## The ITER Neutral Beam Test Facility ; Design Overview

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In the frame an EFDA contract (task ref. TW4-THHN-IITF2) the CEA, in close collaboration with the Consorzio RFX, Padua, and FZK, Karlsruhe, is carrying out a design of the ITER Neutral Beam Test Facility (NBTF). The main objective is to demonstrate the reliability and to optimise the performances of the first ITER neutral beam injector.

The current design of the dedicated beam line vessel (BLV) that allows mixed vertical and horizontal access to beam line components (BLCs) is developed in the paper, as well as man access studies and remote inspection system. The generic design of the Neutral Beam Test Facility general infrastructure is also described, with taking into account the associated safety requirements (Neutrons and X-ray production).

The NBTF is equipped with a cryosorption cryopump developed by FZK. The split two halves cylindrical cryopumps of the NBTF can be further assembled in the final ITER reference configuration (phase 2 of the NBTF operation plan). The 4.5 K cryopanels must be periodically regenerated at 90 K and occasionally at 470 K. The regeneration and cool-down phases of the cryopanels are optimised in terms of facility operation. The cryosystem that supply the necessary cryogens to the cryopump is designed using existing industrial 4.5 K cold power and 80 K helium gas refrigerators.

A total power of about 50 MW will have to be removed during the two stages short and long pulse operation of the NBTF. The cooling plant that is required for cooling down the high and low voltage components is designed for both the short (20 s) and long operating pulses (3600 s) that are to be demonstrated on the test facility. The paper describes the design and the characteristics of both the Primary Heat Transfer System (PHTS) and the associated Heat Removal System (HRS) associated to the NBTF.

## Topic : Status reports and programmes on Negative Ion Beam (SR)