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## Embedded reflectometry into additional heating launchers of WEST

*Monday 13 May 2024 14:00 (30 minutes)*

The performances of the WEST tokamak plasmas relies on additional heating system such as ICRH (Ion Cyclotron Resonance Heating) and LHCD (Lower Hybrid Current Drive). However, the coupling efficiency of these additional power systems strongly depends on the electron density in front of their launchers. Thus, in addition to the reflectometer with waveguide routes already installed in a LH launcher [1] we have now the possibility of performing density measurements in front of an ICRH antenna at three different poloidal and toroidal positions. The objective being to study eventual density asymmetries due to expected cell structures and sheath effects, in front of the antenna. The reflectometer is a W-band fast frequency swept system operating in X-mode which provides density profiles at the very edge. We will present careful waveguide routes design for the attempt to eliminate, or at least minimize, possible higher mode conversion generation generated by waveguide bends. In front of the heating launcher a new design of the bistatic emitting and receiving antennas has been done to find the best compromise, within the limited place available, between the maximization of the reflected signal detection and the direct coupling signal between antennas which provides the phase reference signal. An improvement of 20 dB compare to simple open waveguides, used for the LH launcher, has been achieved. We will discuss the signal processing challenges to perform density profile reconstruction in such metallic environment subject to substantial multi-reflections due the plasma proximity.

[1] F. Clairet, B. Ricaud, F. Briolle, S. Heuraux, and C. Bottereau Rev. Sci. Instrum. 82, 083502 (2011)

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