Universal Prethermal States in Slowly-Driven Systems

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"A periodically driven system with interactions generically tends to an infinite-temperature state at long times. In this final state any quantum features such as topological order disappear. Such features can only be observed in a prethermal quasi-steady state. Here we present general conditions under which a prethermal state is attained and derive a lower bound for its lifetime. The prethermal state is characterized by thermalization of all particles within one band, while the number of particles in the bands doesn't change. The lifetime is the inverse of the rate of exciting particles from one band to the other. We show that in the presence of a large bandgap the rate of exciting particles is exponentially small. This result is general for all interacting systems subjected to a slow drive in any spatial dimension. This has especially big consequences for topological pumps where the prethermal state can be used to measure the topological index of the system."[1]

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[1] Lindner N., Berg E., Rudner M., *Universal chiral quasisteady states in periodically driven many-body systems*, Phys. Rev. X **7**, 011018 (2017).