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**One-Dimensional Analysis of ECRH Preionization for Plasma Start-up in JT-60SA** KAZUYOSHI HADA, Graduate School of Energy Science, Kyoto University, Uji, Kyoto, Japan, KAZUNOBU NAGASAKI, KAI MASUDA, Institute of Advanced Energy , Kyoto University, Uji, Kyoto, Japan, RYOTA KINJO, Graduate School of Energy Science, Kyoto University, Uji, Kyoto, Japan, SHUNSUKE IDE, AKIHIKO ISAYAMA, Japan Atomic Energy Agency, Naka, Ibaraki, Japan — Preionization using Electron Cyclotron Resonance Heating (ECRH) has been proposed to ensure reliable plasma breakdown in superconducting tokamaks where applicable loop voltage is low compared with conventional tokamaks. In this paper, we report results of one-dimensional (1-D) analysis of plasma start-up assisted by ECRH in the JT-60SA superconducting tokamak, which is now under construction. The 1-D model consists of five temporal diffusion-type equations: electron and neutral density equations, electron and ion energy density equations, and a toroidal current equation. The calculation results show that the required ECRH power is estimated to be lower than the zero-dimensional analysis results [1] because of localized power density, and that the plasma start-up is dependent on the ECRH power absorption profile and the resonance location. The ECRH preionization is more effective for plasma start-up when narrowing the ECRH power absorption radius and locating the resonance location close to the plasma core. We will also discuss the difference in plasma production between fundamental and higher harmonic ECRH.

[1] K. Hada *et al.*, presented at JPS Annual Meeting, March 24-27, 2012

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