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Terahertz frequency magneto-dielectric effect in Ni-doped $CaBaCo_4O_7$[1] SHUKAI YU, S. DECKOFF-JONES, D. TALBAYEV, Tulane University, C. DHANA SEKHAR, A. VENIMADHAV, Indian Institute of Technology, Kharagpur, M.K.L. MAN, J. MADEO, E. WONG, T. HARADA, B.M.K. MARISERLA, K.M. DANI, Femtosecond Spectroscopy Unit, Okinawa Institute of Science and Technology Graduate University — We explore the behavior of spin and lattice excitations in high magnetic field in Ni doped magneto-electric material $CaBaCo_4O_7$. This material crystallizes in a polar non-centrosymmetric crystal structure and exhibits a non-collinear ferrimagnetic Co spin ordering. Additional ferroelectricity was reported due to the onset of magnetic order, as well as a strong magneto-dielectric effect of 16%. Low-energy excitations of the material have been studied using THz spectroscopy and include spin excitations and strong lattice vibrational modes at the 1.2 and 1.6 THz frequency. Our THz magnet-spectroscopy measurements in magnetic field up to 17 T addresses the question of the origin of the magnet-dielectric effect. We find that the magneto-dielectric effect results from a significant loss of spectral weight by the lattice vibrational resonances near 1.2 and 1.6 THz frequency. We also find that the vibrational frequencies soften upon doping with Ni.

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