

The Virginia Tech Physics Department presents the following colloquium:

Prof. Daniel Parker
(Virginia Tech Department of Philosophy)

Maxwell's Demon: Wanted Dead or Alive?

Abstract:

In recent years, a consensus has been built in the physics community that Maxwell's Demon, a being that can reliably violate the 2nd law of Thermodynamics, is impossible. The common lore is that this impossibility stems from introducing information-theoretic considerations into the picture. More specifically the claim is that Landauer's principle, which states that there is an irreducible entropy cost to the erasure of the information, blocks any possible attempt to break the 2nd law. Recently, though, this claim has been disputed in the philosophical community.

In my talk, I will review these developments in the literature, and I endeavour to demonstrate the question of whether Maxwell's Demon can exist is a thorny one. Instead of a clear 'yes' or 'no' answer, the possibility of the existence of Maxwell's Demon depends on a delicate and nuanced understanding of the 2nd law, how terms like temperature and entropy are understood in the context of statistical mechanics, and whether one can meaningfully introduce information-theoretic notions into the formalism of statistical mechanics. I conclude that the debate over Landauer's principle is largely a red herring, stemming from a set of conceptual confusions and an overemphasis on the particulars of the Szilard engine (the thought experiment on which these arguments are based) that cannot be generalised to preclude all possible demonic setups.

Friday, October 27, 2006
2:30 P.M.
210 Robeson Hall