Contribution ID: **615** Type: **Poster**

Progress in the Realization of the PRIMA Neutral Beam Test Facility

Thursday, October 16, 2014 8:30 AM (4 hours)

In ITER, additional heating systems are provided to reach higher plasma temperature and to sustain fusion conditions; among them two Neutral Beam Injectors (NBI) will be installed, capable of producing high energy beams up to 1MeV, to transfer to the plasma up to 16.7MW and to operate up to 1 hour.
Such a high NBI performance has never been reached. A research and development plan has been launched to minimize the risks of unsuccessful results of the ITER NBI operation; it involves the realization of a full scale test facility in which issues related to NB physics and technology will be studied and assessed in advance with respect to the ITER operation, in order to guarantee the full ITER performances by means of a dedicated R&D programme.
This test facility, called PRIMA, is under construction in Padova; it will host two experiments: SPIDER and MITICA, full scale prototypes of the ion source and of the whole injector, respectively.
SPIDER will be a RadioFrequency (RF) ion source, based on the configuration adopted by IPP, with the same characteristics foreseen in ITER NBI but with beam energy limited to 100keV. It can generate both Hydrogen and Deuterium Ions; the accelerator is equipped with provisions to filter electrons and it will allow the use of cesium to attain the high values of current density required in the ITER NB ion source. SPIDER is procured by F4E and INDA.
MITICA is the full-scale prototype of the ITER injector, with a similar scheme and layout, provided with the same power supply system and also the control and protection systems are being designed according to the same rules and constraints as in ITER. MITICA is procured by F4E and JADA.
The paper will give a general overview of the test facility and will describe in detail the status of development of the SPIDER and MITICA projects and the last progress in the realization of the main components. A general plan of the realization and commissioning steps will be also given. The most important and critical issues regarding both physics and technology will be presented and the solutions identified or still under evaluations will be discussed.

Paper Number

FIP/2-4Rc

Country or International Organisation

Italy

Primary author: Mr TOIGO, Vanni (Italy)

Co-authors: CHAKRABORTY, Arun Kumar (ITER-India, Institute for Plasma Research); BOILSON, Deirdre (ITER Organization); HANADA, Masaya (Japan Atomic Energy Agency); BONICELLI, Tullio (Fusion For Energy)

Presenter: Mr TOIGO, Vanni (Italy)

Session Classification: Poster 5