

Density profile measurements with a new fast sweep reflectometer on JET

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Abstract

A collaboration between UKAEA, IST and CEA is established since may 2008 to provide accurate density profile measurements on JET plasmas. 6 reflectometers are required, from 33 to 150GHz in Ordinary or Extraordinary polarisation mode, in order to cover each plasma configuration from L to H-mode over a broad range of magnetic field values (from 1.3 to 3.5 T). Density profiles will be measured from edge to magnetic axis, and sometimes beyond the axis on the high field side.

Three of these reflectometers have been designed and built by CEA. They will operate in the frequency ranges of 50-75 GHz (V-Band), 75-110 GHz (W-Band), in O-Mode or X-mode, and 110-150 GHz (D-band) in X-Mode. These reflectometers will perform routine profile measurements within 10 μ s, with heterodyne detection, to ensure high dynamic range sensitivity. Detection allows a separation between phase and amplitude information from the reflected signal. These diagnostics are based on recent technology developments already tested on Tore Supra, using Single Side Band Mixer and I/Q demodulator, which have been adapted to the JET configuration.

We will show the first measurements obtained with the 75-110GHz reflectometer on JET plasmas.