

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Coherent control of the silicon-vacancy spin in diamond** BENJAMIN PINGAULT, DAVID JARAUSCH, CHRISTIAN HEPP, LINA KLINTBERG, University of Cambridge, JONAS BECKER, University of Saarland, MATTHEW MARKHAM, Element Six, CHRISTOPH BECHER, University of Saarland, METE ATATURE, University of Cambridge — Spin impurities in diamond have emerged as a promising building block in a wide range of solid-state-based quantum technologies. The negatively charged silicon-vacancy centre combines the advantages of the high quality of its photonic properties with a ground state spin which can be read out optically. However, for this spin to be usable in a quantum network, full quantum control is essential. Here, we report the measurement of optically detected magnetic resonance and coherent control of a single silicon-vacancy centre spin with microwave field. Using Ramsey interferometry, we directly measure a spin coherence time exceeding 100 ns at 4 K. Furthermore, we show that this coherence time is consistent with dephasing of the spin arising from phonon-mediated excitation to the upper orbital branch of the ground state. Our results make the spin a usable resource to establish the silicon-vacancy centre as a spin-photon interface.

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Date submitted: 11 Nov 2016

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