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Final acceptance test of the Ion Source and Extraction Power Supplies for the SPIDER experiment

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SPIDER experiment, currently under construction at the Neutral Beam Test Facility (NBTF) in Padua, Italy, is a full-size prototype of the ion source for the ITER Neutral Beam (NB) injectors part of the ITER project.
The Ion Source and Extraction Power Supplies (ISEPS) for SPIDER are supplied by OCEM Energy Technology s.r.l. (OCEM) under a procurement contract with Fusion for Energy (F4E) covering also the units required for MITICA and ITER injectors.
ISEPS, with an overall power rating of 5 MVA, form a heterogeneous set of items, ranging from power transformers, medium voltage power distribution equipment at 6.6 kV to solid state power converters and including four 1 MHz radiofrequency generators of 200 kW output power. Both high voltage, down to -12 kV and high current, up to 5kA, power supplies are present.
SPIDER ISEPS has been installed in the NBTF SPIDER High Voltage (HV) Hall, on an air-insulated platform ("HV Deck"), at a nominal voltage to ground of -96kVdc.
The installation of SPIDER ISEPS started in June 2015 and was completed in September 2015. Functional checks started thereafter and power testing in January 2016. The formal Site Acceptance Tests (SAT), witnessed by F4E, Consorzio RFX and the ITER Organization were successfully completed in April 2016. However, few aspects requiring further testing were identified and brought to successful completion in September 2016. After the verification of the final documentation package and the conclusion of the acceptance process, the procurement was closed in February 2017.
This work will give an overview of the testing phase on Site summarizing the most interesting findings on the subsystems operation in the final installation conditions. In particular the focus will be on the final ISEPS acceptance tests, which allowed to prove the correct operation of the different ISEPS subsystems on dummy loads, under remote control of CODAS (COntrol and Data Acquisition System) and Interlock systems.

Eligible for student paper award?

No

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