

Abstract Submitted  
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**An effective Fluctuation Theorem in Bidirectional Single-Electron Counting** YASUHIRO UTSUMI, Mie University, DIMITRY GOLUBEV, MICHAEL MARTHALER, Karlsruhe Institute of Technology, KEIJI SAITO, Graduate School of Science, University of Tokyo, TOSHIMASA FUJISAWA, NTT Basic Research Laboratories, GERD SCHOEN, Karlsruhe Institute of Technology — We investigate the direction-resolved full counting statistics of single-electron tunneling through a double quantum dot system and compare with predictions of the fluctuation theorem (FT) for Markovian stochastic processes. Experimental data obtained for GaAs/GaAlAs heterostructures appear to violate the FT. After analyzing various potential sources for the discrepancy we conclude that the nonequilibrium shot noise of the measurement device influence the tunneling statistics. Taking these modifications into account we show how the FT can be violated due to measurement effects and recovered for fast detection by introducing an “effective temperature.”

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