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Crystal orientation induced spin Rabi beat oscillations of point defects at the c-Si(111)/SiO_2 interface SEOYOUNG PAIK, SANG-YUN LEE, CHRISTOPH BOEHME, University of Utah — Spin-dependent electronic transitions such as certain charge carrier recombination and transport processes in semiconductors are usually governed by the Pauli blockade within pairs of two paramagnetic centers. One implication of this is that the manipulation of spin states, e.g. by magnetic resonant excitation, can produce changes to electric currents of the given semiconductor material. If both spins are changed at the same time, quantum beat effects such as beat oscillation between resonantly induced spin Rabi nutation becomes detectable through current measurements [1]. Here, we report on electrically detected spin Rabi beat oscillation caused by pairs of ^{31}P donor states and P_b interface defects at the phosphorous doped Si(111)/SiO_2interface. Due to the g-factor anisotropy of the P_b center we can tune the intra pair Larmor frequency difference (so called Larmor separation) through orientation of the sample with regard to the external magnetic field. As the Larmor separation governs the spin Rabi beat oscillation, we show experimentally how the crystal orientation can influence the beat effect.

[1] D. R. McCamey, et al. *Phys. Rev. Lett.* **104**, 017601 (2010).

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