Abstract Submitted
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Quantum Thermalization and Localization in Trapped Ions[1] JACOB SMITH, PAUL HESS, HARVEY KAPLAN, AARON LEE, BRIAN NEYENHUIS, LEXI PARSAGIAN, PHIL RICHERME, CHRISTOPHER MONROE, Joint Quantum Institute, University of Maryland Department of Physics and National Institute of Standards and Technology, College Park, Maryland 20742 — Trapped-ion quantum simulators have proven useful in exploring quantum-many-body physics that is difficult to examine in condensed-matter experiments or using classical simulation. Here, we present experiments that investigate thermalization in closed quantum systems. Fully-connected Ising and XY models with tunable disorder are encoded within a chain of $^{171}Yb^{+}$ ions. We prepare arbitrary non-equilibrium initial states and determine if these states thermalize after a long time evolution. One could expect to observe prethermal or many-body localized behavior in our system depending upon the initial conditions and the amount of disorder present.

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