



Opportunities
for Talents

TUM

Technische Universität München

The **Emmy-Noether research group on quantum sensing at the Walter Schottky Institute of TU Munich** invites applications for a

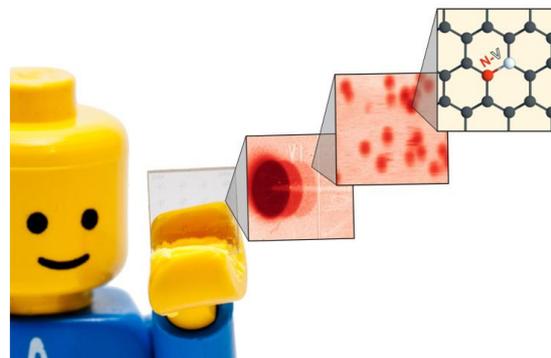
PhD position

within the EU Marie Skłodowska-Curie training network Spin-Nano.

The group

The quantum sensing group is a newly established research group at the Walter Schottky Institute of TU Munich. Its research focuses on quantum sensors and their applications.

Its core tool is the nitrogen-vacancy (NV) color center, a color defect in diamond, which can act as an atomically small detector for electric and magnetic fields. One highlight result of this work has been the detection and spectroscopy of nuclear spins in a few nm small volume^{1,2}, which could pave the way towards magnetic resonance imaging (MRI) of single molecules. More information can be found on our website <http://tinyurl.com/reinhardlab>.



A sensor chip of our experiments (held by the lego man). Single NV centers are visible under a microscope (red dots). Each of them is an atomically small sensor for magnetic fields.

Your project

You will spearhead one essential step to take nanoscale quantum sensing from a proof-of-principle experiment to serious scientific applications. Specifically, this could be work on one of the following topics

- Electric readout of NV centers by advanced electronics and laser excitation protocols.
- Microscale imaging experiments employing ensembles of NV centers for NMR microscopy or imaging of neural action potentials.
- Development of advanced quantum protocols for sensitive detection, polarization and atomic resolution imaging of electron and nuclear spins.

Technically, your work will involve the design and construction of optics and electronics, clean room fabrication and software development, as well as theory and simulation work on spin dynamics and quantum information. Experience in these areas is a benefit, but secondary to motivation and commitment.

You will join and shape a young group and an emerging field of research.

Your application

To qualify for this position you need to fulfill the EU mobility criteria. You may be of any nationality, but you must not have lived in Germany for longer than 12 months within the past three years.

TUM is an equal opportunity employer and will apply affirmative action according to German law.

Applications should be sent to friedemann.reinhard@wsi.tum.de. Please include a motivation letter, your CV, a copy of your most recent thesis and a transcript of grades of your most recent diploma.

¹T. Staudacher et al., Science **339**, 561;

²H. J. Mamin et al., Science **339**, 557