Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Prediction of electromagnons in $BiFeO_3$ from atomistic simulations[1] BRAJESH MANI, CHUN-MIN CHANG, SERGEY LISENKOV, INNA PONOMAREVA, Department of Physics, University of South Florida, Tampa, Florida 33620, USA — We developed a first-principles-based computational approach to study the finite-temperature complex dynamics in multiferroics. Application of this technique to one of the most well-known multiferroic, $BiFeO_3$, revealed that the most general form of the magnetoelectric coupling that is allowed in any multiferroic, may produce an electromagnon in antiferromagnetic ferroelectric. Such an electromagnon shares most of the features with the magnon, but is activated by an electric, rather than magnetic, field. We also found that the A_1 phonon mode is repelled by the magnon mode, while the E phonon modes is rather insensitive to the presence of (electro)magnons. We believe that our findings will aid to a deeper understanding of electromagnon modes and their origin in multiferroics as well as provide a computational methodology for further research.

[1]This work is supported by the U.S. Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering under grant DE-SC0005245.

Brajesh Mani
Department of Physics, University of South Florida,
Tampa, Florida 33620, USA

Date submitted: 14 Nov 2014 Electronic form version 1.4