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Real time electrical detection of coherent spin oscillations in silicon HANS HUEBL, Walther-Meissner-Institute, Bavarian Academy of Sciences and Humanities, FELIX HOEHNE, CHRISTIAN HUCK, MARTIN S. BRANDT, Walther Schottky Institut, Technische Universität München — In this presentation we demonstrate that the bandwidth of pulsed electrically detected magnetic resonance (EDMR) can be increased to at least 80 MHz using a radio frequency-reflectometry scheme based on a tank circuit and homodyne detection. Using this technique, we measure Rabi oscillations of phosphorus donors and Si/SiO₂ interface states in real time during a resonant microwave pulse. We find that the observed signal is in quantitative agreement with simulations based on rate equations modeling the recombination dynamics of the spin system under study. The increased bandwidth demonstrated opens the way to study faster spin-dependent transport processes and could therefore significantly broaden the range of spin systems studied by EDMR.

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