

Abstract Submitted  
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**Role of wall-attached structures in the interface of the quiescent core region in turbulent pipe flow**<sup>1</sup> JONGMIN YANG, JINYUL HWANG, HYUNG JIN SUNG, Korea Adv Inst of Sci Tech — The effects of low- and high-speed structures on the interface of the quiescent core region are explored using direct numerical simulation data of turbulent pipe flow. The quiescent core region is a uniform momentum zone located at the center of the pipe flow, which contains the highest streamwise momentum with a low level of turbulence. The interface of the quiescent core region can be identified from the probability density function of the streamwise modal velocity. In the vicinity of the interface of the quiescent core region, the streamwise velocity changes abruptly. The abrupt jump in velocity causes an increase of the velocity gradient. The interface of the quiescent core region is similar to the laminar superlayer in turbulent/non-turbulent interface. The interface of the quiescent core region contains the low- and high-speed structures. They can be classified into wall-attached and detached structures depending on the distance between the structures and the wall. The influence of the detached structures accounted for most of the number of detected structures is negligible due to its small volume. Conversely, the wall-attached structures adjacent to the interface have a huge influence on the statistical amount of the interface, such as entrainment characteristics.

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