Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Experimental Results on Turbulence at Extreme Reynolds Numbers CHRISTIAN KUECHLER, Max Planck Institute for Dynamics and Self-Organization, GREGORY P. BEWLEY, Cornell University, Ithaca, NY, EBERHARD BODENSCHATZ, Max Planck Institute for Dynamics and Self-Organization
— High-quality measurements of the velocity increment statistics of turbulence at high Reynolds numbers (Re) provide insights into the dynamics of the inertial range. Recently, for decaying turbulence in the Max Planck Variable Density Turbulence Tunnel, we have shown (arXiv:2006.10993) that in the inertial range, the functional dependence of the 2nd order velocity increments on spatial scales becomes independent of the Reynolds number for sufficiently large Re. While the functional dependence reaches a universal form, effects of large-scale inhomogeneity and viscous dissipation remain important across all scales. We review these second-order results up to Taylor-scale Reynolds numbers $R_\lambda \approx 6000$, extend them to higher orders, and also report on ongoing Lagrangian particle tracking experiments.

Christian Kuchler
Max Planck Institute for Dynamics and Self-Organization

Date submitted: 03 Aug 2020 Electronic form version 1.4