

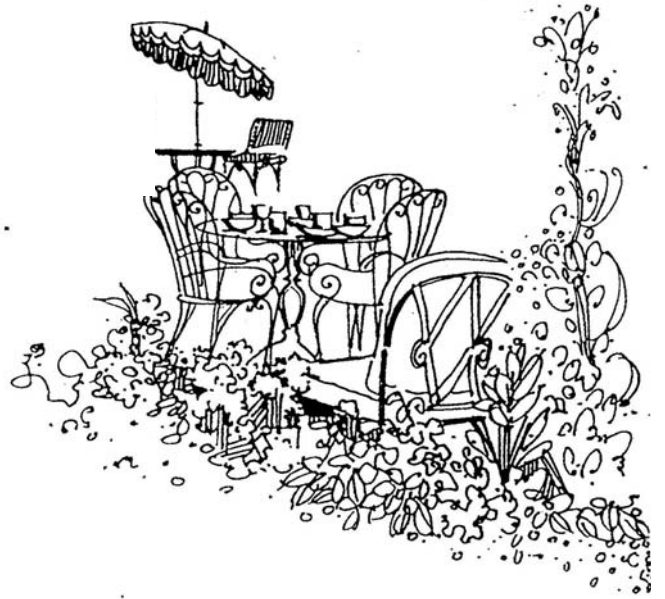
Chez Pierre

Presents ...

FRIDAY, September 26, 2008

12:00pm

MIT Room 4-331



Rob Schoelkopf
Yale University

“The Transmon: Better Superconducting Qubits by Design”

In this talk I will outline the mechanisms for decoherence in superconducting qubits, which is one of the greatest challenges for building a real solid-state quantum information processor. To date, the limiting mechanism has been the influence of $1/f$ noise in various parameters, which leads to excess dephasing. However, by clever design of the circuit, one can dramatically reduce the sensitivity to noise. We have recently introduced a superconducting qubit, known as the transmon, which is exponentially insensitive to $1/f$ charge noise, greatly enhancing the coherence times. We then observe that the limit on the coherence can then be spontaneous emission, which can again be understood and engineered, resulting in homogeneously broadened ($T_2 = 2T_1$) lifetimes in the microsecond range. This allows for one qubit operations at fidelities of about 99%.