Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Large- and very-large-scale motions in wall-bounded flows up to $\delta^+ \approx 2000$[1] JUAN A. SILLERO, JAVIER JIMÉNEZ, U. Politécnica Madrid — Large- (LSM) and very-large-scale motions (VLSM) are investigated using DNSes of turbulent boundary layers and channels in very long computational domains, reaching $\delta^+ \approx 2000$. Two-dimensional connected regions deviating above or below the local mean by more than a given threshold, are constructed in wall-parallel planes for the velocity components and for the pressure, and probability density functions are computed for their streamwise and spanwise lengths. Exponential tails are observed in the buffer, logarithmic and outer regions, that are characteristic of Poisson accretion processes, suggesting that the structures grow by merging smaller ones. In addition, analysis of the tails provides evidence for the presence of VLSMs in u, whereas only LSMs are present in the transversal velocities (v, w) and in the pressure. Although the size of the structures depends on the thresholding value – chosen here as the fraction of the standard deviation at each height that maximizes the number of regions – it is found that boundary layers are shorter and narrower than channels, in agreement with two-point correlations measurements.

[1]Funded by CICYT, INCITE and ERC.

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Date submitted: 02 Aug 2013 Electronic form version 1.4