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High bandwidth EDMR detection H. HUEBL, L.H. WILLEMS VAN BEVEREN, R.P. STARRETT, D.R. MCCAMEY, A.J. FERGUSON, Centre for Quantum Computer Technology, University of New South Wales, Sydney — Several proposals discuss the realization of quantum computation with the help of the spin degree of freedom in semiconductors. Electrically detected magnetic resonance (EDMR) provides a well established tool to investigate spin states in semiconductors which was recently extended to investigate the spin dynamics of phosphorus donors in silicon. Typically, the detection bandwidth of EDMR is limited by the characteristic RC time constant of the sample. In this contribution we show that by embedding the sample in a LRC resonant circuit, a so-called tank circuit, it is possible to overcome this limitations. Here, we investigate a silicon MOSFET where the microwave magnetic field to induce the spin transitions is generated on chip by a shorted coplanar stripline[1]. We monitor the MOSFET resistance with a current preamplifier and in-situ by the response of the LRC resonant circuit and observe a spin resonance signature in both cases. Investigating the detection bandwidth by using frequency modulation of the microwaves applied indicates that the spin signature observed with the tank circuit is limited at the high end currently by the experimental setup. This shows that this method has the expected high bandwidth opening the view to faster phenomena in EDMR in a more direct manner. [1] Willems van Beveren et al., APL **93**, 072102 (2008)

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