

## **Design of a System for Performing High-Voltage Holding Test Campaigns on a Mockup of MITICA Negative Ion Source**

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Abstract:

Megavolt ITER Injector and Concept Advancement (MITICA) is the full-size prototype of the neutral beam injector (NBI) for the ITER currently under construction at the neutral beam test facility (NBTF) (Consorzio RFX, Padova, Italy). One of the main issues of such a complex machine is to secure a stable voltage holding of the ion source-accelerator complex-which is biased at -1 MV and constitutes a very large (cathodic) area, with respect to the ground (the vessel). Coordinated with the experimental program of the HV test facilities in Japan (QST, Naka) and in Italy (high voltage Padova test facility, Consorzio RFX), a test campaign is foreseen for 2020-2021, using the real MITICA vacuum vessel and a mockup of the ion source. This mockup can constitute a simple geometry, where the MITICA ion source is represented by a sphere (cathode), connected to the high-voltage bushing. A planar electrode (anode) will cover the lower part of the beam source vessel (BSV) and will be positioned at an adjustable distance from the sphere, to assure fine control of the electrostatic configuration. The experiments will be devoted to characterize the breakdown voltage as a function of the gap length and vacuum pressure. In this article, the design activity of the electrodes to be used during the campaign is presented.