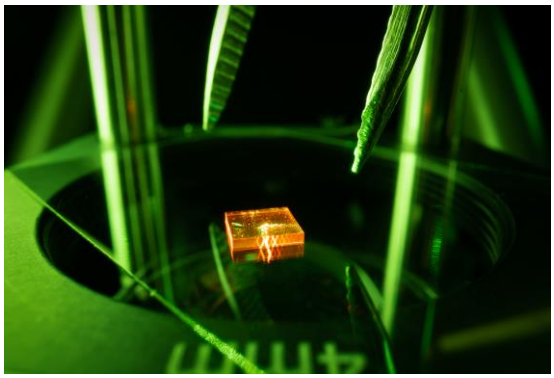
Open Ph.D. or postdoctoral positions for NV-diamond based NMR available

The research group "Biomolecular Quantum sensing" at the Technical University of Munich and member of the Munich Center for Quantum Science and Technology (MCQST) is inviting applications for a Ph.D. or postdoctoral position.



In recent years, spin defects in diamonds have been shown to act as atomic-sized sensors for nanoscale- microscopic magnetic field detection. One highly promising direction NV-based nano- and microscale nuclear magnetic resonance (NMR) spectroscopy. In our lab, this quantum sensor based NMR spectroscopy is applied to life sciences as well as chemistry and physics-based applications (www.bucherlab.org). We are currently exploring two different directions with two open positions:

1) **Surface NMR spectroscopy**. Recently we have applied NV-centers for probing chemistry at surfaces and interfaces [1]. We want to strengthen this research direction by i) developing a second generation of NV-based NMR spectrometer and ii) applying it to material/energy conversion and/or bioanalytical applications.
Qualifications. The highly motivated candidate should have expertise in solid-state NMR-, NQR-, EPR-spectroscopy or NV-quantum sensing and be interested in technology development.

2) **Single-cell NMR spectroscopy.** Our group aims to develop NV-based NMR spectroscopy on the single-cell level [2, 3] within an ERC starting grant. In order to achieve the necessary sensitivities, i) hyperpolarization methods must be applied, and the NV-NMR detection must be improved. In the project, these technological developments will be combined with applications in single-cell biology.
Qualifications. The highly motivated candidate should have expertise in hyperpolarization methods (DNP; PHIP, Overhauser etc.) and/or in hands-on NMR or NV-hardware development (magnet, RF, etc.)

The positions are located at the Technical University of Munich (Chemistry Department) and is integrated into the Munich Center of Quantum Science and Technology. TUM is an equal opportunity employer. Qualified women are therefore particularly encouraged to apply.

To apply, email a motivation letter, CV, and contact information for two references to Dominik Bucher (Dominik.Bucher@tum.de).

More details on the previous development of this project can be found in the following references:

[1] Surface NMR using quantum sensors in diamond, *PNAS*, **119** (5) e2111607119 (2022)

[2] Hyperpolarization-enhanced NMR spectroscopy with femtomole sensitivity using quantum defects in diamond. *Physical Review X* **10,** 021053 (2020)

[3] High-Resolution Magnetic Resonance Spectroscopy Using a Solid-State Spin Sensor, *Nature* 555, 351-354 (2018)