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Electrically detected magnetic resonance in Si:P at high magnetic fields (B = 8.5 T) DANE MCCAMEY, Department of Physics, University of Utah, GAVIN MORLEY, London Centre for Nanotechnology, LOUIS CLAUDE BRUNEL, JOHAN VAN TOL, National High Magnetic Field Laboratory, Florida State University, HEATHER SEIPEL, CHRISTOPH BOEHME, Department of Physics, University of Utah — Phosphorus doped silicon (Si:P) is a technologically important material with possible uses in spintronic and quantum information processing devices. A useful way to understand the properties of this material is by investigation of the spin dependence of its transport processes. Whilst numerous studies of this type have been performed on Si:P at low magnetic fields, no systematic investigation has been undertaken at high magnetic fields. We will present an electrically detected magnetic resonance (EDMR) study of Si:P, with a native oxide surface, at $B = 8.5$ T ($f_{resonance} \sim 240$ GHz). The change in the sample photocurrent, $\Delta I/I$, was measured as a function of B using a microwave chopping method. Resonant signals from the P donors, as well as P_b defects near the Si-SiO_2 interface, were observed. The temperature dependence of the observed signals in the range $T = 3$ K - 10 K will be presented, and the microscopic processes leading to the signals discussed. Finally, pulsed EDMR (Rabi oscillations, Hahn echos) was performed to investigate spin coherence and manipulation in high fields, and these results will also be discussed.

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