**Atomic and Laser Physics Seminar**

**Monday, 22 October**

**11.30**

**Audrey Wood Seminar Room**

**Dr Janet Anders**

University College London

***Equilibrium and non-equilibrium dynamics in the quantum regime***

Landauer's principle is a central example of the connection of information theory and thermodynamics. However, several publications have discussed Landauer's principle and the second law of thermodynamics in the quantum regime and claimed their breaking. If true, these results would have powerful and unlikely consequences for both, thermodynamics and information theory. I will review the original discussion on the model of a quantum brownian oscillator and argue why previous treatments are erroneous and how to resolve the paradoxical situation. I will then describe our ongoing experiments to test equilibrium and non-equilibrium dynamics in the classical and quantum regime with light levitated particles. Finally, I will report on our recent theory work on the reaction rates of enzyme catalysed reactions, that are driven by non-equilibrium (quantum) dynamics.