



**Conference on Many-Body-Localization:
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Dynamics across Many-Body Localization Transition

In the first part of my talk I will illustrate the dynamics in MBL phase using Loschmidt echo which allows to probe the sensitivity of quantum dynamics to perturbations. I will show that Loschmidt echo and its modifications allow to get insights into the relation between physical operators and local integrals of motion, and access the operator spreading in the many-body localized phase. In the second part of my talk I will discuss the dynamics in the critical region preceding MBL transition. Using energy structure of matrix elements, I will extract the many-body Thouless energy which sets the inverse relaxation timescale. This allows to identify the critical region where Thouless energy becomes smaller than the level spacing. In this region matrix elements show critical dependence on the energy difference and exhibit strong multifractality. I will conclude by discussing open questions related to the MBL transition.
