

Session 6: Non-equilibrium: localization and entanglement

Speaker: Ana Laura Gramajo

Affiliation: ICTP

Title: Non-equilibrium dynamics and entanglement in strongly driven coupled-qubits

Abstract: We investigate the dynamics of superconducting (SC) qubits driven by strong harmonic external fields, focussing on the effects of noise, the generation of entanglement, and their application as quantum simulators. The effects of environmental noise are addressed using the Floquet-Markov master equation applied to the Landau-Zener-Stückelberg interferometry. We present a new mechanism for the generation of steady-state entanglement, which can be tuned as a function of the driving amplitude. We have also experimentally implemented a quantum simulator to study mesoscopic effects (weak localization) using coherent scattering at an avoided crossing in a system of two coupled SC-qubits. The scattering events are controllably implemented as Landau-Zener transitions by driving the two-qubit system multiple times through an avoided crossing. These results demonstrate how a well-controlled driven qubit system can be used to study complex effects in mesoscopic physics.
