Speaker: **Alessandra Colla, University of Freiburg**

Title: **Dynamically Emergent Quantum Thermodynamics for Open Systems**

Date: **Friday, April 19th, 15 o‘clock (s.t.)**

Place: **SR I, Physics High-Rise building**

Title: **Dynamically Emergent Quantum Thermodynamics for Open Systems**

Abstract:

The theoretical description of thermodynamic quantities for open quantum systems is particularly challenging for systems under strong or structured interactions with the environment, which in general lead to memory effects and non-negligible energy contributions. We propose a framework based on open quantum systems techniques by identifying an effective energy operator within a time-local master equation. This emergent Hamiltonian contains information about the influence of the coupling on the energy of the system and guides the definition of thermodynamic quantities, leading to a generalization of the laws of quantum thermodynamics. In particular, we find under this framework how negative entropy production rates are related to the backflow of information from the environment to the system. We discuss main features, possible extensions, and experimental tests of this approach.