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First Results at ultra-high R_λ in a wind tunnel CHRISTIAN KUECHLER, EBERHARD BODENSCHATZ, Max Planck Institute for Dynamics and Self-Organization, GREGORY P. BEWLEY, Cornell University — With a new active grid installed, the Variable Density Turbulence Tunnel (VDTT) at the Max-Planck-Institute for Dynamics and Self-Organization produced homogeneous turbulence at Reynolds numbers up to $R_\lambda \approx 7500$. The active grid consisted of 111 individually controllable flaps that produced more intense turbulence than classical fixed grids. We varied the Reynolds number by changing the pressure of sulfur hexafluoride gas in the tunnel between 0.5 and 15 bar, which changes the viscosity of the gas[1]. With hot wire probes called NSTAPs that were 30 microns long[2], we measured velocity spectra and structure functions. While a bottleneck is present in the spectra at Reynolds numbers up to $R_\lambda < 3000$, the bottleneck weakens and disappears at higher R_λ. We compare this observation with measurements made in the field and with computer simulations.

[1]E. Bodenschatz et al, *Rev. Sci. Inst.* **82**(11)
[2]S. Bailey et al, *J. Flu. Mech.* **663**

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