Contribution ID: **499** Type: **Poster**

Predictive Simulations of Core-Edge Plasma for Tokamak Plasma using BALDUR Code

Friday, October 26, 2018 2:00 PM (20 minutes)

Core-Edge simulations of the low confinement mode (L-mode) plasma are carried out using 1.5D BALDUR integrated predictive modeling code in. In each simulation, the plasma current, temperatures, and density profiles for both core and SOL regions are self-consistently evolved. The plasma profiles in the SOL region are simulated by integrating the fluid equations, including sources, along and perpendicular to the field lines. The transport coefficients in the SOL region are determined by either one of three transport models: (A) the neoclassical transport, (B) constant transport coefficients, and (C) the anomalous transport. The solutions in the SOL subsequently provide as the boundary conditions of the core plasma region. The core plasma transport model is described using a combination of anomalous transport by Multi-Mode-Model version 1995 (MMM95) and neoclassical transport provided by NCLASS module. By comparing with 38 L-mode discharges from TFTR, DIII-D, and JET, it is found that the mean standard deviations of the plasma profiles with SOL transport modeled by the anomalous transport are 19% for the electron density, 21% for the electron temperature, and 26% for the ion temperature, while the simulation results using the SOL transport modeled with a fixed constant or the neoclassical transport show higher deviation. Furthermore, the BADLUR code is used to predict the plasma profiles near the edge of the HT-6M tokamak based on the previous developed model. When the plasma current is kept constant and the average density is varied between $1 \times 10^{19} - 9 \times 10^{19}$ $\mathrm{m}{-3}$, the simulations show that power loaded to the limiter is about 30 - 550 kW and the total ion flux to the SOL region is about $2 \times 10^{19} - 2 \times 10^{20}$ s^{-1}. Note that no auxiliary heating is provided. The temperature at the separatrix is found to be about 5 - 7 eV.

Country or International Organization

Thailand

Paper Number

TH/P8-6

Primary author: Dr WISITSORASAK, Apiwat (King Mongkut's University of Technology Thonburi)

Co-authors: Dr CHATTHONG, Boonyarit (Department of Physics, Faculty of Science, Prince of Songkla University); Mrs PROMPING, Jiraporn (Thailand Institute of Nuclear Technology); Dr SANGAROON, Siriyaporn (Mahasarakham University); Dr ONJUN, thawatchai (Sirindhorn International Institute of Technology)

Presenter: Dr WISITSORASAK, Apiwat (King Mongkut's University of Technology Thonburi)

Session Classification: P8 Posters