

PhD position in quantum sensing

The development of quantum metrology /sensing tools require new materials and new principles of operation. In these regards, the nitrogen-vacancy (NV) optical center in diamond is one of the most promising spin system for quantum sensors, applicable for magnetic field measurement, and which offers a unique combination of sensitivity at the atomic level, sub-nanometer spatial resolution and versatility of operation in a wide range of temperatures and environmental conditions.

The potential of NV sensing in the field of scanning microscopy has been demonstrated in the pioneering work at the 3rd Physics Institute of the University of Stuttgart, who is one of the world's leader for quantum technologies, especially in the field of high-resolution quantum sensors. The recent advances in this field have been promoted also in collaboration with Qnami in Basel (CH), who develops and commercializes NV-based quantum microscopes. The key experiments for NV sensing have already gained crucial knowledge about superconducting and new types of 2D magnetic materials which hold the promise to revolutionize the fields of 2D electronics and quantum computing. However, further advances in understanding such materials still require optimization of the NV sensing technology. In particular, one of the challenges so far is related to the performance limits and stability of the NV sensors operated under extreme conditions of cryogenic environment.

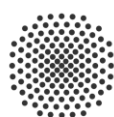
It is planned to achieve these goals through further development of the underlying diamond material technology, with particular focus on epitaxial growth /in-situ doping, ion implantation, material structuring and surface processing.

The focus of this project is to leverage such techniques to stabilize the charge carrier state of the NV center during operation at low temperatures and allow for a robust failure analyses tool for relevant magnetic materials. As the PhD candidate, you will work within the [“Zukunftscluster QSens”](#) with two partners that bring complementary expertise in the commercialization and development of such diamond sensors from Qnami, and in the pioneer use of scanning NV microscopy in the analysis of magnetic materials from the University of Stuttgart.

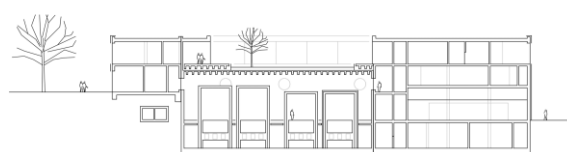


Qnami is a magnet for talents looking to join the quantum revolution at the pulse. Multicultural, open-minded, and highly-skilled, we come from all over the world and have a deep passion for our work. Both business and scientific minded, each of us contributes with our unique skills plus a strong work ethic and enthusiastic spirit.

Qnami develops and commercializes applications of [NV Quantum Sensors](#) (Nitrogen-Vacancy), leveraging proprietary technology and unique know-how. Our first commercial product, the Qnami [ProteusQ](#) is a complete



University of Stuttgart
Center for Applied Quantum Technology

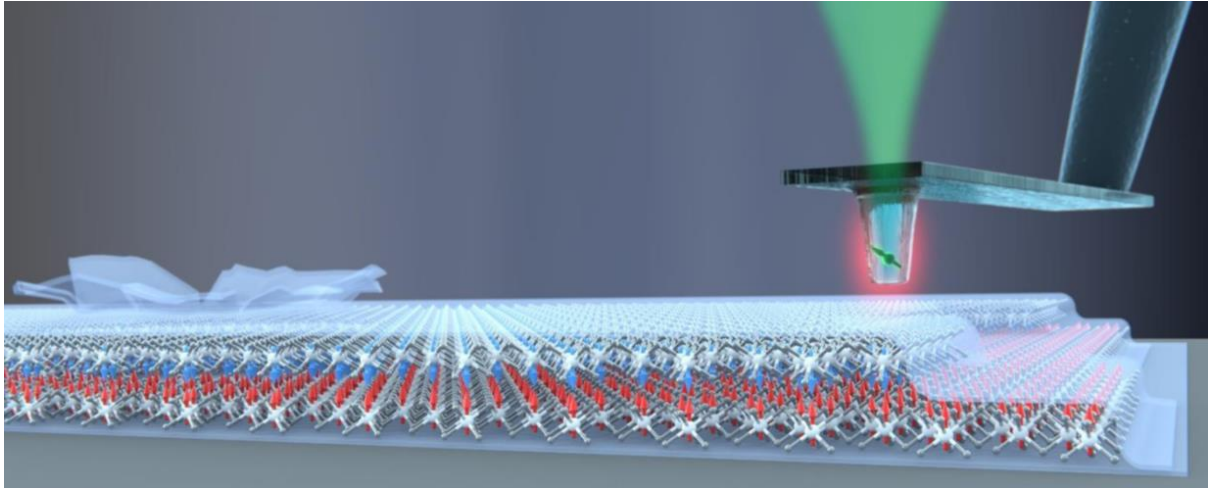


The 3rd Physics Institute of the University of Stuttgart is one of the world's leading institutes for quantum technologies, especially in the field of quantum sensors with high spatial resolution. We operate four NV scanning probe microscopes, one at room temperature, one at helium temperature in an exchange gas cryostat and one in a helium UHV cryostat.

In recent years, preliminary work in the field of superconducting materials as well as new types of 2D magnetic materials such as CrBr_3 and CrI_3 have been successfully completed with these

quantum microscope. It is the first scanning NV microscope for analysis of magnetic materials at atomic-scale, and features state-of-the-art electronics and software, as well as cutting edge diamond quantum sensors.

setups. In addition, a lot of work has been done to develop and improve NV scanning probe microscopy.



Interested in the position? Please send us an email with you CV and motivation letter!

Contact:

3. Physikalisches Institut:

Dr. Rainer Stöhr, rainer.stoehr@pi3.uni-stuttgart.de

Prof. Jörg Wrachtrup, j.wrachtrup@pi3.uni-stuttgart.de

Qnami:

Dr. Felipe Favaro de Oliveira, f.favaro@qnami.ch