

Seminar

Institute for Plasma Research

Title : Design and Development of Helium Cooled Heat Sink Mock-up for Tokamak based Fusion Reactor Applications

Speaker: Dr. Sandeep Rimza
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Date : 29th January 2021 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:

https://meet.ipr.res.in/Dr.SandeepRimza_PDFtalk

Abstract :

It is generally accepted that fusion power is one of the promising sources of sustainable energy in the future. There are many challenges towards successful design of the fusion reactor. One among them is the design of the divertor which is an important part of the fusion reactor that handles extremely high heat flux escaping from the hot core plasma region along Scrape-Off- Layer (SOL). In the present Helium Cooled concept study, plasma facing wall of target is made up of numerous “finger” type assemblies to reduce the thermal-mechanical stresses. Helium gas is preferred as a coolant in “finger” type design concept due to its chemical and neutronic inertness and superior safety aspect. However, its poor thermo- physical characteristics need high pressure to remove large heat flux encountered in a fusion power plant.

In the perspective of future fusion reactor, it is desirable to explore efficient cooling technology for plasma facing wall that can handle the high heat flux at the acceptable pumping power limit. Towards this, a novel sectorial extended surface (SES) was proposed and Experimentally & Numerically investigated. The objective for carrying out the experiment work is to validate the thermal performance of first wall mock up against the estimated values. Other than the “finger” concept, an innovative heat sink design concept is also proposed and numerically investigated for fusion reactor application. In the presentation, all the results of Experimental and Numerical worked carried out for “finger” type heat exchanger with SES as well as proposed First wall Mock-up heat sink design for fusion reactor application will be discussed.
