

Abstract Submitted  
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**Simulation of plasma current ramp-up with reduced magnetic flux consumption in JT-60SA using TOPICS transport code** TAKUMA WAKATSUKI, TAKAHIRO SUZUKI, NOBUHIKO HAYASHI, SHUNSUKE IDE, Japan Atomic Energy Agency, YUICHI TAKASE, The University of Tokyo — Feasibility of current ramp-up with reduced central solenoid (CS) magnetic flux consumption should be demonstrated to envision compact tokamak reactors such as SlimCS. In JT-60SA, issues concerning compact steady-state reactors can be investigated using a variety of heating and current drive combinations (positive and negative ion source based neutral beams and electron cyclotron waves). In this paper, plasma current ramp-up scenarios with reduced CS flux consumption has been investigated on JT-60SA using TOPICS transport code. Time evolution of the temperature profile is calculated using the CDBM model with prescribed density profile. In order to minimize the resistive flux consumption, we aim at ramping-up the plasma current from 0.6 MA to 2.1 MA maintaining a non-inductive full current drive (full-CD) condition. It has been found that a large bootstrap current fraction (>60 %) is needed to achieve a full-CD condition within the heating and CD capability planned in JT-60SA. This condition can be achieved with formation of a strong internal transport barrier. As a result, the resistive flux consumption can be reduced by a factor of 10. Since  $\beta_N$  exceeds  $4 \times \ln(3)$  during the ramp-up phase, we will also discuss the MHD stability.

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