

Fluctuations of entropy production in partially masked electric circuits

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We experimentally investigate fluctuations of entropy production in two capacitively coupled RC circuits driven by constant currents. We focus on analyzing entropy production by merely utilizing partial information of the system with two different reduced descriptions, and give two main statements based on the experimental and theoretical agreements. First, the apparent entropy production derived from a naive reduced description of the circuit follows the Fluctuation Theorem (FT) in the long time limit compared with the intrinsic RC time constants in the circuit. On the other hand, the coarse-grained entropy production follows FT in the short time limit. Moreover, our results imply in general FT can be observed in a system where its environmental couplings to all slow degrees of freedom are weak.