Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

SOL-Divertor Plasma Simulation in the KSTAR Tokamak with a Neutral Transport Model Using the TEP method HYUN-SUN HAN, KI MIN KIM, SANG HEE HONG, Seoul National University — A two-dimensional numerical simulation has been carried out to analyze the transport phenomena of plasma and neutrals in Scrape- off Layer (SOL) and divertor region of the Korea Superconducting Tokamak Advanced Research (KSTAR) tokamak. In this numerical work, the transmission and escape probability (TEP) method is used for a neutral transport model by adapting the GTNEUT [1] code, which is coupled with a plasma transport model based on the Braginskii's fluid formulation. Prior to combining the GTNEUT code with the plasma transport one, preliminary tests are conducted by comparison with a Monte Carlo method to check the numerical accuracy and efficiency of the neutral model. A performance improvement of computing time is achieved during the coupling processes by pre-computing the various transmission coefficients and setting up an interpolation lookup table. As results of the simulation, plasma density and temperature distributions in the SOL-divertor region are calculated for the baseline operation of the KSTAR tokamak. This integrated modeling method could be extended to the simulation of more complicated edge transport for the advanced tokamak operation including impurity transport.
[1] J. Mandrekas, Comput. Phys. Comm., 161, 36 (2004)

Hyun-Sun Han
Seoul National University

Date submitted: 19 Jul 2007 Electronic form version 1.4