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THz spectroscopy of spin waves in multiferroic $Ba_2CoGe_2O_7$ in high magnetic fields[1] URMAS NAGEL, T. RÕÕM, NICPB, Tallinn, Estonia, S. BORDÁCS, D. SZALLER, I. KÉZSMÁRKI, Department of Physics, BUTE, Budapest, Hungary, H. ENGELKAMP, HFML, Radboud University Nijmegen, The Netherlands, J. ROMHÁNYI, K. PENC, MTA SzFKI, Budapest, Hungary, L. DEMKÓ, N. KIDA, H. MURAKAWA, Y. ONOSE, R. SHIMANO, S. MIYAHARA, N. FURUKAWA, Y. TOKURA, Multiferroics Project, ERATO, University of Tokyo, Japan — By applying external magnetic field the square-lattice antiferromagnet $Ba_2CoGe_2O_7$ can be transformed to a chiral form, evidenced by large optical activity when the light is in resonance with spin excitations at sub-terahertz frequencies. We found that the magnetochiral effect, the absorption difference for the light beams propagating parallel and anti-parallel to the applied magnetic field, has an exceptionally large amplitude close to 100% and persists to fields up to 30 T. All these features are ascribed to the magnetoelectric nature of spin excitations as they interact both with the electric and magnetic components of light. We observe a spin flop at 15 T, that is consistent with our theoretical calculations.

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