

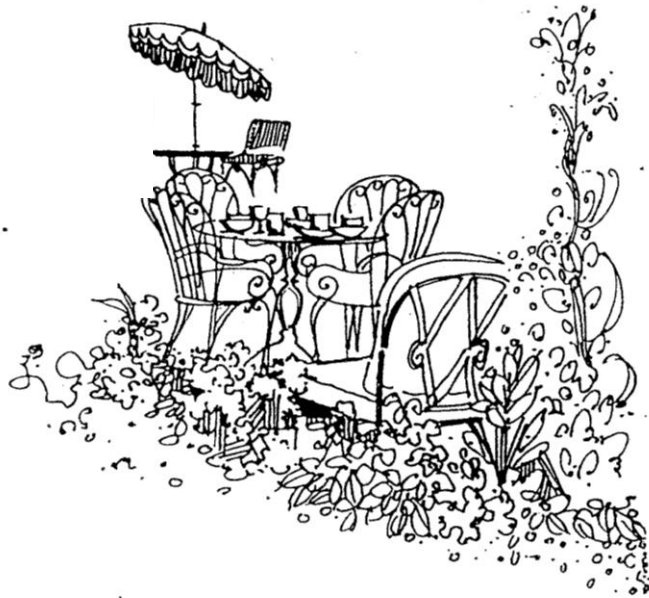
# *Chez Pierre*

Presents ...

**Wednesday, February 16, 2011**

**12:00pm**

**MIT Room 4-331**



## **SPECIAL CHEZ PIERRE SEMINAR**

**Mark Rudner**

**Harvard University**

### **“Topological Transitions in Driven and Dissipative Quantum Transport”**

In this talk, I will discuss new types of topologically-protected robust behavior which arise in periodically driven or dissipative systems. I will begin with a brief review of quantization phenomena in quantum mechanics and the notion of topological classification of quantum states. Then I will discuss our recently developed topological classification scheme for characterizing the behaviors of periodically-driven systems in terms of the properties of their Floquet (evolution) operators. Through this analysis we gain new insight into quantized adiabatic pumping, and discover new types of topologically-protected edge modes which exist only in periodically-driven systems. Last, we will investigate a new type of topological quantization which appears in dissipative quantum transport in a family of one-dimensional models where a particle can decay whenever it visits sites on one of two sublattices. Like other topologically-protected phenomena, such as the quantization of the Hall conductance, this phenomenon is robust against a range of perturbations including certain types of decoherence. Implications of these new phenomena for experiments in solid-state, quantum optical, and cold atomic systems will be discussed.