

# A Spin Qubit Coupled to a Collective Nuclear Quantum Register

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Semiconductor quantum dots possess state-of-the-art single photon emission, making them highly attractive for quantum network applications. Their adoption as quantum nodes has however been limited by their lack of ancillary quantum registers. In this talk, I will present recent advances in realizing a many-body quantum register from the  $\sim 10^5$  nuclear spins that constitute a quantum dot. In particular, I will highlight the transformative nature of the homogeneous nuclear environment provided by recent lattice-matched GaAs quantum dots.