

Technical Meeting on Plasma Physics and Technology Aspects of the Tritium Fuel Cycle for Fusion Energy

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Plasma chamber PMI – Linear plasma facilities (TPE, implantation and irradiated materials)

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A critical challenge for the long-term operation of ITER and the future U.S. fusion pilot plants will be the development of plasma-facing components (PFCs) that demonstrate erosion resistance to intense heat and neutral/ion particle fluxes under the extreme fusion nuclear environment while minimizing in-vessel inventories and ex-vessel permeation of tritium.

INL leverages a series of U.S.-Japan collaborations (TITAN, PHENIX, FRONTIER) to irradiate tungsten and tungsten alloy material in High Flux Isotope Reactor at ORNL and investigate irradiation response on fuel behavior in irradiated tungsten using INL's linear plasma device, Tritium Plasma Experiment.

This talk describes the challenge in modeling tritium behavior in neutron-irradiated PFCs, the U.S.-Japan plans for neutron-irradiation and post-irradiation examination, and the recent findings on fuel retention in neutron-irradiated and also ion irradiated tungsten.

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