

Chez Pierre

Presents ...

Friday, May 15, 2015

10:30am

MIT Room 4-331



Special Friday Chez Pierre Seminar

Michel Devoret

Yale University

“Coherent suppression of quasiparticle dissipation in a Josephson junction.”

Brian Josephson predicted fifty years ago that electrons and holes tunneling across a Josephson junction could interfere destructively, with the result that their dissipative effect would be suppressed. We have been able to measure this spectacular superconductivity effect in a fluxonium artificial atom, which we place in an extremely low loss environment and measure using radio-frequency dispersive techniques. Furthermore, by using a quantum limited amplifier (a Josephson Parametric Converter), we can observe quantum jumps between the 0 and 1 states of the qubit in thermal equilibrium with the environment. The distribution of the times in-between the quantum jumps reveals quantitative information about the population and dynamics of quasiparticles. The data is consistent with the hypothesis that our system is sensitive to single quasiparticle excitations, which opens new perspectives for quasiparticle monitoring in low temperature devices.