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Thermal boundary layer properties in turbulent thermal convection: Effects of Prandtl number[1] SHI-DI HUANG, XIAO-MING LI, JI-DONG HE, PENG HAO, Department of Mechanics and Aerospace Engineering, Southern University of Science and Technology — We report experimental measurements of thermal boundary layer properties in turbulent Rayleigh-Bnard convection with the Prandtl (Pr) number being varied from 11.6 to 157.4. The experiments were conducted in rectangular convection cells over the Rayleigh number Ra range of 1e9 ˜2e10 Both the mean temperature and its root mean square profiles were measured by a thermistor that is movable along the central vertical axis of the cell. These results are compared with the recently derived boundary layer equations by Shishkina et al. (Phys. Rev. Lett., vol. 114, 2015, 114302) and by Wang et al. (Phys. Rev. Fluids, vol. 1, 2016, 082301), with a focus on the effects of Pr number.

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