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Viscous boundary layers in high Rayleigh number convection: A new insight from 3d velocity measurements RONALD DU PUITS, Ilmenau University of Technology, LING LI, ANDRÉ THESS — The local transport inside the boundary layers in turbulent convection is one of the keys to understand the scaling of the global heat transport with respect to the temperature gradient and the vertical extent of a wall bounded fluid-mechanical system. We report highly resolved 3d-Laser Doppler Velocimetry measurements in a large-scale Rayleigh-Bénard experiment with air at Rayleigh numbers up to 10^{12}. The measurements were undertaken in the vicinity of the cooling plate in the central axis of the cylindrical sample. They differ from those reported in the paper du Puits et al [Phys. Rev. E 80, 036318 (2009)] in that all three velocity components have been measured simultaneously. In the present communication we will discuss the results of these measurements and compare them with previous ones as well as with theoretical predictions about the mean velocity profile and the fluctuations in non-isothermal shear layers.

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