



Dr. Juan Polo

Doctor

Technology Innovation Institute

Talk Title: Quantum solitons as a resource for atomtronic interference devices

Abstract: I will present our latest results involving an Atomtronic quantum device based on quantum solitonic particles trapped in an optical lattice. We focus on the metrologic aspect of this mesoscopic quantum system to develop a new type of quantum sensor that can harness the strong correlations of solitonic particles. We first discuss the fractionalization of the elementary flux quanta and show that by including a weak link, in analogy to the famous superconducting quantum interference device (SQUID), one can prepare a qubit state that displays Rabi-like oscillations between different angular momentum states. Finally, I will present a showcase measurement protocol, based on a Ramsey-like measurement, that is able to read-out the Rabi oscillations of the qubit state.