

Physikalisches Kolloquium

Oliver Benson, HU Berlin

»Defect Centers in Diamond for Quantum Applications:
Prospects & Problems«

Einführung: M. Wegener

Defect centers in diamonds have been studied extensively in the last years [1]. They represent single photon sources with stable operation even at room temperature. Additionally, their spin state provides a long decoherence time and can be controlled and read-out optically.

In this talk we focus on nitrogen vacancy (NV) centers in nanocrystalline diamond. First, we introduce basic properties of nanodiamonds and introduce a method to assemble fundamental nanophotonic devices [2]. Then, we report on a novel material platform based on direct laser writing in polymers which allows for fabrication of arbitrary three-dimensional quantum photonic structures [3].

In a second part of the talk we discuss decoherence of the electronic states in NV centers, which is crucial for possible applications in quantum information processing [4]. Finally, we show how a scanning probe can be functionalized with a nanodiamond to perform three-dimensional lifetime imaging with a single quantum emitter.

[1] F. Jelezko, and J. Wrachtrup, *Phys. Stat. Sol. A* **203**, 3207 (2006); I. Aharonovich, A. D. Greentree and S. Praver, *Nature Phys.* **5**, 397 (2011).

[2] O. Benson, *Nature* **480**, 193 (2011).

[3] A. W. Schell, et al., *Scientific Reports* 3:1577, 1-5 (2013)

[4] J. Wolters et al., *Phys. Rev. Lett.* **110**, 027401 (2013); J. Wolters, et al., *arXiv:1301.4544*

Freitag, 29.11.2013, 17 Uhr c.t.,

KIT, Campus Süd,

Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).

Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“