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Shape reconstruction of merging spherical tokamak plasma in UTST device TOMOHIKO USHIKI, The University of Tokyo, MASAFUMI ITAGAKI, Hokkaido University, MICHIAKI INOMOTO, The University of Tokyo — Spherical tokamak (ST) merging method is one of the ST start-up methods which heats the plasma through magnetic reconnection. In the present study reconstruction of eddy current profile and plasma shape was performed during spherical tokamak merging only using external sensor signals by the Cauchy condition surface (CCS) method. CCS method have been implemented for JT-60 (QST), QUEST (Kyushu University), KSTAR (NFRI), RELAX (KIT), and LHD (Nifs). In this method, CCS was assumed inside each plasmas, where both flux function and its normal derivative are unknown. Effect of plasma current was replaced by the boundary condition of CCS, assuming vacuum field everywhere. Also, the nodal points for the boundary integrals of eddy current density were set using quadratic elements in order to express the complicated vacuum vessel shape. Reconstructed profiles of the eddy current and the magnetic flux were well coincided with the reference in each phase of merging process. Magnetic sensor installation plan for UTST was determined from these calculation results. Acknowledgements This work was supported by the JSPS A3 Foresight Program Innovative Tokamak Plasma Startup and Current Drive in Spherical Torus.

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