Abstract Submitted
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Enhancement of the Magnetic Moment in Ultrathin Fe-doped $CoFe_2O_4$[1] JARRETT MOYER, CARLOS VAZ, DIVINE KUMAH, Department of Applied Physics and CRISP, Yale University, DARIO ARENA, National Synchrotron Light Source, Brookhaven National Laboratory, VICTOR HENRICH, Department of Applied Physics and CRISP, Yale University — The magnetic properties of magnetic oxides can be drastically altered through a reduction in film thickness. It has previously been demonstrated that the magnetic moments of $CoFe_2O_4$ and $NiFe_2O_4$ are enhanced for ultrathin films; however, the physical mechanisms for this enhancement are still unknown. To determine the physical cause of this increased magnetic moment and to examine the effect of Fe doping, thin films of $Co_{1-x}Fe_{2+x}O_4$ ($0 \leq x \leq 0.8$) are grown epitaxially on MgO (001) substrates by MBE at thicknesses ranging from 3 – 20 nm. SQUID magnetometry measures the bulk magnetic properties of the samples and confirms that there is an increase in the magnetic moment for all stoichiometries as the film thickness is reduced. XAS, XMLD and XMCD measurements examine the cation-specific magnetic moments and spin directions to explain the physical mechanisms that lead to an enhanced magnetic moment in ultrathin Fe-doped $CoFe_2O_4$ films.

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