

## Nanoscale Quantum Sensing

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### **Abstract:**

The accuracy of measurements is limited by quantum mechanics. Ingenious demonstrations, like measuring gravitational fields or time have explored accuracy limits and reached fundamental obstructions. Yet, precision measurements so far are restricted to macroscale and dedicated environments. In the talk I will discuss spin quantum sensors comprising a single electron spin plus a nuclear spin quantum register which function under environmental conditions. With such a system we measure a variety of quantities including electric and magnetic fields, temperature, and force. We use nuclear spins to enhance the measurement accuracy of the electron spin e.g. via quantum error correction, as ancillary quantum bits for memory or quantum Fourier transformation. I will present a variety of applications ranging from fundamental science to imaging of biological tissue.