

Physics Colloquium

Dr. Claire Le Gall

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“Collective Phenomena in QD Nuclear Spin Ensemble”

Friday, April 30, 2021

2:30pm—3:30pm

Zoom link: <https://virginiatech.zoom.us/j/96084996911>

A coherent ensemble of spins interfaced with a fully controllable proxy qubit is an attractive platform to generate many-body entanglement and study out-of-equilibrium dynamics in a complex quantum system. Semiconductor quantum dots are a physical realization of such a toy system, where the electron spin can be operated both as a control and a probe over the dense ensemble of nuclear spins within the QD. This talk will introduce how we can engineer all-optically a “flip-flop” interaction term between the electron and the nuclei and control the interaction strength. Further, I will present our latest experimental progress on manipulating and characterizing the nuclear spin state, specifically the manifestation of sub-radiance in optically tailored polarized nuclear states.