Design of a fast-sweep profile reflectometry system on JET

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A new fast sweep reflectometry system dedicated to density measurement is being commissioned on JET tokamak. This system has been designed to use the actual waveguide infrastructure and to cover most of the JET plasma configurations. The aim is to produce density profiles covering the plasma from the low field side to the plasma centre with a high time resolution. In order to achieve these goals, 6 reflectometers will be used using both ordinary and extraordinary polarisation. The reflectometers will sweep 4 frequency bands from 33 GHz to 150 GHz in 10 μs. The physical and technical reasons leading to the frequency bands and polarisations choice will be discussed.

Only 4 corrugated waveguides are available for JET reflectometry. This project will have to share the waveguides with the actual correlation system. The microwave combiner system design, allowing the use of 10 reflectometers in 4 waveguides, will be presented. The performance of specially designed microwave filters and quasi-optical boxes will also be included. Finally the data acquisition system will be described.

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