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Plasma shape reconstruction of merging spherical tokamak based on modified CCS method TOMOHIKO USHIKI, MICHIAKI INOMOTO, Graduate School of Frontier Sciences, The University of Tokyo, MASAFUMI ITAGAKI, Hokkaido University, STEVEN MCNAMARA, Tokamak Energy Ltd — The merging start-up method is the one of the CS-free start-up schemes that has the advantage of high plasma temperature and density because it involves reconnection heating and compression processes. In order to achieve optimal merging operations, the initial two STs should have identical plasma currents and shapes, and then move symmetrically toward the center of the device with appropriate velocity. Furthermore, from the viewpoint of the compression effect, controlling the plasma major radius is also important. To realize the active feedback control of the plasma currents, the positions, and the shapes of the two initial STs and to optimize the plasma parameters described above, accurate estimation of the plasma boundary shape is highly important. In the present work, the Modified-CCS method is demonstrated to reconstruct the plasma boundary shapes as well as the eddy current profiles in the UTST (The University of Tokyo) and ST40 device (Tokamak Energy Ltd). The present research results demonstrate the effectiveness of the M-CCS method in the reconstruction analyses of ST merging

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