

## **Results of the implementation on a mock-up of the full 3dB hybrid matching option of the ITER ICRH system**

D. Grine, M. Vervier, A. Messiaen, P. Dumortier

*Laboratory for Plasma Physics, Royal Military Academy, Belgium*

Each of the two ICRH antennas for ITER must couple 20MW to the plasma in the 40-55MHz band via an array of 24 radiating shorted straps fed by four generators. The matching system must provide automatic matching control on the mean load provided by the plasma and be resilient ( $|\Gamma| < 0.2$ ) to a wide range of fast antenna load excursions occurring in ELMY plasmas. Furthermore, good control of the current distribution in the strap array must be possible for the various heating and current drive scenarios. Two load resilient matching options have been considered for ITER: the 4 “Conjugate-T” (CT) and the 4 hybrids ones, the first being presently considered as a back-up option [1]. Automatic control of these 2 options has been developed, and tested for optimization on a low-powered scaled mock-up. Successful implementation of the simultaneous feedback control of 11 actuators for the matching of the 4CT and for the control of the toroidal phasing has already been achieved [2]. The matching and the array current control of the 3dB hybrid option are provided by simultaneous feedback control of the decouplers and double stub tuners (in total 23 actuators) and this has also been successfully achieved for the full array. The paper discusses the circuit implementation and presents the obtained results.

[1] A. Messiaen et al., Nucl. Fusion, **29** (2009) in press.

[2] D. Grine et al., Proc. of the 18<sup>th</sup> Top. Conf. on RF Power in Plasmas (2009)