

Abstract Submitted  
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**Optical diode effect at THz frequencies of spin-wave excitations in the room-temperature multiferroic  $\text{BiFeO}_3$** <sup>1</sup> TOOMAS RÕÕM, U. NAGEL, National Institute of Chemical Physics and Biophysics, Tallinn, Estonia, S. BORDÁCS, I. KÉZSMÁRKI, Budapest University of Technology and Economics, Budapest, Hungary, H.T. YI, S.-W. CHEONG, Rutgers Univ., New Jersey, J. H. LEE, R.S. FISHMAN, Oak Ridge National Laboratory, Tennessee — We studied the unidirectional transmission of THz radiation in  $\text{BiFeO}_3$  crystals, the unique multiferroic compound offering a real potential for room-temperature applications. We found that the optical magnetoelectric effect generated by spin waves in  $\text{BiFeO}_3$  is robust enough to cause considerable nonreciprocal directional dichroism in the GHz-THz range even at room temperature. The optical magnetoelectric effect in  $\text{BiFeO}_3$  is dominated by two types of spin-current induced polarizations, while the exchange-striction and single-ion polarization terms do not significantly contribute to it. Our work demonstrates that the nonreciprocal directional dichroism spectra and their theoretical analysis provide microscopic model of the magnetoelectric couplings in multiferroic materials.

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