



School of Nano Science



IPM Condensed Matter &
Statistical Physics Group

Weekly Seminar

Quantum Thermodynamics of a Bipartite System

Invited Speaker:

Stefano Marcantoni

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Abstract

In classical thermodynamics, dealing with macroscopic systems, energy and entropy are supposed to be additive quantities. This property does not hold in general when interacting microscopic systems are considered because both the interaction energy and the correlation are not negligible.

We consider a generic bipartite quantum system initially prepared in a product state and we study the energy and entropy exchange in time between the interacting subsystems. By properly defining heat, work and entropy production at the microscopic level, we can write a generalized version of the First and Second Law of Thermodynamics which highlights the role of correlation and interaction. If one of the two subsystems is taken to be a thermal bath the known results from the theory of open quantum systems are recovered.

Finally, we show that a similar formulation can be given using classical mechanics.

Wednesday, 19 Khordad 95 (8 June, 2016), 2-3 pm

Farmaniyeh seminar room