

Diamond based quantum sensors

Fedor Jelezko

*Institute of quantum optics, Ulm University
fedor.jelezko@uni-ulm.de*

Synthetic diamond has recently emerged as a candidate material for a range of quantum-based applications including quantum information processing and quantum sensing. In this presentation we will show how single nitrogen-vacancy (NV) colour centres can be created close to the diamond surface can be employed as nanoscale sensors of electric and magnetic fields. We will show nanoscale NMR enabled by single NV centres and discuss sensitivity and spectral resolution limits of nanoscale NMR. We will also discuss applications of NV centres for hyperpolarisation of nuclear spins and application of optical spin polarisation in MRI.