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Seminar

Institute for Plasma Research

Title: Design, Development and Characterization of Doppler Shifted Spectroscopic Diagnostic system for negative hydrogen ion beam in fusion application

Speaker: Mr. Arnab Deka
Institute for Plasma Research, Gandhinagar

Date: 29th September 2023 (Friday)

Time: 10:30 AM

Venue: Seminar Hall, IPR

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Abstract

Doppler Shifted Spectroscopic Diagnostic is one of the most useful non-invasive diagnostic to characterize a neutral beam in fusion application. A negative hydrogen ion-based neutral beam injector (NNBI) is used in large-scale fusion reactors (ITER class) for heating and diagnostic purposes. At Institute for Plasma Research, an NNBI system, named Indian Test Facility (INTF) is being constructed to test the Diagnostics Neutral Beam (DNB) of the International Thermonuclear Experimental Reactor (ITER), France. To characterize the DNB system in INTF the beam divergence and the homogeneity need to be estimated by Doppler Shift Spectroscopy (DSS). The present work involves the design, development and characterization of DSS diagnostics. To design the diagnostics optical design of the line of sights and selection of optical systems and modelling of the beam emissions and simulation of the signals have been done and data processing and codes to estimate beam divergence and beam inhomogeneity have been developed. The DSS system for INTF has been modelled and the signals the simulated and benchmarked with experimental data. Experiments have been performed to estimate the beam divergence and the beam inhomogeneity of the ROBIN (Rf Operated Beam source in India for Negative ions) system. In this talk, the design, development and characterization of the DSS diagnostics for an NNBI system will be presented.
