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Quantum physics with small diamond spin clusters

JOERG WRACHTRUP, University of Stuttgart

Diamond spins are an ideal test bed for exploring quantum physics of few well controllable qubit systems. Defect center electron spins show strong coupling to a light field and at the same time interact with few surrounding nuclei in the lattice. As a result the system usually constitutes a few qubit system with excellent coherence and controllability even at room temperature. It fulfills all characteristics of a quantum register including single shot read-out capability. The talk will highlight how to use such systems for carrying out quantum algorithms which might be even usable for sensing applications.