Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Below band gap Faraday and Kerr measurements in ferromagnetic GaMnAs GHEORGHE ACBAS, M.-H. KIM, J. CERNE, Physics Dept. Univ. at Buffalo, SUNY, Buffalo, NY, M. CUKR, V. NOVAK, T. JUNGWIRTH, Institute of Physics, Acad. of Sciences of the Czech Republic, Prague, Czech Republic, M.A. SCARPULLA, Materials Department, Univ. of California, Santa Barbara, O.D. DUBON, Mat. Scie. & Eng. Dep., Univ. of California, Berkeley, J. SINOVA, Physics Dept., Texas A&M Univ., College Station, TX — We have studied the Faraday and Kerr effects in a series of ferromagnetic GaMnAs films in the 115-1500 meV energy range. This provides a direct magneto-optical probe of the valence band, which is critical to understanding the ferromagnetic origin in this material. Previous magneto-optical studies probed the region around the band gap (1.5 eV) where numerous contributions to the optical response were inferred: ferromagnetic, paramagnetic, valence band, impurity bands, intra-d level or intra-gap defect levels. We compare our experimental results with predictions from mean field Zener model calculations. We find that the results are consistent with a picture in which the Fermi level resides inside the spin split valence band. Many-body band renormalization effects have to be included in order to model the results quantitatively.

Gheorghe Acbas
Physics Dept. Univ. at Buffalo, SUNY, Buffalo, NY

Date submitted: 19 Dec 2008 Electronic form version 1.4