Development of data acquisition and control system for multipoint plasma electron density measurement.

Abstract

Background: Microwave interferometer is used as diagnostic system for real time line integrated plasma electron density measurement. The tokamak plasma electron density at different special point is measured using individual heterodyne interferometer. The electron density is linearly related to the phase difference between the transmitted and received microwave which is penetrated through the plasma.

Objective: The single channel 100 GHz interferometer is operational in ADITYA-U Tokamak. The similar multi special point interferometer is required for plasma electron density profile generation. The data acquisition and control system is required to develop for multi-point interferometer I and Q signal acquisition and phase measurement from I and Q signal. The estimated phase from individual interferometer is directly related to the electron density of the plasma which will be used for density profile generation. The student will be work on development of individual phase measurement for I and Q signal and emended with the multipoint density measurement and control logic implementation for density profile generation in FPGA.

Deliverables:

(1) Phase measurement techniques implementation in FPGA.

(2) Implementation of multipoint electron density measurement using interferometer.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: M.E./M.Tech Electronics and Instrumentation Engineering

3) Academic Project duration:

(a) Total academic project duration: 52 Weeks
(b) Student's presence at IPR for academic project work: 4 Full working Days per week

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