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Abstract

Quantum repeater is one of the key elements to realize long distance quantum communication. In the heart of a quantum repeater is quantum memory. There are a few requirements for this memory: it needs to couple to flying qubits: photon ; it needs to have long coherence time, so quantum error correction algorithm can be performed in the quantum repeater nodes; it needs to be stable under optical illuminations. Nitrogen nuclear spin is available for every nitrogen vacancy center(NV) in diamond. Besides it can be a robust quantum memory for spin qubit operation, nitrogen nuclear spin can couple to photon by taking advantage of optically resonant excitation of spin-selective transitions in low temperature. Here we demonstrate the coherent storage of quantum information from photon into nuclear spin. We show this quantum memory fulfills requirements as quantum memory for quantum repeater. Coherent time beyond 10 seconds is measured in C^{13} natural abundant sample.

About the Speaker

Sen Yang graduated from Tsinghua University in 2002, and got his Ph.D. from University of California, San Diego. He did postdoc in UT Austin and Uni Stuttgart. In 2016, he joined the Chinese University of Hong Kong as an assistant professor.