Contribution ID: **13** Type: **not specified**

Strong hole spin-photon coupling in silicon

Monday 29 August 2022 10:15 (25 minutes)

Recently, hole spins in silicon and germanium have shown increasing interest for quantum information processing owing to the advantage of manipulating their state with electric instead of magnetic microwave fields. This is possible due to the strong spin-orbit interaction intrinsically present in the valance band of these materials. Spin-orbit coupling offers as well the possibility to couple a hole spin to the electric field component of a microwave photon. Here we show a strong hole spin-photon interaction on a CMOS compatible platform. We find a coupling strength up to 330 MHz, accompanied by a cooperativity reaching 1600. Moreover, the dominating Rashba spin-orbit coupling allows us to tune the spin-photon coupling strength by more than one order of magnitude by simply varying the magnetic field orientation with respect to the spin-orbit field. This largely coupled spin-photon system opens the door to the achievement of high-fidelity two qubits gate with distant spins.

Presenter: YU, Cécile (CEA-IRIG)

Session Classification: Qubit connectivity and architecture