Turbulent Poiseuille & Couette flows at high Re[1] MYOUNGKYU
LEE, ROBERT D. MOSER, The University of Texas at Austin — We present the
results of direct numerical simulation (DNS) of high Re turbulent Poiseuille and
Couette flows. Couette flow has been simulated with a streamwise (x) domain that
is $100\pi\delta$ long at Reynolds number up to $Re_\tau \approx 500$. In addition Poiseuille flow simu-
lations up to $Re_\tau \approx 5200$ were performed (Lee & Moser, *J. Fluid Mech.*, **774**, 2015).
In Couette flow, extremely large scale motions, which are approximately $50\pi\delta$ long in
the x-direction with very strong intensity, have been observed. In this presentation
we will focus on a comparison between these two flows in terms of the vorticity-
velocity co-spectra, which are interesting because of the relationship between the
Reynolds stress and the velocity-vorticity correlation ($\partial_y \langle u'v' \rangle = \langle w'\omega_y' \rangle - \langle v'\omega_z' \rangle$).
Also considered will be the spectra of the turbulent transport term in the evolution
equation for the turbulent kinetic energy. In both (co)-spectra it is shown that the
difference between the two flows at high Re are primarily at large scales.

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