

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Control of Spin Wave Band Structure in YIG using Electric Fields¹ GLADE SIETSEMA, MICHAEL E. FLATTÉ, University of Iowa — It has previously been shown that a uniform electric field can be used to modify the dispersion relations of spin waves in a YIG slab ². The application of the electric field results in a Dzyaloshinsky-Moriya interaction, which then produces a linear shift of the spin wave frequencies ³. In this work we consider the effects of a periodically varying electric field on a slab of YIG. The spin wave frequencies and linewidths of the system are obtained from the Landau-Lifshitz-Gilbert equation using the plane-wave expansion method. We demonstrate that the periodic variation of the electric field opens band gaps in the spin wave dispersion relations. A band gap width of several hundred MHz is observed when the electric field strength is alternating between 0 and $8 \cdot 10^7$ V/m over a length scale of 200 nm. The frequency and width of these band gaps can be tuned by adjusting the electric field strength and the lattice constant associated with the periodicity, and quality factors on the order of 100 can be achieved.

¹This work is supported in part by DARPA.

²X. Zhang et al., Phys. Rev. Lett. **113**, 037202 (2014)

³T. Liu et al., Phys. Rev. Lett. **106**, 247203 (2011)

Glade Sietsema
University of Iowa

Date submitted: 06 Nov 2015

Electronic form version 1.4