



Contribution ID: 60

Type: Oral

Oral_24: Progress in ITER ECE Diagnostic Design and Integration

Thursday, 9 September 2021 16:00 (30 minutes)

Abstract. The ITER Electron Cyclotron Emission (ECE) diagnostic has primary roles in providing measurements of the core electron temperature profile and the electron temperature fluctuation associated with the Neoclassical Tearing Modes (NTM). Indian domestic agency (IN-DA) and US-DA share the responsibility to supply this diagnostic. The IN-DA scope has passed its Preliminary Design Review (PDR) and is progressing towards the Final Design Review (FDR). In parallel, the diagnostic integration in the Equatorial Port is ongoing. Several so-called captive components for transmission lines have passed FDR and will be manufactured for installation in the tokamak building soon. The ITER ECE system includes radial and oblique lines-of-sight. Four 45-meter long low-loss transmission lines are designed to transmit mm-wave power in the frequency range of 70- 1000 GHz in both X- and O-mode polarization from the port plug to the ECE instrumentation room in the diagnostic building. Prototype transmission lines are being tested. A prototype polarizing Martin-Puplett type Fourier Transform Spectrometer (FTS), operating in the frequency range 70-1000 GHz, features an in-vacuo fast scanning mechanism and a cryo-cooled dual-channel THz detector system. Its performance has been assessed in detail against ITER requirements. Assessment of the instrumentation and control requirements, functional and non-functional requirements, operation procedures, plant automation are ongoing. The current status of the diagnostic, together with integration activities, is presented.

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