

Speaker: Alessandra Colla, University of Freiburg

Title: Thermodynamic roles of quantum environments: from heat bath to work reservoir

Date: Tuesday, February 6th, 11 o'clock (s.t.)

Place: Seminar room 915

Quantum Systems controlled by quantum systems or measurement-based feedback

Environments in quantum thermodynamics usually take the role of heat baths. These baths are Markovian, weakly coupled to the system, and initialized in a thermal state. Whenever one of these properties is missing, standard quantum thermodynamics is no longer suitable to treat the thermodynamic properties of the system that result from the interaction with the environment. Using a recently proposed framework for open system quantum thermodynamics at arbitrary coupling regimes, we show that within the very same model (a Fano-Anderson Hamiltonian) the environment can take three different thermodynamic roles: a standard heat bath, exchanging only heat with the system, a work reservoir, exchanging only work, and a hybrid environment, providing both types of energy exchange. The exact role of the environment is determined by the strength and structure of the coupling, and by its initial state.