

Abstract Submitted  
for the DPP12 Meeting of  
The American Physical Society

**Conceptual Study of the Steady-state of the Merging Start-up ST DEMO Reactor**<sup>1</sup> KEII GI, TORU II, MICHIAKI INOMOTO, YASUSHI ONO, The University of Tokyo, KENJI TOBITA, Japan Atomic Energy Agency (JAEA) — We studied a new conceptual design of the advanced ST DEMO reactor with the merging start-up [1], which has been developed in TS-3, TS-4, UTST and MAST. Its unique characteristics are low aspect ratio ( $A < 2.0$ ), high-beta ( $\beta > 30$  [%]) due to the significant heating of merging [2], high bootstrap current fraction ( $f_{BS} > 80$  [%]), stable high-elongation ( $\kappa > 2.5$ ) and rapid non-inductive ramp-up by the plasma merging method. First, we calculated the appropriate parameters set by the 0-D system code: TPC. Then, we produced the 2-D axisymmetric MHD equilibrium consistent with the result of the 0-D system code using the 2-D free boundary equilibrium code: MEUDAS, interactively recalculating the parameters set by TPC. The experimentally obtained profiles in TS-4 and MAST were used for our calculation model. We will also derive the current profile by ACCOME code (analyzer for current drive consistent with MHD equilibrium), and confirm the beta limit by the linear ideal MHD stability analysis code: ERATO-J to develop this conceptual study.

[1] Y. Ono et al., 19th IAEA Fusion Energy Conference, EX/P3-15 (2002).

[2] Y. Ono et al., Phys. Rev. Lett. 107, 185001 (2011).

<sup>1</sup>This work was supported by Grant-in-Aid for JSPS Fellows 24-1756 and Core-to-Core Program 22001.

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Date submitted: 18 Jul 2012

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