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X-RAY MEASUREMENTS REVEAL THE FINE DYNAMICS OF CURRENT MICRO-DISCHARGES IN A VACUUM HIGH VOLTAGE EXPERIMENT

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The High Voltage Padova Test Facility (HVPTF) is an experimental device for investigating High Voltage (HV) insulation in vacuum, in support of the realization of MITICA, the prototype of a neutral beam injector for ITER. Inside a high vacuum chamber, two stainless steel electrodes, separated by a few centimetres gap, can achieve an HV difference up to 800 kV During the conditioning process of the electrodes, current micro-discharges and the presence of associated X-rays are observed, along with a global increase of gas emission (H_2 and CO_2 are detected by the Residual Gas Analyser). Different X-rays detectors have been installed during the last five years on HVPTF, with the aim to investigate the physical processes behind the conditioning by means of X-rays analyses.

In this contribution, new information provided by the different devices are presented: in particular, the identification of a fine dynamics in the micro-discharge phenomenon is shown. Moreover, the growing contribution of the vacuum chamber during the electrodes conditioning, operating as a third electrode, is investigated. A possible physical interpretation of the micro-discharge dynamics is sketched.

Finally, the new set of LYSO scintillators is described and preliminary results about the recent electro-polished electrodes campaign is introduced.

Topic

Experiments and Diagnostics

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