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Many-body energy localization transition in periodically driven system LUCA D'ALESSIO, ANATOLI POLKOVNIKOV, Boston University — According to the second law of thermodynamics the total entropy and energy of a system is increased during almost any dynamical process. Notable exceptions are known in noninteracting systems of particles moving in periodic potentials. Here the phenomenon of dynamical localization can prevent heating beyond certain threshold. However, it was believed that driven ergodic systems will always heat without bound. Here, on the contrary, we report strong evidence of dynamical localization transition in periodically driven ergodic systems in the thermodynamic limit. This phenomenon is reminiscent of many-body localization in energy space. We report numerical evidence based on exact diagonalization of small spin chains and theoretical arguments based on the Magnus expansion. Our findings are valid for both classical and quantum systems.

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