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EX/P3-32: Toroidal Rotation Characteristics in KSTAR Plasmas

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Investigation of the toroidal rotation is one of the most important topics for the magnetically confined fusion plasma researches since it is essential for the stabilization of resistive wall modes (RWMs) and its shear plays an important role to improve plasma confinement by suppressing turbulent transport. Impurity toroidal rotation has been observed in the core region of KSTAR plasmas from the Doppler shift of helium-like argon x-ray lines with various plasma discharges including pure ohmic heating, electron cyclotron resonance heating (ECRH), and neutral beam injection (NBI). The direction of the impurity rotation in the KSTAR ohmic plasma discharges is the same as that of the electrons, opposite to the plasma current, and the magnitude of the core toroidal rotation velocity is consistent with that of the ECEI measurement. In NBI heated plasmas, the toroidal rotation, V⊠, is co-current direction and the speed is increased up to 200 km/s. The core toroidal rotation velocity directly changed when large type-I edge localized modes occurred in the H-mode discharge. This paper will describe the experimental results of impurity toroidal rotation characteristics with ohmic plasmas as well as plasmas with ECRH, and NBI heating in KSTAR plasmas.

Country or International Organization of Primary Author

Korea

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SNU, PPPL

Primary author: Mr LEE, Sang Gon (Republic of Korea)

Co-authors: Mr LEE, H. H. (National Fusion Research Institute); Dr KWON, J. M. (National Fusion Research Institute); Ms YOO, J. W. (National Fusion Research Institute); Dr KWAK, Jong-Gu (National Fusion Research Institute); Dr HILL, Kenneth (Princeton Plasma Physics Laboratory); Dr TERZOLO, Laurent (National Fusion Research Institute); Dr BITTER, Manfred (Princeton Plasma Physics Laboratory); Dr KO, W. H. (National Fusion Research Institute); Dr OH, Y. K. (National Fusion Research Institute); Mr KIM, Y. S. (National Fusion Research Institute); Prof. NA, Yong-Su (Seoul National University); Dr SHI, Yuejiang (National Fusion Research Institute)

Presenter: Mr LEE, Sang Gon (Republic of Korea)

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