**Thomas Ihn (ETH Zurich)**

**Title: Coherent spin-photon coupling using a resonant exchange qubit**

**Abstract:**

Coherent coupling of long-distance spins is a crucial step towards quantum information processing with spin-qubits. We use a circuit quantum electrodynamics architecture to demonstrate strong coupling between a single microwave photon in a high impedance NbTiN cavity and a three-electron spin-qubit in a GaAs triple quantum dot. We resolve the vacuum Rabi mode splitting with a coupling strength of 31 MHz and a qubit decoherence rate of 20 MHz. The spin-qubit is formed by exchange interaction, which naturally couples spin and orbital degrees of freedom. We can directly access the amount of spin-charge coupling electrostatically. This allows us to tune both the qubit-photon coupling strength as well as the qubit decoherence. From dispersive two-tone spectroscopy measurements we extract a minimum qubit decoherence rate of 9 MHz for a coupling strength of 18 MHz. We also observe an ac Stark shift of the qubit frequency, which allows us to calibrate the number of photons in the resonator and gives direct access to the qubit-photon coupling strength.