

Abstract Submitted
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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 simulations 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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