

Seminar

Institute for Plasma Research

Title : Study of generation and transport of runaway electrons in Aditya and Aditya-U tokamak

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Date : 22nd January 2020 (Wednesday)

Time : 04:15 PM

Venue : Seminar Hall, IPR

Abstract :

Runaway electrons (REs) are those electrons, which are collisionally decoupled from the bulk plasma and accelerate freely to very high energies (~ several tens of MeV). Robust schemes for control and mitigation of these REs are the need of the hour, as they pose a severe threat to the peripheral plasma facing components of a tokamak. In ADITYA/ADITYA-U tokamak, observations of RE generation by sawteeth instability and their subsequent loss to the limiter revealed that overlapping of two magnetic islands ($m/n=2/1$ & $3/1$) significantly enhances the radial RE loss, whereas the RE loss is reduced when good magnetic surfaces exist between the islands. Analyzing a large number of discharges, it has been observed that the presence of a single, large $m/n=2/1$ magnetic island ($> 5 - 10$ % of minor radius) tends to decrease the RE loss, whereas stochastic magnetic fluctuations enhance the loss. In order to characterize the effect of these $m/n=2/1$ MHD modes on RE loss, the MHD mode amplitude and rotation frequency have been altered in a controlled manner by periodic gas puffing during the course of a single discharge. These periodic gas-puffs also resulted in a reduction of turbulent electrostatic fluctuations in edge/SOL plasma region leading to a reduction in RE loss.
