Physics Colloquium

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"Quantum thermalization and many-body localization"

Thursday, April 25th, 2019 at 4:10PM in LL. 316

Most quantum systems with many interacting degrees of freedom will, under their own unitary quantum dynamics, bring themselves to thermal equilibrium, even when fully isolated from any external environment. Part of this talk will be to explain what the previous sentence means and to present our current understanding of how this "thermalization" works. There are also certain interacting quantum systems that fail to thermalize themselves, namely systems that are many-body localized. This is the many-body, high-temperature version of Anderson localization. And there are some quantum many-body systems that, as one varies a parameter, undergo a new type of phase transition from a phase that does thermalize itself to a phase that is many-body localized and thus fails to do so. This physics is being experimentally explored now, for example with ultracold atoms in optical lattices.

David Huse *works in statistical physics and theoretical condensed matter physics. He received his Ph.D. at Cornell in 1983, was at Bell Labs from then until 1996, when he moved to Princeton. Topics he has worked on include: spin glasses and other magnetic systems, vortices in superconductors, phase transitions, and many-body quantum dynamics.*