

Abstract Submitted
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Heat transport and temperature profiles in turbulent convection of fluids heated locally from below PING WEI, School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai, China, GUENTER AHLERS, Department of Physics, UCSB, CA, USA — We measured mean-temperature profiles in turbulent convection of fluids heated locally from below in a cylindrical sample with aspect ratio $\Gamma \equiv D/L = 1.00$ ($D = 24.1$ cm is the diameter and L the height). Heating was near the bottom-plate center over a circular area of diameter $D_h/D = 0.053$, while cooling was over the entire top plate. Rayleigh- and Prandtl-number ranges were $6 \times 10^9 \leq Ra \leq 2 \times 10^{12}$ and $5 \leq Pr \leq 12.3$. The measurements were at radial distances r from the vertical center line with $\xi \equiv 1 - 2r/D = 1.00$ (along the center line) and $\xi = 0.135$ (near the side wall) and at several vertical locations z/L . The center temperature was well below the mean temperature. Near the side wall the mean temperature varied logarithmically with z/L near the bottom and $1 - z/L$ near the top plate. Along the center line such a log layer was found near the bottom plate, but not near the top plate.

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