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Dissipative Effects on Inertial-Range Statistics at High Reynolds Numbers MICHAEL SINHUBER, GREGORY BEWLEY, EBERHARD BODENSCHATZ, Max Planck Institute for Dynamics and Self-Organization — Using the unique capabilities of the Variable Density Turbulence Tunnel at the Max Planck Institute for Dynamics and Self-Organization, we were able to measure extremely long time series of up to 10^{10} samples of the turbulent fluctuating velocity in a well-controlled environment at a wide range of high Reynolds numbers up to $R_\lambda = 1600$. These classical grid measurements were conducted using both classical hot-wire probes as well as NSTAP probes developed at Princeton University. With these long datasets, we were able to uncover fine details of the structure functions and their scaling behavior. We find that deviations from ideal scaling is anchored to the small scales and that dissipation influences the inertial-range statistics even up to $r/\eta = 1000$.

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