Chez Pierre

Presents …

Monday, February 22, 2016
12:00pm noon
MIT Room 4-331

Special Chez Pierre Seminar

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” Shaking up statistical physics in interacting quantum systems“

Statistical mechanics is a central pillar of modern physics with applications across the sciences. At its core is the idea of thermal equilibrium, which allows for a simple description of an interacting quantum system in terms of a few properties like temperature, without keeping track of the entire wavefunction. But what if a quantum system fails to equilibrate?

In this talk, I will discuss how we are discovering the answer to this question theoretically and experimentally. I’ll focus on two settings: disordered systems and periodically driven systems. In the former, many-body localization can prevent thermalization even at very high energy densities. The transition between the localized and the thermal phase is a fascinating dynamical quantum transition about which little is known. I will derive a rigorous constraint on this transition and apply it to current numerical studies and cold atomic experiments. Clean periodically driven systems, on the other hand, generically heat indefinitely. I will present one physical setting of interacting bosons in which this expectation fails.