Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

K-ETH Algorithm for calculating finte temperature Green's functions of strongly correlated systems.[1] JEFFREY COHN, KHADIJEH SONA NAJAFI , Georgetown University, FOREST YANG, UC-Berkeley, JAMES FREERICKS, Georgetown University — We illustrate an efficient algorithm for calculating Fermionic many-body Greenâ^{TM}s functions at finite temperature, which avoid Gibbs state preparation techniques to initialize the calculation. Instead, by properly invoking the eigenstate thermalization hypothesis (ETH), we are able to initialize the computation rapidly. We show how sum rules guarantee the Greenâ^{TM}s functions are correct for short times and we also show how the time at which results begin to fail grows with the system size being simulated. We propose that this algorithm can have applicability to the simulations of a wide range of different strongly correlated systems.

[1]Supported by the National Science Foundation-Grant(PHY-1620555)

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Date submitted: 26 Jan 2018 Electronic form version 1.4