

# **I & C Development of Fourier Transform Spectrometer (FTS) system for ECE Diagnostic**

## **Abstract**

The ITER FTS Electron cyclotron Emission (ECE) Diagnostic has a Secondary role to measure the distribution of non-thermal electrons and power loss due to ECE radiation for advanced physics studies. This diagnostic performs physics studies by measuring ECE radiation temperature in multiple harmonics. The typical FTS Diagnostic system consists of Antenna (or Front-end optics); Transmission Lines systems and Fourier Transform Spectrometer.

The Fourier transform spectrometer consists of an Interferometric unit, Bolometer detectors, a preamplifier, and a Data acquisition system and control software. The control software will be used to control the Interferogram acquisition. The Fast Data acquisition system (Analog to Digital Conversion) will digitize the FTS detector signal based on the triggering pulse generated from the position metrology system. The slow DAQ system will be used to acquire and monitor the temperature, and pressure of the FTS Vessel and Detector cryostat.

In this project, the Project student will perform the following activities

Work Scope of Project student:

- ? Understanding of FTS Electron Cyclotron Emission (ECE) Diagnostic system with Instrumentation & Control
- ? Develop LabVIEW-based I & C of FTS detector system
- ? Develop I & C interfaces of all FTS auxiliary systems (Vacuum Pump, Cryo -cooler, signal generator, amplifier, etc.) with LabVIEW software
- ? Explore and Work towards the development of I & C for prototype FTS based on the CODAC core platform, which is EPICS-based software
- ? Prepare report as per Project completion requirement

Eligibility: This project requires understanding of basic instrumentation, control system, & data acquisition, C/C++ language, LabVIEW, and EPICS Software. Only students of Electronics/ Instrumentation Engineering branches can submit their applications.

## **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: 48 Weeks**

**(b) Student's presence at IPR for academic project work: 5 Full working Days per week**

**Email to: ravinder.kumar@iter-india.org[Guide's e-mail address] and project\_ece@ipr.res.in [Academic Project Coordinator's e-mail address]**

**Phone Number: 079 -07923269864 [Guide's phone number]**