

Abstract Submitted  
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**Many-body localization transition of one-dimensional interacting hard-core bosons in a random potential** ARIJEET PAL, DAVID HUSE, Princeton University — We use exact diagonalizations to explore the properties of the exact many-body eigenstates of this model. The model can also be viewed as the spin-1/2 Heisenberg chain with a static random field along the z-direction. We explore the correlation functions within each of the eigenstates, looking at all states and thus effectively working at infinite temperature. For weak random potential the correlations are consistent with the eigenstates being thermal, as expected in this nonlocalized, ergodic phase. For strong random potential the eigenstates are localized, with very little entanglement. We roughly locate the many-body localization transition and explore the finite-size scaling and the probability distributions of the correlations, in particular asking the question of whether this transition is more consistent with conventional or with infinite-randomness scaling.

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