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L3/L2 Branching Ratio for Rare Earth Compounds YONGBIN LEE, JONG-WOO KIM, ALAN GOLDMAN, BRUCE HARMON, Ames Laboratory — Variation of the  $L_3/L_2$  intensity ratio for rare earth compounds– the so called branching ratio (BR) is an outstanding subjects in the field of magnetic Xray scattering. In X-ray absorptions not influenced by magnetism, the ratio is about 2, which can be explained by the statistical number of 2p core electrons. However, in X-ray circular dichroism(XMCD) and X-ray resonant magnetic scattering (XRMS), BRs greater than 10 and less than 0.1 have been observed. We show by first principles calculation for hcp heavy rare earth metals that the 4f-5d exchange interaction and the spin-orbit interaction in the 5d band states are the key to understand the variation of BR. In this talk, we will also discuss quadrupole transitions, crystal fields, and hybridization of 5d states with the empty, highly polarized 4f states and the effects on the BR. We will compare our results with XRMS data obtained for RENi2MnGe2 samples, and describe general systematics.

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