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Signatures of many-body localization transition in entanglement and particle number fluctuation following a global quench RAJEEV SINGH, JENS BARDARSON, FRANK POLLMANN, Max Planck Institute for the Physics of Complex Systems, Dresden — The presence of disorder in a non-interacting system can localize all the energy eigenstates, a well-known phenomena known as Anderson localization. In recent years understanding the effect of disorder on quantum systems in the presence of interactions has gained a lot of interest and has been termed many-body localization (MBL). Effects of interactions show up as the logarithmic growth of entanglement entropy after a global quench. We perform a systematic study of the evolution and saturation of entanglement and particle number fluctuations, and show that they can be used to detect the localization transition. The particle number fluctuations can potentially be measured in experiments, thus giving us the first experimental signature of MBL.

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