



# Condensed Matter Theory Center Seminar

**David Marcos**

(CSIC, Madrid)

Monday, March 8

10:00 AM-11:30 AM

2202 Physics Building

## **“Noise Correlations and Coherent Coupling in Solid State Qubits”**

In this seminar I will present recent advances in the fields of quantum transport and hybrid quantum systems. The former has incorporated a theory of counting statistics to investigate high-order current correlations through nanoscopic conductors. These can reveal valuable information such as coherence times and phase transitions. In particular, I will apply the theory to investigate the fluctuation-dissipation theorem in situations out of equilibrium and also show how a non-Markovian description becomes essential to study quantum noise. In the second part, I will review some proposals that combine solid-state and quantum-optics systems in the context of quantum information processing. I shall present a hybrid system consisting on a flux qubit coupled to an ensemble of NV centers in diamond. At high densities coherent transfer between both systems becomes possible, and therefore this opens the possibility of interfacing superconducting qubits with light.