Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Predictive Simulation of Profile Modification by Hydrogenic Pellet Injection into Tokamak Plasma KI MIN KIM, HYUNSUN HAN, SANG HEE HONG, Dep. of Nuclear Engineering, Seoul National University — Pellet injection is a useful method for fueling and plasma profile control in the advanced tokamak operation. In this numerical work, profile modifications by hydrogenic pellet injection into tokamak plasmas have been simulated with a 1.5D core transport code. A neutral gas shielding (NGS) model is coupled to the transport code to calculate the pellet ablation rate during pellet passing through the background plasma. At the same time, a model of pellet drift caused by the variation of the toroidal magnetic field is taken into account. Simulation results present the plasma pressure profiles modified by the pellet injection in the H-mode operation, and the diverse characteristics of pellet ablations are compared according to background plasma property, pellet parameter and injecting location. The pellet injection from the high-filed side (HFS) predicts the deeper penetration of pellet materials into the core plasmas compared with the one from the low-field side (LFS) injection because of the pellet movement in the direction of major radius after ablation. Based on the simulation results, a pellet pace making scenario using the hydrogenic pellet injection method is proposed for ELM mitigation in the ELMy H-mode discharge, and tested under the KSTAR tokamak baseline operation conditions.

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Date submitted: 17 Jul 2008 Electronic form version 1.4