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Flow profile measurement with multi-Mach probes on the HIST spherical torus device S. HASHIMOTO, T. NISHIOKA, K. ANDO, Y. KIKUCHI, N. FUKUMOTO, M. NAGATA, University of Hyogo — Role of plasma flow during MHD relaxation and magnetic reconnection processes is still underlying physics. The HIST spherical torus can generate various spherical torus (ST) configurations by changing the external toroidal magnetic field. Especially, the flipped ST (F-ST) configuration has been for the first time found in the HIST device [1]. In the present study, plasma flow measurements were performed by multi-Mach probes in the ST and the F-ST configurations. In addition, the measured plasma flow was compared with that evaluated by an ion Doppler spectrometer (IDS) system and plasma images measured by a high-speed camera. As the result, it was shown that the toroidal plasma flow (~ 20 km/s) at the location far from the plasma gun was clearly reversed after the transition from the ST to the F-ST. However, the direction of the toroidal flow was not changed near the plasma gun. Therefore, it can be considered that there are flipped and non-reversal regions in the plasma. The result agrees well with a magnetic configuration predicted by magnetic field measurements. The plasma images measured by the high-speed camera also indicated that a helically twisted structure appeared from the gun region, and it localized at the edge region. [1] M. Nagata et al., Phys. Rev. Lett. **90**, pp. 225001-225004 (2003).

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