Seminar

Institute for Plasma Research

Title : Nuclear Data for Fusion Reactor Design

Speaker: Dr. Jyoti Pandey

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Date : 8th July 2020 (Wednesday)

Time : 03.30 PM

Venue : Online - Join the talk:

https://meet.ipr.res.in/DrJyotiPandey-PDFtalk

Abstract :

High quality nuclear data is one of the fundamental pre-requisites for upcoming fusion reactor, in order to model the reactor designing and to predict the activation, heating, shielding and material damage induced by nuclear reactions. Nowadays there is a greater demand for the Cross-sections and Activation data for long-lived radioisotopes in the mass region A~50-60 and their impact on Fusion Reactor Technology. The various radionuclides are produced inside the reactor environment during it's operation and after shutdown. The selection of this mass region for the present study is due to a thousand tons of Stainless-Steel (SS) is going to use for the construction of upcoming fusion reactor, mainly in Shielding Blanket, Vaccum Vessel, Cryostat.

Present talk will highlight the need, impact and first time experimental measurement of cross-section performed specially for the long-lived radionuclides in the medium mass region. The main focus will be on (i) the measurement of neutron induced cross-section of radionuclide ^{59}Ni(n,xp) by surrogate ratio method. The surrogate reaction ratio technique has been used first time for the charged particle emission reaction. (ii) estimation of the amount of radionuclides formed in fusion reactor environment through different pathways using activation code ACTYS and FISPACT-2007 (iii) impact of radionuclides on reactor material i.e. primary knock on atom spectra, number of He and H atom produced at critical components of the fusion reactor. On the basis of the nuclear reaction modular code TALYS, there is an anomalous behaviour of various radionuclides at the lower energy neutron induced cross-section calculation. The present talk contributes in improving the knowledge of the nuclear data mainly for the long-lived radionuclides which are important to fusion reactor design.