

Quantum technology with spins

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Abstract

Spins in wide band gap semiconductors are a leading contender in various areas of quantum technology. Most notably they have been established as a novel tool for nanoscale sensing, major hardware for long distance quantum entanglement, as well as small scale quantum registers for quantum computing. I will present the use of spins in in those areas [1,2,3]. Specifically, I will discuss quantum sensing with spins to investigate magnetism in 2D materials including the investigation domain patterns [4] and Moiré structures in twisted 2D layers. Here the nitrogen vacancy center in diamond is used to probe and image electronic magnetism in mono- and multilayers of materials like CrBr₃. By using dedicated measurements strategies based on quantum algorithms one can enhance the performance of those quantum sensors to achieve better signal quality and improve the spectral resolution in those measurements. [5].

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 - [3] N. Chejanovsky et al. Nature Mat. 20, 1079 (2021)
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