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Temperature power spectra of turbulent Rayleigh-Bénard convection with a Prandtl number $Pr = 12.3$ [*1] GUENTER AHLERS, PING WEI, UCSB, Sante Barbara, CA, USA, XIAOZHOU HE, MPIDS, Göttingen, Germany — We report on measurements of power spectra of temperature fluctuations in turbulent Rayleigh-Bénard convection in a cylindrical sample with aspect ratio $\Gamma = D/L = 0.50$ (D is the diameter and L the height) as a function of the distance z from the bottom or top plate. The working fluid was a fluorocarbon at a mean temperature $T_m = 25.00^o$C with a Prandtl number $Pr = 12.3$, and the Rayleigh number was $Ra \simeq 4 \times 10^{11}$. Consistent with many previous investigations, there was a low-frequency range, spanning about a factor of twenty, where the spectra could be described by a power law $P(f) = P_0 f^{-\alpha}$. Contrary to the finding by He et al.[2] for $Pr \simeq 0.8$ of a universal spectrum with $\alpha = 1.0$ in the near-wall range $z/L \leq 0.1$ and $\alpha \simeq 1.5$ for $z/L = 0.5$, we found that α varied with z from about 0.6 near the plate ($z/L \simeq 0.01$) to about 1.1 at the cell center ($z/L = 0.5$). Along the sample center line and for $z/L \leq 0.1$ α could be described well by $\alpha = \alpha_0 \ln(z/L) + \alpha_1$ with $\alpha_0 \simeq 0.2$ and $\alpha_1 \simeq 1.5$.

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[2]X. He, D.P.M. vanGils, E. Bodenschatz, and G.Ahlers, Phys. Rev. Lett. **112**, 174501 (2014).

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