

Full counting statistics, Renyi's relative entropy and modular theory

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Abstract: Full counting statistics refers to a repeated quantum measurement of charge/heat fluxes in an open quantum systems. We shall show that the momentum generating functions for this measurement process equals Renyi's relative entropy of the state at time t with respect to the initial state, and then relate it to the matrix elements of L_p -Liouvillean, a particular non-selfadjoint operator which links Renyi's relative entropy to the Tomita-Takesaki modular theory and is the natural non-commutative generalization of Ruelle's transfer operator. This set of ideas leads to powerful computational tools and new conceptual results like far from equilibrium Fluctuation-Dissipation Theorem and quantum Evans-Searles and Gallavotti-Cohen fluctuation symmetries.

This talk is based on the joint work with Y. Ogata, C.-A. Pillet and Y. Pautrat.