NV Centers : Decoherence and Noise

Maud Barthélemy & Natasja Jovanovic

Abstract

A key challenge of quantum computing is to deal with decoherence by the environment. The most promising remedy is to use dynamic decoupling. In this presentation, we will consider a specific hybrid system, the NV center, which is a 2-qubit system composed of an electron and a nuclear spin. A decoherence-protected quantum gate can be realized by decoupling the electron spin from the environment causing the decoherence, while keeping the entanglement between the two qubits. This technique allows to construct any gate. In particular, the CNOT gate is implemented and reaches high-fidelity results, even with stronger induced decoherence.