Title: Realization and measurement of superradiant phases in circuit QED

Abstract: Circuit QED provides a flexible framework for the quantum simulation of generic theoretical models. The interaction between artificial Josephson atoms and transmission line resonators can be tuned into the ultrastrong coupling regime, where superradiant phases appear in the ground state of the system. By exploiting the coupling to both field quadratures, one can control the symmetries of the model, and realize the double-chain Dicke model [1], or the exact Tavis-Cummings model [2]. We proposed a measurement protocol to detect the superradiant ground state of these systems by spectroscopy of an ancillary qubit weakly coupled to the resonator mode [3].