

Abstract Submitted  
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**Measuring commutator square in nuclear spin systems** XUAN WEI, Massachusetts Inst of Tech-MIT, CHANDRASEKHAR RAMANATHAN, Dartmouth College, PAOLA CAPPELLARO, Massachusetts Inst of Tech-MIT — Out-of-time ordered correlations (OTOC) have recently received much attention due to their unique ability to probe information scrambling in many-body quantum systems. As a result OTOC have been fruitfully applied to the study of quantum chaos, many-body localization, and quantum phase transitions. We provide experimental measurements of the commutator square, akin to OTOC, in a disordered interacting spin chain at effectively infinite temperature. We observe a slow growth of the commutator square consistent with slow information scrambling in disordered systems. We also measure the commutator square in a system exhibiting a phase transition; we observe the commutator square to grow the fastest near the critical point.

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