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Mapping magnetism with atomic resolution using aberrated electron probes[1] JUAN IDROBO, Oak Ridge National Laboratory, JÁN RUSZ, Uppsala University, MICHAEL A. MCGUIRE, CHRISTOPHER T. SYMONS, RANGA RAJU VATSAVAI, ANDREW R. LUPINI, Oak Ridge National Laboratory — In this talk, we report a direct experimental real-space mapping of magnetic circular dichroism with atomic resolution in aberration-corrected scanning transmission electron microscopy (STEM). Using an aberrated electron probe with customized phase distribution, we reveal with electron energy-loss (EEL) spectroscopy the checkerboard antiferromagnetic ordering of Mn moments in LaMnAsO by observing a dichroic signal in the Mn L-edge. The aberrated probes allow the collection of EEL spectra using the transmitted beam, which results in a magnetic circular dichroic signal with intrinsically larger signal-to-noise ratios than those obtained via nanodiffraction techniques (where most of the transmitted electrons are discarded). The novel experimental setup presented here, which can easily be implemented in aberration-corrected STEM, opens new paths for probing dichroic signals in materials with unprecedented spatial resolution.

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