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Entanglement properties after a partial measurement: a numerical study of excited states in Hubbard-like models JAMES R. GARRISON, RYAN V. MISHMASH, UCSB, TARUN GROVER, KITP, MATTHEW P.A. FISHER, UCSB — Our growing understanding of entanglement in condensed matter systems continues to provide incredible insight into characterizing phases of matter. Recently, progress in many-body localization (MBL) has revealed a deep connection between the entanglement properties of finite energy density eigenstates and whether or not the state is thermalized. Inspired by developments in MBL as well as a desire to identify and characterize a proposed "quantum disentangled liquid," we have performed exact diagonalization studies on one-dimensional Hubbard-like models. Specifically, we begin with an excited energy eigenstate, perform a partial measurement (e.g., measure the total spin on each site), and study the properties of the resulting wave function. By numerically studying small systems, we can gain insights into whether spin and charge thermalize independently, and develop intuition which may one day guide experiments on cold atom systems.

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