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CURRENT SIGNALS AND X-RAYS SPECTRA ANALYSIS FOR A VACUUM HIGH VOLTAGE HOLDING EXPERIMENT

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The High Voltage Padova Test Facility (HVPTF) is an experimental device for investigating HV insulation in vacuum, in support of the realization of MITICA, the prototype neutral beam injector for ITER. The experiments here described aim at understanding the physical phenomena underlying voltage holding in vacuum and specifically the electrode “conditioning” process. Two stainless steel electrodes are positioned inside a high vacuum chamber, separated by a few cm gap. When HV is applied (up to 400 kV), the breakdown voltage typically increases in time and achieves a saturation value in about ten hours. A highly time-resolved X-rays diagnostic has been recently installed in the device, measuring single X-ray emission events produced during the “conditioning” phase. High energy peaks have been observed in correspondence to each current peak collected by the electrodes. This work presents a characterization of the current and the X-rays events during the conditioning phase, in terms of frequency, amplitude and their occurrence with respect to the voltage between the electrodes.

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