SEMINAR: Dispersive Readout: Improvement at High Driving and Hamiltonian Learning Application

LUCIANO PEREIRA

October 09, 2026
09:30 to 10:30
Yellow Lecture Room 247

Abstract:
Dispersive readout is the standard strategy to measure superconducting qubits. The qubit is coupled to a highly detuned resonator, which allows the implementation of strong non-demolition or weak continuous measurements. In this talk, I will present two results based on dispersive measurements. First, we show that at strong driving, the readout is limited mainly by a measurement-induced rotation of the qubit [1]. Rotating the qubit into the measurement basis turns dispersive readout into longitudinal readout, which remains quantum non-demolition even at strong driving. Second, we use continuous dispersive measurements to reconstruct time-dependent Hamiltonians for many-qubit devices, with rigorous error bounds and sample complexity guarantees [2].

[1] Coherent correction of dispersive qubit readout at strong drive: Ideal longitudinal readout in a rotated basis, L. Pereira, J. J. Garcia-Ripoll, T. Ramos, in preparation.
[2] Rigorous Time-dependent Hamiltonian Learning via Continuous Weak Measurements, J. Jimenez-Rodriguez, G. Franceschetto, A. Acin, and L. Pereira, arXiv:2607.16047 (2026).

Hosted by: Prof. Dr. Oriol Romero-Isart