Contribution ID: **9** Type: **Oral**

Status of NIO1 negative ion source and acceleration system

Friday, 3 March 2017 10:30 (20 minutes)

Neutral Beam Injectors (NBI) are fundamental to increase the plasma temperature in magnetic confinement fusion devices. In the perspective of dense and large plasmas foreseen in advanced experiments, the use of negative ions is needed to efficiently produce neutrals in MeV energy range, able to penetrate the plasma core. In the framework of the accompanying activities in support to the ITER NBI test facility a relatively compact radiofrequency (RF) ion source, named NIO1 (Negative Ion Optimization phase 1) is being developed and tested in Padua, Italy, in collaboration between Consorzio RFX and INFN. Negative hydrogen ions are formed in a cold, inductively coupled plasma with a 2MHz, 2.5 kW external antenna.
The negative ions are extracted by means of a set of gridded electrodes to form 9 beamlets, arranged in a 3x3 configuration. The nominal beam current is 135 mA and the final beam energy 60 keV. After the first test in Air and Argon doped Oxygen plasmas, the source is now routinely operated in Hydrogen, at an average RF power <1200W. The set of diagnostic used include infra-red calorimetri, Langmuir probes, beam and source spectroscopy and linear CCD detectors. This contribution describes the main features of the experiment as well as its current status. Future improvements to the extraction system are discussed.

Primary author: VELTRI, Pierluigi (LNL)

Co-authors: Dr SERIANNI, Gianluigi (Consorzio RFX); CAVENAGO, Marco (LNL)

Presenter: VELTRI, Pierluigi (LNL)

Session Classification: other application