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Logarithmic Boundary Layers in Strong Taylor-Couette Turbulence DETLEF LOHSE, SANDER HUISMAN, University of Twente, RODOLFO OSTILLA, Univ of Twente, SVEN SCHARNOWSKI, CHRISTIAN CIERPKA, CHRISTIAN KÄHLER, Univ. Bundeswehr Muenchen, ROBERTO VERZICCO, Univ of Rome Tor Vergata, CHAO SUN, Univ of Twente, SIEGFRIED GROSSMANN, Univ of Marburg — We provide direct measurements of boundary layer profiles in highly turbulent Taylor-Couette flow up to $Re = 2\times10^6$ using high-resolution particle image velocimetry and particle tracking velocimetry, complemented by DNS data on the same system up to $Re = 10^5$. We find that the mean azimuthal velocity profile at the inner and outer cylinder can be fitted by the von Kármán log law, but with corrections due to the curvature of the cylinder, which we theoretically account for, based on the Navier-Stokes equation and a closure assumption for the turbulent diffusivity. In particular, we study how these corrections depend on the cylinder radius ratio and show that they are different for the boundary layers at the inner and at the outer cylinder.

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