

# Physikalisches Kolloquium

**Tim Taminiau, TU Delft**

**»Spins in diamond: from atomic-scale imaging to quantum networks«**

*Einführung: D. Hunger*

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Abstract: Spins associated with defects in diamond provide promising quantum bits for a variety of applications in quantum science and technology. In particular, the combination of long-lived spin states and a link to optical photons enables new opportunities for quantum sensing, quantum computation and quantum networks.

In this lecture, I will introduce spins in diamond and discuss our latest results on controlling large clusters of spins associated to a single nitrogen-vacancy (NV) center in diamond. I will show that such clusters can be used as small quantum processors with up to 10 quantum bits, and that these quantum bits provide extremely good quantum memories with coherence times up to 1 minute [1]. Furthermore, I will discuss how we can image the complex spin environment of a single NV with atomic-scale resolution [2]. These results provide new opportunities for quantum networks, as well as for imaging complex spin structures, such as individual molecules.

[1] Bradley et al., arXiv:1905.02094 (2019).

[2] Abobeih, et al., arXiv:1905.02095 (2019).

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**Freitag, 29.11.2019, 15:45 Uhr,**

**KIT, Campus Süd,  
Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).  
Anschließend Nachsitzung.**