Single shot readout and entanglement of multiple nuclear spins in diamond

G. Waldherr[1], Y. Wang[1], S. Zaiser[1], M. Jamali[1], P. Neumann[1], and J. Wrachtrup[1]

[1] *3. Physikalisches Institut, Universität Stuttgart, Germany*

ABSTRACT

Increasing the number of long-lived, individually addressable qubits is one of the main challenges for building a scalable quantum computer. Therefore, initialization, readout and entanglement of all these qubits is required. Here, we demonstrate a small quantum register based on the nitrogen-vacancy defect (NV) in diamond at ambient conditions. We use three nuclear spins close to the NV electron spin, and perform single shot readout of these spins[1],[2]. Furthermore, entanglement of these spins is created and analysed by state tomography,

References

[1] Neumann, P. et al. Single-Shot Readout of a Single Nuclear Spin. Science 329, 542–544 (2010)

[2] Dréau, A. et al. Single-Shot Readout of Multiple Nuclear Spin Qubits in Diamond under Ambient Conditions. Phys. Rev. Lett. 110, 060502 (2013)