

Massachusetts Institute of Technology  
Department of Physics

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## Condensed Matter Theory Seminar

"Quantum entanglement growth under noisy unitary dynamics"

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**Abstract:** A quantum many-body system, prepared initially in a product state, will generate entanglement between distant regions dynamically. How does this happen? While we know a lot about entanglement in ground states, our understanding of the dynamics of entanglement is limited. In this talk I will discuss entanglement entropy growth for quantum systems subject to random unitary dynamics — i.e. Hamiltonian evolution with time-dependent noise, or a random quantum circuit. I will show how entanglement growth in this ‘noisy’ situation exhibits remarkable universal structure, which in 1D is related to the Kardar—Parisi—Zhang equation. I will argue that understanding this structure leads us to ways of thinking about entanglement growth that are useful outside the noisy context.

**12:30pm**  
**Tuesday, May 24, 2016**  
**Duboc Room (4-331)**