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Spatial properties of large-scale structure in a turbulent boundary layer[1] JINYUL HWANG, JIN LEE, KAIST, SEO YOON JUNG, KAERI, TAMER A. ZAKI, Imperial College London, HYUNG JIN SUNG, KAIST — Direct numerical simulation (DNS) database of a zero pressure-gradient turbulent boundary layer was scrutinized to investigate the spatial distribution of vortices around a streamwise-elongated low-speed structure. The turbulent flow field has been numerically produced by preceding the bypass transition simulation using the isotropic free-stream turbulence, in which the Reynolds number reaches up to $Re_\theta = 3280$. In the present study, the low-speed structures and vortices have been identified and tracked in order to obtain spatial properties of the large-scale structures. The information about the inclination angle, distance and population of individual vortices on the long streamwise structure has been investigated. Finally, the present study provides statistical evidence on the formation of large-scale packet-like structure and its variation along the downstream.

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