Abstract:
We consider Landauer’s principle for repeated interaction systems (RIS) consisting of a reference quantum system $S$ that interacts, in sequence, with independent quantum probes forming a structured environment. Landauer’s bound relates the energy variation of the environment to a decrease of entropy of the system $S$ during the evolution. Assuming the environment displays small variations of order $1/T$ between the successive probes encountered by $S$, we develop a discrete time non-unitary adiabatic theorem that describes the reduced dynamics of $S$ at time $n=T$. Our analysis shows that Landauer’s bound for RIS is not saturated in the adiabatic regime.

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