The details are in the devil: Maxwell’s demon in the real world

Prof. John Bechhoefer
Dept. of Physics, Simon Fraser University, Burnaby, BC, Canada

One hundred and fifty years ago, Maxwell first posed the thought experiment that became known as “Maxwell’s demon”. Designed to understand more deeply the nature of the newly formulated second law of thermodynamics, the demon was to play a long, controversial role in the development of statistical physics. Just two months later, Maxwell’s paper “On governors” gave the first analysis of a feedback system. These two foundational works reflect the fundamental and practical aspects of control. I will present an experiment that unites the two: using feedback to create “impossible” dynamics, we make a Maxwell demon that can reach the fundamental limits to control set by thermodynamics. We test - and then extend - Rolf Landauer’s 1961 prediction that information erasure requires at least as much work as can be extracted from a system by virtue of information. These fundamental thermodynamic limits are benchmarks for evaluating the performance of practical information engines, such as those active within cells and other complex systems.

Wednesday, November 29th, 2017 at 2:15 pm

MPIDS, Prandtl lecture hall, building AI, Am Faßberg 11, Göttingen