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Toroidal rotation studies in KSTAR[1] S.G. LEE, H.H. LEE, National Fusion Research Institute, J.W. YOO, Korea University of Science and Technology, Y.S. KIM, W.H. KO, L. TERZOLO, National Fusion Research Institute, M. BITTER, K. HILL, Princeton Plasma Physics Laboratory, KSTAR TEAM — 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 and its shear plays an important role to improve plasma confinement by suppressing turbulent transport. The most advantage of KSTAR tokamak for toroidal rotation studies is that it equips two main diagnostics including the high-resolution X-ray imaging crystal spectrometer (XICS) and charge exchange spectroscopy (CES). Simultaneous core toroidal rotation and ion temperature measurements of different impurity species from the XICS and CES have shown in reasonable agreement with various plasma discharges in KSTAR. It has been observed that the toroidal rotation in KSTAR is faster than that of other tokamak devices with similar machine size and momentum input. This may due to an intrinsically low toroidal field ripple and error field of the KSTAR device. A strong braking of the toroidal rotation by the n = 1 non-resonant magnetic perturbations (NRMPs) also indicates these low toroidal field ripple and error field. Recently, it has been found that n = 2 NRMPs can also damp the toroidal rotation in KSTAR. The detail toroidal rotation studies will be presented.

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