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**Nanoscale Interface Interaction with Magneto-Optical Kerr Effect (MOKE)** CAMERON HICKERT, BRADLEY BECKER, MARK SIEMENS, XIN FAN, University of Denver — While much effort has been dedicated to studying the interplay between magnetism and light, the role of nanoscale effects is only now being recognized. Our lab recently measured a surprising phenomenon in which the magneto-optical response of a magnetic material is reversed when a nonmagnetic film is added above it. This effect cannot be explained by basic theories of magnetism, suggesting an uncharacterized role of the interface in affecting bulk magnetization. The specific phenomenon we study is the Magneto-Optic Kerr Effect (MOKE), which describes the polarization rotation of light reflecting off a magnetized surface. The developed surface MOKE setup allows us to study how electricity can affect magnetism via interface spin-orbit interaction. In this study, we utilize a nonmagnetic platinum nanofilm layered above a permalloy ferromagnetic nanofilm. By varying the current passing through the nanofilms, and measuring the MOKE with perpendicular light incidence, we are able to detect how electricity can manipulate magnetism. Preliminary data from other experiments suggests this rigorous quantification will allow us to improve scientific conceptions of magnetization and spin-orbit interaction, with potential technological applications in magnetic memory and computer hard drives.

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