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Thermalization at the Many-body localization Phase Transition
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It has been recently found that sufficiently disordered, isolated quantum systems may fail to thermalize leading to a 'many-body localized' phase. In this phase the basic tenet of equilibrium statistical mechanics, namely, the equal likelihood for all microstates with the same energy, breaks down. A fundamental question is what happens as the disorder becomes weaker so that one approaches the localization-delocalization transition? In particular, does the system thermalize *at* the transition? In this talk, I will show that certain general considerations involving the behavior of entanglement entropy close to the transition imply that at a continuous many-body localization transition, the system is fully thermalized in the sense that critical eigenstates show ergodic behavior.

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