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Modeling of the thermal boundary layer in turbulent Rayleigh–Bénard convection.[1] MOHAMMAD EMRAN, OLGA SHISHKINA, Max Planck Institute for Dynamics and Self-Organization, Goettingen. — We report modeling of the thermal boundary layer in turbulent Rayleigh–Bénard convection (RBC), which incorporates the effect of turbulent fluctuations. The study is based on the thermal boundary layer equation from Shishkina et al., Phys. Rev. Lett. 114, 114302 (2015) and new Direct Numerical Simulations (DNS) of RBC in a cylindrical cell of the aspect ratio 1, for the Prandtl number variation of several orders of magnitude. Our modeled temperature profiles are found to agree with the DNS much better than those obtained with the classical Prandtl–Blasius or Falkner–Skan approaches.

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