Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Magnetic Field Sensing Using NV Centres In Diamond

Phani Kumar Peddibhotla

IISER, Bhopal

Several magnetic field measuring instruments have been developed over the past few decades, such as optically pumped magnetometers, superconducting quantum interference devices (SQUID), Hall effect magnetometers and magnetic resonance force microscopy (MRFM) devices. However, their utility is typically limited by low spatial resolution and high technical complexity. Recently, nitrogen-vacancy (NV) centre-based scalar and vector magnetometers have gained tractability as they can be operated at ambient conditions. The NV centre is a fluorescent defect in diamond, whose spin state can be optically initialised and measured at room temperature [1]. Its magnetic sensing properties are enabled by spin-dependent photoluminescence and spin-manipulation via electron spin resonance by microwave radiation. Recent studies have shown that it can also be used as an atomic-scale probe of the charge and strain environments intrinsic to the diamond lattice [2-4]. In this talk, I'll discuss our high-resolution microwave spectroscopy studies using single NV centres in diamond for magnetometry applications.

References:

1. R. Schirhagl et al, Annual Reviews in Physical Chemistry, 2014, 65, 83.
2. P. Peddibhotla et al, Nano Letters, 2017, 17 (3), 1496.
3. T. Mittiga et al, Phys. Rev. Lett. 121, 246402 (2018).
4. Shashank Kumar et al, 2023 Quantum Sci. Technol. 8 025011.

Tuesday, Jul 2nd 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H