DY 40: Talk J. Bechhoefer

Time: Wednesday 9:30–10:00   Location: BH-N 243

Invited Talk   DY 40.1   Wed 9:30   BH-N 243
Measurement of the functional form of Shannon entropy by partial erasure of a bit — •John Bechhoefer[1], Momčilo Gavrilov[1,2], and Raphaël Chétrite[1,3,4] — [1]Dept. of Physics, Simon Fraser University, Burnaby, British Columbia, Canada — [2]Present address: Dept. of Biophysics and Biophysical Chemistry, Johns Hopkins University, Baltimore, MD, USA — [3]Pacific Institute for the Mathematical Sciences, UMI 3069, Vancouver, British Columbia, Canada — [4]Permanent address: Université Côte d'Azur, CNRS, LJAD, Parc Valrose, NICE, France

We use a feedback trap to erase a fraction of a bit of information from a memory whose states are encoded in the two states of a double-well potential. The system consists of a colloidal particle in water in a "virtual" potential. We show experimentally that the minimum amount of work required is proportional to the Shannon entropy function for a two-state system, for arbitrary state probabilities. This is the first experimental confirmation that the Shannon function is the appropriate definition for nonequilibrium system entropy as it relates to thermodynamics.