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Experiment of beam particle self interaction in JT-60U K. OKANO, R. HIWATARI, Central Research Institute of Electric power Industry (CRIEPI), T. SUZUKI, N. UMEDA, K. MASAKI, K. TOBITA, T. FUJITA, Japan Atomic Energy Research Institute(JAERI) — Circulating fast ions generated by NBI will affect the beam stopping cross-section of the neutral beam itself through the interaction between the neutrals and the fast ions, i.e. "beam-particle self-interaction (BPSI)." Our estimation has shown that the BPSI effect will be detectable in JT-60U by using 350keV N-NB injection. The beam power and energy were 1.5 MW and 350 keV, respectively. In order to estimate the shine-through power, heat transport in the facing tile on the N-NB line has been analyzed. Without the BPSI effect, the shine-through power should be in proportion to the beam power and therefore to the beam current Iacc. It is found that, however, the time evolution of the tile temperature is not reproduced with the shine-through power in proportion to Iacc in a low density plasma (1x10ˆ19mˆ-3). Assuming that the shine-through fraction decreases exponentially about by 35% within several hundred msec, the time evolution of tile temperature has been well reproduced. This time scale is close to the build-up time of fast ion component due to N-NB injection (∼200 msec), and the reduction rate of shine-through is consistent to the estimated range by the theory. Therefore, we conclude that the reduction of beam shine-trough observed in this experiment is due to the BPSI effect.

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