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Test of the steady-state fluctuation theorem in turbulent Rayleigh-Bénard convection PINGER TONG, Department of Physics, Hong Kong University of Science and Technology, XIAODONG SHANG, KEQING XIA, Department of Physics, the Chinese University of Hong Kong — Local convective heat flux in turbulent thermal convection is obtained from simultaneous velocity and temperature measurements in an aspect-ratio-one cell filled with water. It is found that large positive fluctuations of the vertical heat flux occurs more often in the plume-dominated sidewall region and their histograms are highly asymmetric. The statistical properties of the time-averaged local flux fluctuations are analyzed and the results are compared with the predictions of the steady state fluctuation theorem of Gallavotti and Cohen. Work supported by the Research Grants Council of Hong Kong SAR under Grant Nos. HKUST603003 (P.T.) and CUHK403003 (K.Q.X.).

Pinger Tong
Hong Kong University of Science and Technology

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