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Toroidal Rotation and Momentum Transport Studies in KSTAR Plasmas

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An investigation of toroidal rotation and momentum transport was carried out at KSTAR. The impurity toroidal rotation has been observed in the core region from the Doppler shift of helium-like argon x-ray line with various plasma discharges including a pure ohmic heating and neutral beam injection (NBI). In the ohmic plasmas, the direction and magnitude of the core rotation strongly depends on the initial plasma conditions during the plasma current ramp-up phase, and the measured ion thermal Mach number is proportional to the normalized plasma pressure. In the NBI heated plasmas, the core toroidal rotation is proportional to the ion temperature up to ~ 2.5 keV, and then it is saturated to ~ 250 km/sec with the ion temperature up to 4 keV. This observation is under consideration with the NUBEAM simulations focusing on the effects of the beam energy and momentum transport. This paper will describe the experimental results of the toroidal rotation and momentum transport studies in the KSTAR device.

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