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Optical Probe of Magnetization Dynamics in SrRuO₃ Thin Films

M.C. LANGNER, C.L.S. KANTNER, L.M. MARTIN, Y.-H. CHU, M. HUIJBEN, R. RAMESH, J. ORENSTEIN, University of California, Berkeley — We report all-optical measurements of ferromagnetic resonance (FMR) in the oxide ferromagnet SrRuO₃ using the time-resolved magneto-optic Kerr effect. A Kerr signal at the FMR frequency is triggered by a laser-induced change in the direction of the magnetocrystalline anisotropy. We measure the subsequent precession of the magnetization vector as a function of temperature and laser intensity. We perform measurements in very thin films, with thicknesses from 2-10 nm, and show that the cooling of the film is limited by the boundary resistance between the film and substrate. This cooling of the SRO film via the substrate varies linearly with the film thickness, allowing us to separate thermal effects from the recovery kinetics.

Matthew Langner
University of California, Berkeley

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