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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 entropy production rate $\sigma(\mathbf{r}, t)$ in turbulent thermal convection is obtained from simultaneous velocity and temperature measurements in an aspect-ratio-one cell filled with water. The statistical properties of the time-averaged $\sigma(\mathbf{r}, t)$ are analyzed and the results are compared with the predictions of the steady state fluctuation theorem (SSFT) of Gallavotti and Cohen. The experiment reveals that the SSFT can indeed be extended to the local variables, but further development is needed in order to incorporate the common dynamic complexities of far-from-equilibrium systems into the theory. *Work supported by the Research Grants Council of Hong Kong SAR under Grant Nos. HKUST603504 (P.T.) and CUHK403003 (K.Q.X.).

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