

— Wednesday : L. Hruza

Title: Can the macroscopic fluctuation theory be quantized? An introduction to QSSEP

Abstract: I will start by reviewing the (classical) MFT (macroscopic fluctuation theory) which describes out-of-equilibrium current and density fluctuation on the basis of information about the system that is already available at equilibrium. From a quantum perspective a natural question to ask, is if the theory can be extended to describe fluctuation of quantum mechanical properties such as coherences? Motivated by this question, I will then introduce QSSEP (quantum symmetric simple exclusion process), a simple toy model that describes diffusive transport with non-vanishing coherences. I will briefly explain some of its properties: its relation to the (classical) SSEP (symmetric simple exclusion process), the large deviation behaviour of the cumulants of coherences and the equation governing their time evolution, (if time permits) our result that QSSEP is not integrable as far as the level spacing statistics is considered. I will then put QSSEP into a broader context of other microscopic quantum models with diffusive transport, explaining that most of them do not show long ranged coherences. Finally, I will show our recent result for the QSSEP entanglement distribution, which suggests that all the information needed is already contained in the classical SSEP. This brings us back to the initial question about how MFT could be quantized and what the study of QSSEP has contributed to this question so far.