Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Anomalous scaling of temperature structure functions in turbulent thermal convection[1] PENGER TONG, Hong Kong University of Science and Technology, XIAOZHOU HE, Max Planck Institute for Dynamics and Self Organization, XIAODONG SHANG, South China Sea Institute of Oceanology, CAS
— The scaling properties of the temperature structure function (SF) are investigated in turbulent Rayleigh-Benard convection [1]. The measured SFs are found to exhibit good scaling in space and time and the resulting SF exponent is obtained both at the center of the convection cell and near the sidewall. It is found that the difference in the functional form of the measured SF exponents at the two locations in the cell is caused by the change of the geometry of the most dissipative structures in the (inhomogeneous) temperature field from being sheet-like at the cell center to filament-like near the sidewall. The experiment thus provides direct evidence showing that the universality features of turbulent cascade are linked to the degree of anisotropy and inhomogeneity of turbulent statistics.

[1] "Test of the anomalous scaling of passive temperature fluctuations in turbulent Rayleigh-Benard convection with spatial inhomogeneity," Xiaozhou He, Xiao-dong Shang and Penger Tong, J. Fluid Mech. **753**, 104 (2014).

[1]This work was supported by the Research Grants Council of Hong Kong SAR.

Penger Tong
Hong Kong University of Science and Technology

Date submitted: 25 Jul 2014 Electronic form version 1.4