
Thermodynamics with superconducting circuits

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Abstract

In this talk, we will discuss an elementary thermal machine able to cool down or heat up a superconducting quantum bit. We have realized such a machine using superconducting circuits in two protocols. First, by measurement based feedback, a macroscopic observer acquires information about the quantum system and reacts on it. Second, by reservoir engineering, the entropy of the qubit is transferred to a cavity mode and towards a cold reservoir. We will discuss how these protocols relate to Maxwell demons. In a second part, I will discuss how the direct detection of the fluorescence signal, through which the qubit energy leaks out, allows the recording of its quantum trajectories. The tools to probe the thermodynamics of these trajectories will be discussed.

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