Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

THz spectroscopy of spin waves in multiferroic $BiFeO_3$ in high magnetic fields URMAS NAGEL, T. KATUWAL, T. RÕÕM, Nat.-l Inst. of Chem. Phys. & Biophys., Tallinn, Estonia, H. ENGELKAMP, Radboud University Nijmegen, The Netherlands, D. TALBAYEV, Tulane Univ., New Orleans, H.T. YI, S.-W. CHEONG, Rutgers Univ., New Jersey, RANDY S. FISHMAN, Oak Ridge National Laboratory, Tennessee — We have studied the magnetic field dependence of far-infrared active magnetic modes in a single ferroelectric domain $BiFeO_3$ crystal at low temperature. The modes soften close to the critical field of 18.8 T along the [001] (pseudocubic) axis, where the cycloidal structure changes to the homogeneous canted antiferromagnetic state and a new strong mode with linear field dependence appears that persists at least up to 31 T. A microscopic model that includes two Dzyaloshinskii-Moriya interactions and easy-axis anisotropy describes closely both the zero-field spectroscopic modes as well as their splitting and evolution in a magnetic field. The good agreement of theory with experiment suggests that the proposed model provides the foundation for future technological applications of this multiferroic material.

Urmas Nagel
Nat.-l Inst. of Chem. Phys. & Biophys., Tallinn, Estonia

Date submitted: 15 Nov 2013 Electronic form version 1.4