate that the origin of this effect is related to two linear magnetoelectric interactions that couple the component of electric field perpendicular to the ferroelectric vector to a quadratic form of the Néel vector. We calculate the magnon spectra due to each of these interactions and show that only one of them is consistent with experimental data. At high electric fields, this interaction induces a phase transition to a homogeneous state, and the multi-magnon spectra will fuse into two magnon frequencies. We discuss the possible microscopic mechanisms responsible for this novel interaction and the prospect for applications in magnonics.

[1] P. Rovillain, *et al.*, Nature Materials advance online publication Nov. 14 2010 (DOI 10.1038/nmat2899), http://dx.doi.org/10.1038/nmat2899

[1]We acknowledge support from NSERC-Discovery (Canada) and the Agence Nationale pour la Recherche (France).

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Date submitted: 30 Nov 2010 Electronic form version 1.4