

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

A subextensive bound on entropy production in the adiabatic limit BENJAMIN MACHTA, Princeton Univ — Biological and engineered systems operate by coupling function to the transfer of heat and/or particles down a thermal or chemical gradient. In idealized *deterministically* driven systems, thermodynamic control can be exerted reversibly, with no entropy production, as long as the rate of the protocol is made slow compared to the equilibration time of the system. Here we consider *fully realizable, entropically driven* systems where the control parameters themselves obey rules that are reversible and that acquire directionality in time solely through dissipation. I will show that when such a system moves in a directed way through thermodynamic space, it must produce entropy that is on average larger than its generalized displacement as measured by the Fisher information metric. This distance measure is sub-extensive but cannot be made small by slowing the rate of the protocol. (see Phys. Rev. Lett. 115, 260603) I will discuss the application of this bound to the question of the minimum energetic cost of a computation.

Benjamin Machta
Princeton Univ

Date submitted: 11 Nov 2016

Electronic form version 1.4