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**Influence of Non-Markovian system-bath interactions on thermodynamic process efficiencies** HIL FUNG HARRY CHEUNG, JIALUN LUO, YOGESH S PATIL, MUKUND VENGALATTORE, Cornell University — Efficiency and power of Markovian heat engines follow well established limits such as the Carnot limit and the Curzon-Ahlborn bound. However, the bounds in the presence of non-Markovian system-bath interactions remain elusive. Here, we realize a non-Markovian heat engine in an optomechanical system, and explore its power and efficiency at various parameter regimes. We also propose extending this heat engine to the quantum regime in a hybrid quantum system that couples a cavity optomechanical device to an ultracold spin ensemble. These experiments are potential platforms for studying generalized quantum thermodynamic bounds for quantum heat engines.

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