

# Spin polarized photoemission studies of the 3s core level in ferromagnetic systems<sup>a)</sup> (abstract)

Y. Liu, J. Xu, D-J. Huang, and P. D. Johnson

*Physics Department, Brookhaven National Laboratory, Upton, New York 11973*

Spin polarized core level photoemission studies are capable of providing local site specific magnetic information. 3s core level photoemission spectra are characterized by a main peak and satellite whose separation reflects the exchange interaction between the core level and the net spin in the valence bands. However, there is currently considerable disagreement as to whether the splitting between these two peaks may be taken as a measure of the local moment. An alternative approach is to examine the intensities of the different peaks in the spectra. Indeed analysis of the multiplet intensities in the final state suggests that it should be possible to obtain a reasonable measure of the local magnetic moment through measurement of the spin dependent intensities in the multiplet structure. In detailed spin polarized photoemission studies of the 3s core level of Fe and Co films grown on Ag(001) and Cu(001) substrates, respectively, we find that this is indeed the case. This suggests that studies of the spin polarization of the 3s core level photoemission may provide an important new technique for the measurement of magnetic moments in thin films. Lineshape fitting reveals new information about the lifetime of the core holes. Previous studies have suggested that a majority spin core hole will be shorter lived than a minority spin core hole because of the higher density of majority spin electrons in the valence bands. However, our studies indicate that the lifetime is more complicated and that it shows a strong dependence on the LS in the final state. © 1996 American Institute of Physics. [S0021-8979(90)70668-5]

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