

Abstract Submitted  
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**Theory of the Spin-Splitting of the Valence Band Landau Levels in GaAs**<sup>1</sup> X. PAN, G.D. SANDERS, C.J. STANTON, University of Florida, K. RAMASWAMY, S. MUI, S.E. HAYES, Washington University, S.A. CROOKER, National High Magnetic Field Laboratory — We present calculations of the spin-dependent band structure and magneto-optical absorption spectra in bulk GaAs. Our calculations are based on the 8-band Pidgeon-Brown model. Optical properties are calculated within the golden rule approximation and compared with experiments. Although GaAs has a small  $g$ -factor leading to nearly spin-degenerate conduction band Landau levels, the valence band Landau levels are spin-split and the spin splitting can be observed in the circularly polarized magneto-absorption spectra. By carefully analyzing the energy band structure and the absorption spectra together, we identify the origins of all the optical transitions. We also separate contributions to the absorption coefficient from spin-up electrons and spin-down electrons to get the conduction band electron spin polarization. This information is used to compute the optically-pumped NMR (OPNMR) signal. We demonstrate that OPNMR can provide unique insight into the spin-dependent valence band electronic states.

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