Multiparameter quantum sensing with nanoscale resolution

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Abstract

Spin defects in wide band gap semiconductors enable quantum sensing with a spatial accuracy of a few nano meter. This leads to a variety of intriguing applications in material- as well as bio science. It turns out, that the sensor spin is sensitive to a number of external parameters and that dedicated Hamiltonian engineering renders the system sensitive to a particular quantity, like e.g. temperature while it stays insensitive to others, like e.g. magnetic fields. The talk will demonstrate sensing of various quantities and discuss the enhancement of sensor performance by using ancilla quantum bits for signal processing.