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Small-scale statistics in direct numerical simulation of turbulent channel flow up to Re_τ = 5120 KOJI MORISHITA, Kobe University, JST CREST, TAKASHI ISHIHARA, Nagoya University, JST CREST, YUKIO KANEDA, Aichi Institute of Technology — Small-scale statistics in high-Reynolds number turbulent channel flow are studied by direct numerical simulation (DNS) with Re_τ up to 5120. The DNS exhibits a range where the mean stream-wise velocity U fits well to the log-law and the energy dissipation rate is nearly inversely proportional to the distance from the wall. The width of the range increases with the Reynolds number. In the range, the spectrum $E_{12}(k_1)$ of the cross correlation between the stream-wise and span-wise fluctuating velocity components fits well to the -7/3 power law in the inertial sub-range, where k_1 is the wave number in the stream wise direction. Its pre-factor is in good agreement with laboratory experiments of turbulent boundary layer by Saddoughi et al. (1994) and Tsuji (2003), and DNS of homogeneous turbulent shear flow by Ishihara et al.(2002).

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