

Correlations in thermodynamics of quantum systems beyond the weak-coupling regime

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In this talk, I will demonstrate a framework to obtain thermodynamics of a non-equilibrium quantum system from its dynamics. In particular, I will discuss rules governing heat and work flow and entropy exchange in a quantum system in the presence of interaction and correlations with an environment¹. I will also introduce a non-equilibrium temperature and discuss how it may characterize equilibration of two quantum systems.

¹S. Alipour, F. Benatti, F. Bakhshinezhad, M. Afsary, S. Marcantoni, A. T. Rezakhani *Correlations in quantum thermodynamics: Heat, work, and entropy production*, Sci. Rep. **6**, 35568 (2016); S. Alipour, A. T. Rezakhani, A. P. Babu, K. Mølmer, M. Möttönen, T. Ala-Nissila *Correlation Picture Approach to Open-Quantum-System Dynamics*, *arXiv:1903.03861*.