Landauer’s Principle for Trajectories of Repeated Interaction Systems

Alain Joye (Institut Fourier, Grenoble)

Abstract: We study Landauer’s principle for repeated interaction systems consisting of a reference quantum system $S$ in contact with an environment $E$ consisting of a chain of independent quantum probes.

The system $S$ interacts with each probe sequentially and the Landauer principle relates the energy variation of $E$ and the decrease of entropy of $S$ by the entropy production of the dynamical process. We address the adiabatic regime where the environment, consisting of $T \gg 1$ probes, displays variations of order $1/T$ between the successive probes. We analyze Landauer’s bound and its refinements at the level of the full statistics associated to a two-time measurement protocol of, essentially, the energy of $E$.

This is joint work with E. Hanson, Y. Pautrat, and R. Raquépas.