

Coupling of the JET ICRF antennas in ELMy H-mode plasmas with ITER relevant plasma - straps distance.

M.-L. Mayoral¹, I. Monakhov¹, P. Jacquet¹, J. Ongena² and JET EFDA Contributors*

¹ UKAEA/Euratom Fusion Association, Abingdon, U. K.

²ERM-KMS, Association EURATOM-Belgian State, Brussels.

* See appendix of M.L. Watkins et al., *Fusion Energy 2006 (Proc. 21st Int. Conf. Chengdu) IAEA.*

In ITER, the requirement for the ICRF antenna is to deliver 20 MW in ELMy H-mode plasmas with an averaged antenna-plasma separatrix distance of 14 cm [1]. Two major problems will have to be solved: the very fast change in antenna loading during ELMs and the decrease of the loading when the plasma is pushed far away from the antenna. JET has the capability to combine these conditions and for the first time, experiments were performed in ELMy H-mode at antenna - separatrix distance, referred as ROG, varied from 10 to 14 cm. When ROG was increased, the perturbation caused by ELMs was found to decrease significantly and the loading between ELMs was found to deteriorate to very low values. In order to compensate the latter unwanted effect, different levels of deuterium gas were injected in the edge both from the divertor and the midplane. Using this technique, the loading was increased by more than a factor 3 and up to 8 MW of ICRF power were coupled. The variation of the antennas' loading was monitored using a fast data acquisition system (100 μ s) and compared to variations of the edge density, D-alpha intensity and infra-red camera measurements.

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[1] D.W. Swain, R. Goulding, Proceedings of SOFT Conf. 2007, Warsaw, Poland