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### Overview of Ion Source Characterization Diagnostics in Indian Test Facility (INTF)

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Indian Test facility (INTF) is envisaged to characterize ITER Diagnostic Neutral Beam (DNB) system and establish the functionality of its eight inductively coupled RF plasma driver based negative hydrogen ion source and its beam line components. A number of diagnostics are planned in INTF to characterize the ion source performance. Negative ion source, where the negative hydrogen ion production is enhanced by Cesium evaporation, will be monitored by optical emission spectroscopy (OES) and cavity ring down spectroscopy (CRDS). Plasma near the extraction region in the ion source will be studied using standard electrostatic probes. The beam divergence and negative ion stripping losses are planned to be measured using Doppler Shift Spectroscopy. During initial phase of ion beam characterization, similar parameters will also be characterized with Carbon Fiber Composite (CFC) based infrared (IR) imaging diagnostics. Safe operation of the beam will be ensured by using standard thermocouples and standard electrical voltage-current measurement sensors. A novel concept based on plasma density dependent plasma impedance to characterize the RF driver plasma using RF electrical impedance matching parameters will be tested in INTF. The results from this novel method will be validated with OES data.

The paper will discuss about the overview of the complete INTF diagnostics including its present status of procurement, experimentation, interface with mechanical systems in INTF and integration with INTF data acquisition & control systems.