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Electronic Structure of NiO (100) and CoO (100) Ultrathin Films on Fe_3O_4(100)[1] HUI-QIONG WANG, VICTOR HENRICH, Department of Applied Physics, Yale University, PO Box 208284, New Haven, CT 06520 — The electronic structure of ultrathin epitaxial films of two insulating antiferromagnets, NiO and CoO, grown on the metallic ferrimagnet Fe_3O_4 is being investigated. NiO (100) and CoO (100) are grown monolayer by monolayer on Fe_3O_4 (100) using molecular beam expitaxy; the thin-film electronic properties are characterized by measuring ultraviolet photoelectron spectra (UPS) as a function of overlayer thickness. The evolution of the density-of-states in the O 2p/Fe 3d and O 2p/Ni 3d bands exhibits a shift in the position of the NiO valence band for ultrathin films relative to bulk-like thick films; that band shift is also observed for ultrathin CoO (100) films grown on Fe_3O_4 (100). Several possibilities for the origin of that shift will be discussed: one is modification of metal 3d - O 2p hybridization in the thin film; another is change of the on-site Coulomb interaction, U, due to polarization energy and substrate image potentials.

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