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Dynamics of interacting quantum systems near the transition to a many-body localization phase[1] E. JONATHAN TORRES-HERRERA, Department of Physics, Yeshiva University, New York, NY 10016 and Instituto de Fisica, Benemerita Universidad Autonoma de Puebla, Puebla 72570, Mexico, LEA F. SANTOS, Department of Physics, Yeshiva University, New York, NY 10016, USA — Many-body localization (MBL) has become a very active field of research. The interest in the subject is motivated by indications of the existence of a MBL phase transition and by advances in experiments with optical lattices, which may serve as testbeds for corroborating theoretical predictions. A paradigmatic system that exhibits a MBL phase transition is the one-dimensional Heisenberg model with on-site disorder. Here, we study the dynamics of these systems. In particular, we report the observation of a power-law decay of the fidelity (survival probability) near the MBL transition. We provide numerical evidence suggesting that the exponent of this decay is related to the multifractal structure of the eigenstates through the so-called correlation dimension.

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Eduardo Jonathan Torres Herrera
Yeshiva University

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