Seminar

Institute for Plasma Research

Title :   Simulation of edge-plasmas of ADITYA-U tokamak using UEDGE code

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Date :   17th February 2021 (Wednesday)

Time :   03:30 PM

Venue :   Online - Join the talk:
               https://meet.ipr.res.in/ritu_pdfTalk

Abstract :

The edge plasma of various tokamaks is one of the important topics of research in fusion community because the edge-region regulates the whole plasma column through different atomic/molecular collisional processes between fuel neutral and plasma particles along with parallel and cross field transport of charged particles near the limiter/divertor and vessel wall. An attempt has been made to study the edge plasma of ADITYA-U tokamak using edge-plasma-fluid-transport UEDGE code. Initially, the Python based source code is installed and benchmarked with the earlier findings of edge plasma of various tokamaks with divertor configuration. Besides that, a MATLAB / Python based mesh generator program is developed inhouse for ADITYA-U tokamak having limiter configuration with the help of reconstructed plasma equilibrium. First, different cell structures are configured to investigate the edge plasma for ADITYA-U tokamak with limiter geometry. A mesh structure of less than 0.5 cm grid size along radial direction and 1 cm along poloidal direction, which becomes nonuniform near the limiter, is considered for the input to the UEDGE code to estimate the edge plasma parameters of ADITYA-U. The edge radial profiles of plasma parameters such as electron temperature and the plasma density are obtained from UEDGE code over a range of input parameters. The simulation results are compared with the existing Langmuir probe measurements and are found in reasonable agreement with the probe measurements. The coupling of UEDGE code with DEGAS2 code is underway, which will deliver the information on neutral dynamics.