

Quantum sensing with solid-state spins in diamond

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Sensing environment parameters with nanometer scale resolution is gaining importance in many scientific and technological applications, including bio-medical and novel material investigations. In this talk we present time-resolved nanoscale sensing of temperature and magnetic fields utilizing nitrogen vacancy (NV) centers in diamond. We first present measurement of spatiotemporal temperature field of semiconductor nano-membranes under laser heating, for the studies of microscopic, nonclassical thermal transport. Next we present sensing of microwave fields, and transient nutation decay method and the conventional magnetic resonance method are compared. We will present the most recent results and discuss the possible underlying microscopic mechanisms given by the measurements.