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# Quantum physics and information with spins in diamond

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## Abstract

The nitrogen vacancy (NV) center in diamond is a promising candidate to realize controlled extended multi-qubit quantum systems [1,2]. On the one hand, the NV electronic spin couples to photons making it possible to cool, prepare and read out the system. On the other hand, the NV electron spin couples to a bath of nuclear spins in the environment, providing multiple individual qubits to control as well a dissipative coupling to the bath to investigate.

In this talk I will introduce our control techniques and describe two recent experiments:

1 - quantum error correction based on projective multi-qubit measurements and real-time feedback [3] and

2 – the protection of multi-qubit states in quantum Zeno subspaces by introducing controlled decoherence channels [4].

These experiments highlight the interplay of coherent spin control and non-unitary interactions with the environment in quantum information experiments with spins in diamond.

W. Pfaff et al., *Science* **345**, 532 (2014)

T. H. Taminiou et al., *Nature Nanotech.* **9**, 171 (2014)

J. Cramer et al., arXiv:1508.01388 (2015)

N. Kalb et al., in preparation

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