

Einladung zum  
Laser- und Quantenoptikseminar

**Am Freitag, 05.05.2017, um 10:00 Uhr**

**Raum 46-387/388**

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**Color centers in diamond: artificial atoms  
for quantum information and sensing**

Individual, optically active impurities in diamond, i.e. color centers, are stable atom-like, solid-state quantum systems. Nitrogen vacancy (NV) centers provide electronic spins that allow for coherent manipulation using microwaves and read-out using confocal laser fluorescence microscopy even for single centers. Due to their atomic size and coherent spins, individual NV centers form nanoscopic quantum sensors for e.g. magnetic fields and optical near fields. Using scanning probe techniques, NV centers in single crystal diamond probes [1] can interact in a spatially controlled way with their environment e.g. detecting magnetic fields of nanoparticles [1] or in superconductors [2]. To harness the full potential of NV based sensing, incorporation into well selected nanophotonic structures is mandatory [3,4] to enable scanning probe operation as well as efficient fluorescence collection. Moreover, NV centers are susceptible to crystal strain and are thus potential candidates for spin based hybrid spin-oscillator systems for quantum information [5].

[1] P. Appel et al., Rev. Sci. Instr. 87, 063703 (2016)

[2] L. Thiel et al., Nature Nanotechn., 11, 677–681 (2016)

[3] E. Neu et al., Appl. Phys. Lett., 104, 153108 (2014)

[4] R. Nelz et al. Appl. Phys. Lett., 109, 193105 (2016)

[5] A. Barfuss et al., Nature Physics 11, 820 (2015)

Der Gast wird betreut von Prof. Dr. A. Widera

**GÄSTE SIND HERZLICH WILLKOMMEN!**