

Abstract Submitted
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Universality of energy spectrum in turbulent Rayleigh-Benard convection KUNLUN BAI, JUDITH HOELLER, ERIC BROWN, Yale University — We present study of energy spectrum in turbulent Rayleigh-Benard convection, in both cylindrical and cubic containers, tilting and non-tilting conditions, and with Rayleigh number ranging from 0.5×10^9 to 1×10^{10} . For these different conditions of geometry, tilt, and Rayleigh number, the temperature spectra measured on the system side walls are significantly different from each other. Even for the same condition, the spectrum varies depending on whether the sensors locate in the path of large-scale circulations. However, quite interestingly, once the signals of large-scale circulations are subtracted from the raw temperature, all spectra display a universal shape, regardless of system geometry, tilt, Rayleigh number, and location of sensors. It suggests that one could model the large-scale circulations and small-scale fluctuations separately in turbulent Rayleigh-Benard convection.

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