

Abstract Submitted
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The Reynolds number near the transition to the ultimate state of turbulent Rayleigh-Bénard convection¹ XIAOZHOU HE, MPIDS, Goettingen, Germany, GUENTER AHLERS, University of California, Santa Barbara, DENIS FUNFSCHILLING, LSGC CNRS, Nancy, France, HOLGER NOBACH, EBERHARD BODENSCHATZ, MPIDS, Goettingen, Germany — Measurements of a Reynolds number Re for Rayleigh-Bénard convection (RBC) of a cylindrical sample over the Rayleigh-number range $2 \times 10^{12} \leq Ra \leq 2 \times 10^{15}$ and the Prandtl-number range $0.79 \leq Pr \leq 0.86$ are presented. The aspect ratio $\Gamma \equiv D/L$ was 0.50 ($D = 1.12$ m was the diameter and $L = 2.24$ m was the height). We used the elliptic approximation of He and Zhang^{2,3} to determine an effective Re . For $Ra \geq 3 \times 10^{14}$ the data yielded $Re = Re_0 Ra^{\alpha_{eff}}$ with $\alpha_{eff} \simeq 0.50$. This result is consistent with predictions for the ultimate state, where the boundary layers are turbulent.^{4,5}

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