SPM based on diamond defect centers for nano-scale spin physics

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Probing and imaging magnetism at nanometer scale with high field sensitivity is of great interest in a wide range of fields, including solid-state physics, materials science and biomedical applications. In this talk, I will introduce a novel scanning magnetometer based on nitrogen-vacancy (NV) defect center in diamond. The diamond NV center has promising potential for nanometer and nanotesla magnetometry due to its atomic-scale size, long spin coherence times and high magnetic field sensitivity (e.g. < nT/Hz1/2). Since these properties are robust against a wide range of operating temperature, it is also suitable for studying novel magnetic materials exhibiting temperature-dependent magnetic orders. I will present basic working principle of the system and examples of imaging magnetic samples including room temperature skyrmion.