

## **Guided Radar Arc Detection: First Experimental Tests on MXP Testbed**

S.M. Salvador<sup>1</sup>, R. Maggiora<sup>1</sup>, R. D’Inca<sup>2</sup>, H. Fuenfgelder<sup>2</sup>

<sup>1</sup>*Politecnico di Torino, Department of Electronics, Torino ITALY*

<sup>2</sup>*Max Planck Institut für Plasmaphysik, Garching, Germany, EURATOM*

The Guidar technology has been proposed for the detection of electric arcs in the transmission lines for antennas for plasma heating and current drive [1]. After a preliminary study to assess the feasibility of this technique, some experimental tests with real arcs were conducted on the MXP testbed installed at IPP, Garching.

The low frequency (25MHz) Guidar signal, made of a sequence of short phase-modulated impulses, is upshifted to around 400MHz and injected in the transmission line by means of a directional coupler. The echoes are then extracted with another directional coupler and downshifted again for the processing. The analysis is performed at a pulse repetition frequency of 120-165kHz, enabling an arc detection within 6-8 $\mu$ s.

Tests have shown encouraging results to demonstrate the capability of the guidar system to easily detect both high voltage and, most important, low voltage arcs taking place on the vacuum feedthrough. The possibility of locating the arcs has also been addressed in the testbed with simulated arcs and a next campaign is scheduled to confirm the analysis. The insensitivity of the method to slow changes of the line voltage standing wave ratio (mimicking antenna load variations) was also tested.

[1] S. Salvador and R. Maggiora, AIP Conf. Proc., November 26, 2009, Volume 1187, pp. 261-264