

## **ITER Neutral Beam Test Facility status**

Diego Marcuzzi,<sup>1,\*</sup> and the Consorzio RFX NBTF Team<sup>1</sup>

<sup>1</sup>*Consorzio RFX, Corso Stati Uniti, 4, 35127 Padova, Italy*

\*corresponding author: diego.marcuzzi@igi.cnr.it

Heating Neutral Beam (HNB) injectors, necessary to achieve burning conditions and to control plasma instabilities in ITER, are characterized by such demanding parameters that a Neutral Beam Test Facility (NBTF), dedicated to their development and optimization, has been established in Padua (Italy), with direct contribution of Italian government (through Consorzio RFX as host entity), ITER International Organization (in kind contributions of the ITER Domestic Agencies of Europe, Japan and India) and technical and scientific support of various European laboratories and universities. The NBTF hosts two experiments: SPIDER, devoted to the ion source optimization towards the required source performances; MITICA, the full-size prototype of the ITER HNB, with an ion source identical to SPIDER.

This paper gives an overview of the NBTF realization progress with particular emphasis on issues discovered during this phase of activities and on solutions adopted for minimizing the impact on the schedule and maintaining the goals of the facilities. The realization of MITICA is well advanced; operation is expected to start in 2023 due to the long procurement time of the in-vessel mechanical components. The beam source power supplies, operating at 1MV, are in an advanced phase of realization; all high voltage components have been installed and the complex insulation test phase began in 2018. At the same time, construction and installation of SPIDER plant systems was successfully completed with their integration into the facility. The mechanical components of SPIDER ion source were installed inside the vessel and connected to the plants. The integrated commissioning with the control (CODAS), protection and safety systems ended positively and the first experimental phase began. The first results of the SPIDER experimentation, with data from operational diagnostics, and the plans for the 1MV insulation tests on the MITICA high voltage components are summarized.