Abstract Submitted
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Determining the bandtail shape of highly Si-doped $Al_{0.3}Ga_{0.7}As$ for investigation as a spin transport channel[1] JENNIFER MISURACA, PENG XIONG, STEPHAN VON MOLNAR, MARTECH, Florida State University, JELENA TRBOVIC, Institute of Physics, University of Basel, JUN LU, JIANHUA ZHAO, Institute of Semiconductors, Chinese Academy of Sciences, HIDEO OHNO, Tohoku University — Knowledge of the band structure near the metal insulator transition (MIT) is essential to understanding spin transport and coherence in a semiconductor. Highly Si-doped $Al_{0.3}Ga_{0.7}As$ can be driven through the MIT using persistent photoconductivity [1] via photodoping the insulating sample at 5K. This provides a way to tune the carrier concentration of the sample *in situ*. The carrier concentration as a function of temperature for various illumination times is measured as the Fermi energy is tuned systematically. The critical carrier concentrations for the MIT and the deep state Hall activation energies of two differently Si-doped, MBE grown, $Al_{0.3}Ga_{0.7}As$ samples have been established. Furthermore, the bandtail shape of the DOS has been inferred using the shallow activation energies [2] in a 16 meV range between the Fermi energy of the unilluminated sample and the mobility edge. [1] S. Katsumoto, et al. J. Phys. Soc. Jpn. 56, 2259 (1987). [2] I. Terry, et al. Solid State Commun. 84, 235 (1992).

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