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Seminar

Institute for Plasma Research

Title : Nuclear Analysis for ITER deliverables from IN-DA

Speaker: Dr. Jyoti Pandey
ITER-India, IPR, Gandhinagar

Date : 06th August 2021 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:

https://meet.ipr.res.in/PDF_Extension_Talk_Dr.Jyoti_Pandey

Abstract :

As ITER is an experimental machine, equipped with a large array of diagnostic instruments to provide the measurements necessary to control, evaluate and optimize plasma performance in ITER and to further enhance the understanding of plasma physics. ITER diagnostic port plugs are subjected to a severe nuclear environment, which presents a critical design challenge. Each port plug and all the diagnostic equipment in the port are in place for all the operational scenarios of ITER from startup until the 700-MW super shots. The shutdown dose rates, contact dose rates, and nuclear activity should be below the specified design limits. The activity and dose rate in general can be contributed by machine and/or diagnostic structures. Neutrons activate the materials while travel through either diagnostic apertures or gaps in the geometries. A detailed nuclear analysis is required to understand the nuclear activation and to have a maintenance and decommissioning plan. Detailed reports includes distribution of neutron flux, level of nuclear activation with their radiological impact is needed for qualifying package in preliminary design review (PDR), conceptual design review (CDR), and final design review (FDR). In the present work, we performed detailed nuclear analysis for XRCS, diagnostic components and related peripherals located at the two different ITER ports. The radioactive waste classification based on ANDRA (French Agency for the management of radioactive waste) is also done. According to the activation analysis, XRCS Survey sight-tube's radwaste classification is Type A. Activity for individual sight-tube components and various shielding components is also calculated along with their ITER radwaste classification. The current radioactive waste analysis is a part of the neutronic study performed in order to understand the localized effect on shutdown dose rate (SDDR), in EPP-11 interspace, contribution due to the neutrons streaming from the XRCS sight tube. All these studies will contribute to the decommissioning plan of ITER. The results related to these studies will be presented and discussed in the talk.
