
Quantum Sensing Group

(Mgr. Tomáš Šikorský, PhD)

The group specialises in the development of **quantum sensors based on nitrogen-vacancy centres in diamond, atomic defects whose quantum state can be initialised by a laser pulse and subsequently read via fluorescence**. A significant benefit of these centres is their robustness, which enables them to retain their quantum properties even at ambient temperature and without the requirement for vacuum apparatus.

The team's research is centred on the development of pulse protocols for high-sensitivity magnetometry, the nanofabrication of diamond photonic nanostructures, and the construction of a compact platform for microscopic NMR. The objective of the former is to enhance sensor sensitivity by disrupting the planar symmetry of the surface, while the latter enables the detection of chemical composition without the need for superconducting magnets.

The researchers have been working in collaboration with the **Myfab group at Uppsala University** and with **Carlos III University in Madrid**, as well as with Professor Alexander Kromka at the **Institute of Physics of the Czech Academy of Sciences** in the CVD, on the growth and nanofabrication of diamond samples.

Tomáš Šikorský has been building his own quantum sensing group at the Faculty of Mathematics and Physics of Charles University as part of the **PRIMUS program**. He was employed at the **Vienna University of Technology**, where his research concentrated on laser spectroscopy of the thorium-229 atomic nucleus in a crystal matrix. The project resulted in the inaugural creation of a nuclear clock. He obtained his Ph.D. at the **Weizmann Institute of Science in Israel**, specialising in the field of experimental quantum information processing.