ICFO

SEMINAR: Spin Noise Spectroscopy of a single charge using single photons

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15:00 to 16:00
Seminar Room

Self-assembled semiconductor quantum dots (QDs) are deterministic single photon emitters with exceptional high indistinguishability and brightness [1]. A single charge may be injected in the QD, turning this platform into a spin-photon interface. Such interfaces enable the deterministic interaction between the spin qubit embedded in the quantum dot (stationary qubit) and single photons (flying qubits), constituting the basis for optical quantum gates [2]. Following this scheme, spin-photon entanglement [3], distant spin-spin entanglement [4] and multi-partite photonic cluster states [5] have been demonstrated. However, short spin coherence times in the order of 1-10ns [6] strongly limit the entanglement fidelity and the interest of this platform for real-world applications. Overcoming this limitation and exploiting the potential of this platform as a fast and highly efficient spin-photon interface requires a thorough understanding of the noise mechanisms present in the solid state [7]. In this presentation, I introduce a novel technique to perform spin noise spectroscopy measurements with unprecedented sensitivity, paving the way for ultrafast measurements of the spin dynamics.

Hosted by: Prof. Dr. Hugues de Riedmatten