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Imaging of In-Plane Magnetization using the Time Resolved Anomalous Nernst Effect[1] JASON BARTELL, DARRYL NGAI, GREGORY FUCHS, Cornell University — We report on measurements of the time-resolved anomalous Nernst effect (TRANE) for diffraction-limited imaging of in-plane magnetization using a high resolution optical microscope. In TRANE microscopy, pulsed laser light is used to create a transient thermal gradient perpendicular to the film plane. In response, a voltage is generated by the anomalous Nernst effect. The voltage has an amplitude proportional to the in-plane projection of the magnetic moment along a direction perpendicular to the voltage contacts. We show that the TRANE voltage persists for less than 100 ps in 30 nm thick magnetic samples. Additionally, we demonstrate spatial resolution limited only by the area of the thermal gradient generated by the focused laser pulse.

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