Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Many-body localization characterized from a one-particle perspective SOUMYA BERA, MPI-PKS Dresden, HENNING SCHOMERUS, Lancaster, UK, FABIAN HEIDRICH-MEISNER, LMU, Munich, JENS BARDARSON, MPI-PKS Dresden — We show that the one-particle density matrix can be used to characterize the interaction-driven many-body localization transition in closed fermionic systems. The eigenstates of density matrix are localized in the many-body localized phase and spread out when one enters the delocalized phase, while the eigenvalues reveals the distinctive Fock-space structure of the many-body eigenstates, exhibiting a step-like discontinuity in the localized phase. The associated one-particle occupation entropy is small in the localized phase and large in the delocalized phase, with diverging fluctuations at the transition. We analyze the inverse participation ratio of the natural orbitals and found that it is independent of system size in the localized phase.

Soumya Bera
MPI-PKS Dresden

Date submitted: 06 Nov 2015 Electronic form version 1.4