Collapse of the Hyperfine Magnetic Field at the Ru site in GdRu$_2$ and HoRu$_2$ \footnote{This work is supported by USDOE(DE-FG02-03ER46064) in Buffalo, by RC CCSA #7669 in Fresno, and by USDOE(DE-FG02-04ER46105) and NSF(DMR0802478) in San Diego.} D. COFFEY, Buffalo State College, NY 14222, M. DEMARCO, Buffalo State College and SUNY Buffalo, NY 14222, P.-C. HO, California State University, Fresno CA 93740, T. SAYLES, M. B. MAPLE, University of California, San Diego, CA 92093, J. W. LYNN, Q. HUANG, NCNR, Gaithersburg MD 20899 — The Mössbauer Effect (ME) is frequently used to investigate magnetically ordered systems. One usually assumes that the magnetic order induces a hyperfine magnetic field, $H_{\text{hyper}}$, at the ME active site. This is the case in the ruthenates where the temperature dependences of $H_{\text{hyper}}$ at $^{99}$Ru sites track the magnetic order. This is not the case in GdRu$_2$ and HoRu$_2$. Specific heat, magnetization, and susceptibility show that there is ferromagnetic order below 93K in GdRu$_2$. Neutron diffraction data reveal that HoRu$_2$ orders ferromagnetically at 15.30(4) K with an ordered moment of 7.98(8) $\mu_B$. However there is no evidence of a correspondingly large $H_{\text{hyper}}$ in the $^{99}$Ru ME in either material. \textit{Ab initio} calculations shows that spin polarization occurs only on the rare earth sites with $H_{\text{hyper}} < 5T$ on the Ru sites. The results are compared with the corresponding calculations for ferromagnetic SrRuO$_3$.

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Dermot Coffey
Buffalo State College

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