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Study of toroidal rotation and ion temperature pedestals between ELM bursts on KSTAR H-mode plasmas

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Steep pedestal profiles of ion temperature (T_i) and toroidal rotation (V_Φ) are routinely observed in neutral beam injection (NBI)-heated KSTAR H-mode plasmas [W. H. Ko et al Nucl. Fusion **55** 083013 (2015)]. In this work, we report a result of detailed analysis of pedestal characteristics. By analyzing a set of data with different experimental conditions, we show that T_i and V_Φ pedestals are coupled each other whose correlation becomes stronger when NBI-power is low. This suggests the existence of intrinsic toroidal torque in the pedestal. To investigate further the magnitude and the role of intrinsic torque, we perform a 1D transport analysis and find that the prevalence of residual micro-turbulences is necessary to explain momentum transport in the pedestal. The estimated strength of intrinsic torque is shown to be comparable to that from a 2.7MW NBI source. Finally, we show that non-diffusive momentum flux is indispensable to explain momentum transport in the pedestal and a residual stress model fits the observed momentum flux reasonably.

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