Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Many-body localization effects in a disordered system coupled to a delocalized chain KATHARINE HYATT, University of California - Santa Barbara , JAMES R. GARRISON, Univ of California - Santa Barbara , BELA BAUER, Station Q, Microsoft Research — The possibility of closed quantum systems that robustly violate quantum statistical mechanics has received a tremendous amount of interest in recent years. Using both numerical and analytical techniques, it has been established that weakly interacting disordered systems can be brought into a many-body localized regime, where the system does not conduct and does not equilibrate even for arbitrarily long times. The starting point for such a phase is usually taken to be an Anderson insulator where in the limit of vanishing interactions, all degrees of freedom of the system are localized. Here, we revisit this problem in a model where in the non-interacting limit, some degrees of freedom are localized while others remain delocalized. Such a system can be viewed as a model for a many-body localized system brought into contact with a small bath of a comparable number of degrees of freedom. We numerically study the effect of interactions on this system and find that generically, the entire system delocalizes. However, we find certain parameter regimes where results are consistent with localization of the entire system, an effect recently termed many-body proximity effect.

Katharine Hyatt
University of California - Santa Barbara

Date submitted: 06 Nov 2015 Electronic form version 1.4