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Breaking Barriers with Maxwell's Demon

Department of Physics Colloquium

In 1871, James Clerk Maxwell proposed a mythical creature that could regulate the motion of gas-phase particles by controlling a gate.

This creature was called Maxwell's demon by Lord Kelvin, and remained a vigorous topic of debate for over 130 years. The demon seemed to violate the Second Law of Thermodynamics, though it was later shown that in principle, information entropy saves us from that catastrophe. In this talk, I will describe how we have now realized Maxwell's demon in the laboratory with a self-acting one-way wall, and how it enables the control of matter with light. In particular, I will discuss how Maxwell's demon is being used to break the barriers of Laser Cooling, Isotope Separation and Nanoscience.

