Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

High Field Magnetic Circular Dichroism in Ferromagnetic InMnSb and InMnAs[1] M. A. MEEKER, B. A. MAGILL, G. A. KHODAPARAST, Virginia Tech, D. SAHA, C. J. STANTON, University of Florida, S. MCGILL, NHMFL, Florida, B. W. WESSELS, Northwestern Univ. — An understanding of the fundamental interactions in narrow gap ferromagnetic semiconductors such as InMnAs and InMnSb has been developed primarily from static magnetization and electrical transport measurements. In this study, to provide a better understanding of the coupling of the Mn impurities to the conduction and valence bands through the sp-d exchange interactions, we have performed magnetic circular dichroism measurements (MCD) on MOVPE grown InMnAs and InMnSb. In our samples, the Mn content varies from 2% to 10.7% and all the samples have Curie temperatures above 300 K. The samples were photo-excited using a Quartz Tungsten Halogen lamp with energies ranging between 0.92-1.45 eV, and in magnetic fields up to 31 T. The temperatures ranged from 15-190 K. Comparison of the observed MCD with theoretical calculations provides a direct method to probe the band structure including the temperature dependence of the spin-orbit split-off bandgap and g-factors, as well as a means to estimate the sp-d coupling constants.

[1]Supported by the AFOSR through grant FA9550-14-1-0376, NSF-Career Award DMR-0846834 , NSF-DMR-60035274 , NSF-DMR-1305666, NSF MRI program (DMR-1229217).

G. A. Khodaparast
Virginia Tech

Date submitted: 04 Nov 2015 Electronic form version 1.4