

# Magnetic hysteresis loop investigated by terahertz magnetic resonance in canted antiferromagnetic YFeO<sub>3</sub>

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We investigate a free induction decay (FID) process for the canted antiferromagnetic YFeO<sub>3</sub> single crystal after the resonant excitation of a ferromagnetic mode located at about 0.3 THz. Employing terahertz time-domain spectroscopy (THz TDS), we used two wire-grid polarizers with polarization of +45 or -45 degree from y-axis of the c-cut parallel crystal plate, and could obtain the FID signals excluding a strong contribution of the transmitted THz wave. By varying the magnetic field strength applied along the c-axis of the sample, we could observe the hysteresis behavior of FID signals which are in good agreement with the results obtained by other conventional techniques, such as a magneto-optic Kerr effect measurement and vibrating sample magnetometry. By examining the FID process in detail, we discuss the spin dynamics which are possibly contributed to by a domain distribution, particularly by magnetic domain walls.

Keywords :canted antiferromagnet, free induction decay, YFeO<sub>3</sub>, hysteresis