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Floquet prethermalization and regimes of heating in a periodically driven, interacting quantum system[1] SIMON WEIDINGER, MICHAEL KNAP, Technical University of Munich — We study the regimes of heating in the periodically driven $O(N)$-model, which represents a generic model for interacting quantum many-body systems. By computing the absorbed energy with a non-equilibrium Keldysh Green's function approach, we establish three dynamical regimes: at short times a single-particle dominated regime, at intermediate times a stable Floquet prethermal regime in which the system ceases to absorb, and at parametrically late times a thermalizing regime. Our simulations suggest that in the thermalizing regime the absorbed energy grows algebraically in time with an the exponent that approaches the universal value of $1/2$, and is thus significantly slower than linear Joule heating. Our results demonstrate the parametric stability of prethermal states in a generic many-body system driven at frequencies that are comparable to its microscopic scales. This paves the way for realizing exotic quantum phases, such as time crystals or interacting topological phases, in the prethermal regime of interacting Floquet systems.

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