Quantitative measurement of magnetic fields and magnetic moments of nanoparticles by off-axis electron holography — •Zi-An Li[1], Andras Kovcas[2], Alexandra Terwey[1], Rafal E. Dunin-Borkowski[2], and Michael Farle[1] — [1]Faculty of Physics and Center for Nanointegration (CENIDE), University Duisburg-Essen, Germany — [2]Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons and Peter Grünberg Institute, Research Centre Jülich, Germany

The quantitative mapping of magnetic fields and the measurement of magnetic moments of individual nanoparticles is critically important, both for the fundamental understanding of nanoscale magnetism and for practical applications. Off-axis electron holography provides direct access to the magnetic field within and around an object of interest in the transmission electron microscope. Here, we use off-axis electron holography to map local variations in magnetic induction within and around individual nanoparticles with close to 2 nm spatial resolution. We apply a contour integration method developed by Beleggia et al. [1] to measure their magnetic moments with an estimated accuracy of better than 1%. The origins of possible statistical and systematic errors in such measurements are discussed [2].

References:
1.*M. Beleggia, K. Takeshi, R. E. Dunin-Borkowski. Ultramicroscopy, 110, 425-432, (2010)
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