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**Spin flip times of donor bound electrons in GaAs and InP as a function of magnetic field** TODD KARIN, RUSSELL BARBOUR, PATRICK WIHELM, KAI-MEI FU, Department of Physics, University of Washington — Donor bound electrons in III-V semiconductors could provide a qubit with high optical homogeneity and strong optical transitions. The fundamental limit to their performance in quantum information devices is the electron spin flip time $T_1$. However, the specific mechanisms responsible for spin flips of donor bound electrons are not well understood. We have measured the spin flip time $T_1$ for electron spins bound to donors in GaAs and InP as a function of magnetic field and donor density in order to help elucidate the mechanisms responsible for spin flips. Measuring $T_1$ in this way probes the fundamental limits for using bound electrons in semiconductors for quantum information applications.

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