

Advanced reflectometer systems for the JET KG10 density profile diagnostic

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The new JET diagnostic should be able to provide high resolution density profiles aiming to study the evolution of transport barriers; pedestal survey; study of fast transient events (ELMs, pellets...) and coupling of RF heating. It is a very demanding system which accesses the machine through a long and complex transmission line and covers also long distances in the JET plasma.

IPFN constructed three of the system 6 channels and developed the controllers for all the 6 channels. Novel microwave technologies have been incorporated to improve the diagnostic performance. Here we present the main features of the systems; the choice of improved remote operation over TCPIP and the use of frequency translator techniques for signal generation along with custom made electronics for the critical parts of the system such as the tuning ramp generation and I&Q detection. Results from first tests using the MWA long transmission lines were made with and without plasma. These first measurements confirm the high system performance. The impact of the applied advanced techniques on the future development of a new generation of reflectometers able to cope with ITER relevant plasmas plus long and complex transmission lines is discussed.