

Abstract Submitted  
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**How can an autonomous quantum Maxwell demon harness correlated information?**<sup>1</sup> ADRIAN CHAPMAN, AKIMASA MIYAKE, Univ of New Mexico, CQUIC THERMODYNAMICS TEAM — We study an autonomous quantum system, which exhibits refrigeration under an information-work tradeoff like a Maxwell demon. The system becomes correlated as a single demon qubit interacts sequentially with memory qubits while in contact with two heat reservoirs of different temperatures. Using strong subadditivity of the von Neumann entropy, we derive a global Clausius inequality to show thermodynamical advantages from access to correlated information. It is demonstrated, in a matrix product density operator formalism, that our demon can simultaneously realize refrigeration against a thermal gradient and erasure of information from its memory, which is impossible without correlations. The phenomenon can be even enhanced by the presence of quantum coherence.

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Adrian Chapman  
Univ of New Mexico

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