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Role of large scale motion in high Re channel flow[1] MYOUNGKYU LEE, ROBERT D. MOSER, University of Texas at Austin — Direct numerical simulations (DNS) of turbulent channel flow at Reynolds numbers up to $Re_\tau \approx 5200$ have been performed to study high Reynolds number wall-bounded turbulence. DNS result have shown that $Re_\tau \approx 5200$ is high enough to exhibit scale separation between the near-wall and outer regions. [Lee & Moser, *J. Fluid Mech.*, vol 774, 2015]. In this presentation we focus on the role of large scale motion on the transport of turbulent kinetic energy, $u_i' u_i'/2$, and Reynolds stress, $u'v'$. Spectral analysis of the evolution equation for the two-point correlation is performed to investigate the contribution of motions at different length scales to transport. It is shown that only the turbulent transport terms show significant Re dependencies. Furthermore, the turbulent transport terms can be decomposed into two parts, one that contributes to transport in the wall-normal direction and one that is responsible for transfer between length scales. The results show that the large scale motion in the outer region has direct effects on the flow in the near-wall region through transport of turbulent kinetic energy and Reynolds stress.

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