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Magnetic resonance at the Verwey transition in epitaxial  $Fe_3O_4^{-1}$ M. PECHAN, B. KASTER, J. DOU, Dept. of Physics, Miami University, Oxford, OH, P. JAYATHILAKA, C. BAUER, C. MILLER, Dept. of Physics, Center for Integrated Functional Materials, University of South Florida, Tampa, Florida —  $Fe_3O_4$ is of interest due to its potential applications in the field of spintronics. Previous studies on magnetite films and  $Fe_3O_4/Cr/NiFe$  spin values indicate the presence of a uniaxial anisotropy when the magnetite is grown in a magnetic field. Two 170 nm thick films of  $Fe_3O_4$  were reactively sputtered simultaneously onto (100) MgO substrates without and with an applied field (100 Oe). Epitaxy was confirmed by in-plane x-ray diffraction and optimal oxygen stoichiometry is confirmed by the 119 K Verwey transition temperature  $(T_V)$ . Ferromagnetic resonance (FMR) measurements at 35 GHz in the plane of the film revealed four-fold anisotropy confirming high quality (100) epitaxy, with an additional uniaxial contribution present in the field-grown sample. Temperature dependent FMR on the sample grown without field clearly reflects  $T_V$  in the linewidth and in-plane and out-of-plane anisotropies. The in-plane uniaxial anisotropy for the sample grown with field exhibits an even stronger temperature response at  $T_V$ . Detailed discussions of thermal variations of magnetization, anisotropy and relaxation processes will be presented.

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