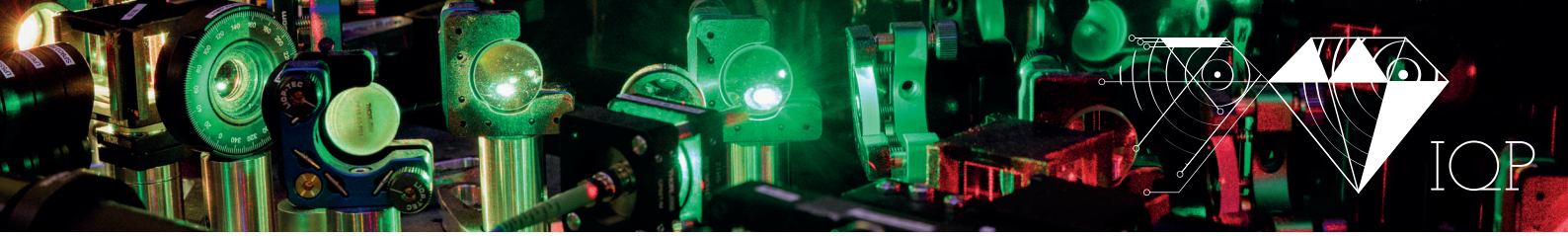


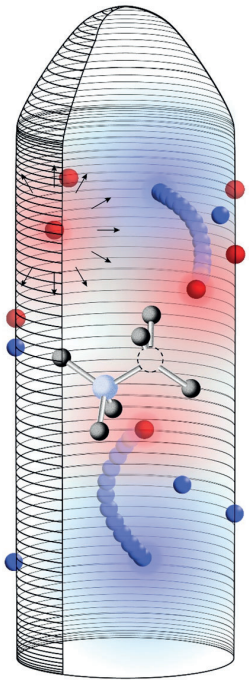
Master Thesis

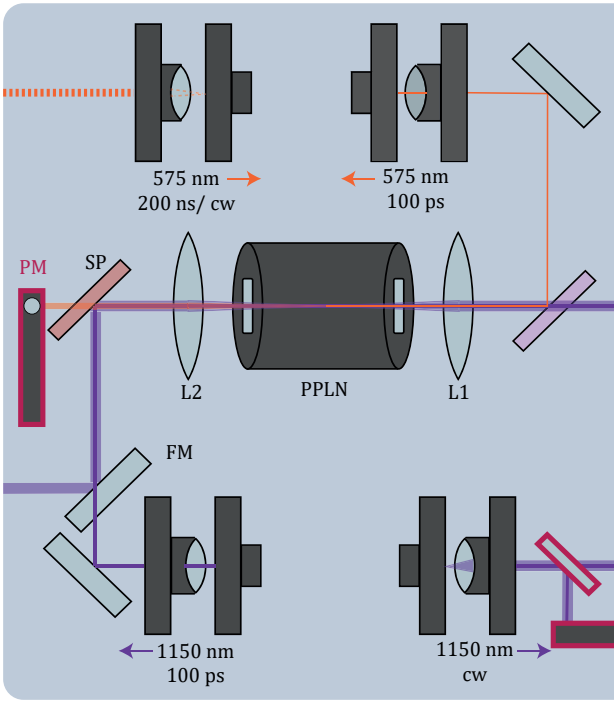
Low-noise charge state initialization of a diamond color center

Spin-photon interfaces form essential building blocks of proposed quantum communication networks. The nitrogen-vacancy color center in diamond is an especially promising candidate due to its remarkably long spin coherence time. However, a challenge that remains is the limited spectral stability caused by Stark shift-inducing charge fluctuations in a solid-state system like diamond. Off-resonant green laser pulses (≈ 530 nm) used to reset the negative charge state (NV^-) of the NV center are a major catalyzer of the electric field noise. Yellow resonant excitation (575 nm) of the neutral charge state NV^0 instead has been demonstrated to greatly improve spectral stability.

The scope of the proposed Master thesis project includes

- construction of a 575 nm yellow laser source via frequency-doubling of a 1150 nm infrared laser
- pulsing of the lab-built light source with an acousto-optic modulator
- resonant absorption spectroscopy of the NV^0 resonance
- calibration of the resonant charge-state repump mechanism.





We in the Integrated Quantum Photonics Group offer a welcoming research atmosphere that allows new members to get acquainted with the necessary physics background quickly. In addition to personal supervision by a group member, you will have the chance to present the status of your project regularly within the group to get feedback and guidance.

Contact

Kilian Unterguggenberger - **kilian.unterguggenberger@hu-berlin.de** - or
Prof. Tim Schröder - **tim.schroeder@physik.hu-berlin.de** -
for more information.

hu.berlin/iqp

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UNIVERSITÄT
ZU BERLIN