

Abstract Submitted  
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**Modification of large-scale motions in a turbulent pipe flow** KOHEI SENSU, HIROAKI SHINOZAKI, JUN SAKAKIBARA, Meiji Univ — We performed experiments to modify the flow structures in a fully developed turbulent flow in a straight round pipe. The modification of the flow was achieved by installing a short coaxial inner pipe. The inner pipe has ability to add continuous suction or blowing disturbance through its outer surface. The experiments were conducted at a Reynolds number of 44,000 with seven different disturbance patterns. The wall static pressure was measured and pipe friction coefficient was evaluated. The velocity distribution was measured with PIV and very large scale motions (VLSMs) were visualized. Pipe friction coefficient was increased by installing the inner pipe, while turbulence intensities over the cross section were reduced. Slight change of the friction was observed if the disturbance was added. We decomposed fluctuating velocity field in the azimuthal direction by a Fourier series expansion. As a result, we obtained that contribution of lower azimuthal mode numbers ( $m = 2, 3, 4$ ) reduced while the higher modes increased. This was consistent with the observation of visualized very large scale motions.

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