

Against the flow: A colloidal Maxwell's demon

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The connection between information and thermodynamics has been fascinating scientists ever since Maxwell envisioned his celebrated demon. Technological progress now allows realizing lab this celebrated idea that was originally conceived as a thought experiment. Indeed, recent years have seen experimental realizations of several types of information engines.

In this talk, I will describe a realization of Maxwell's demon in which a colloidal particle is "directed" against a fluid flow. Beyond its appealing simplicity, our experimental setup also exhibits an almost full conversion of information to useful work, since it allows to control how much work is applied directly on the particle. Another feature of the setup is a frequent repeated measurement of the particle location, resulting in nontrivial correlations between the outcomes of consecutive measurements. The effect of these correlations on the useful information acquired is investigated with the help of computer simulations.

- [1] T. Admon, S. Rahav, and Y. Roichman, "Experimental Realization of an Information Machine with Tunable Temporal Correlations", *Phys. Rev. Lett.*, 121, 180601 (2018).