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Temperature fluctuation in Rayleigh-Bénard convection: Logarithmic vs power-law[1] YU-HAO HE, KE-QING XIA, The Chinese University of Hong Kong — We present an experimental measurement of the rms temperature (σ_T) profile in two regions inside a large aspect ratio ($\Gamma = 4.2$) rectangular Rayleigh-Bénard convection cell. The Rayleigh number (Ra) is from 3.2×10^7 to 1.9×10^8 at fixed Prandtl number ($Pr = 4.34$). It is found that, in one region, where the boundary layer is sheared by a large-scale wind, σ_T versus the distance (z) above the bottom plate, obeys power law over one decade, whereas in another region, where plumes concentrate and move upward (plume-ejection region), the profile of σ_T has a logarithmic dependence on z. When normalized by a typical temperature scale θ_*, the profiles of σ_T at different Rayleigh numbers collapse onto a single curve, indicating a university of σ_T profile with respect to Ra. 1. This work is supported by the Hong Kong Research Grant Council under grant number N_CUHK437/15.

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