

Andrés Rosario Hamann, PhD, University of Queensland, Australia

QSIT talk at ETH Zurich, 14. June 2018, 10:30 am

HPF G 6 seminar room

Title:

Nonreciprocity realized with quantum nonlinearity

Abstract:

Nonreciprocal devices are a key element for signal routing and noise isolation. Rapid development of quantum technologies has boosted the demand for a new generation of miniaturized and low-loss nonreciprocal components. In this talk, I will present our results on how to use a pair of tunable superconducting artificial atoms in a 1D waveguide to experimentally realize a minimal passive nonreciprocal device. Taking advantage of the quantum nonlinear behavior of artificial atoms, we achieve nonreciprocal transmission through the waveguide in a wide range of powers. Our results are consistent with theoretical modeling showing that nonreciprocity is associated with the population of the two-qubit nonlocal entangled quasi-dark state, which responds asymmetrically to incident fields from opposing directions. Building on this, I will finalize by presenting an extension to our experiment allowing for stabilized entanglement between the two artificial atoms.