Integrated quantum photonics with solid-state quantum emitters

Abstract:
Future quantum information processing would rely on solid-state quantum systems that integrate multiple quantum emitters, waveguides, beamsplitters, and detectors on the same chip, and therefore all quantum operations are efficiently possible on-a-chip. Solid-state quantum emitters have attracted much attention as a source of both photonic and spin qubits. Integrating these artificial atoms onto nano-photonic structures or photonic circuits offers a new possibility for achieving efficient quantum interaction such as two-photon quantum interference, atom-mediated photon-photon interaction, and photon-mediated atom-atom interaction on-a-chip. In this seminar, I present recent researches on hybrid quantum photonic systems that involve multiple quantum emitters and their linear/nonlinear quantum interactions on-a-chip.