

TCSUH SPECIAL SEMINAR

Di Chen

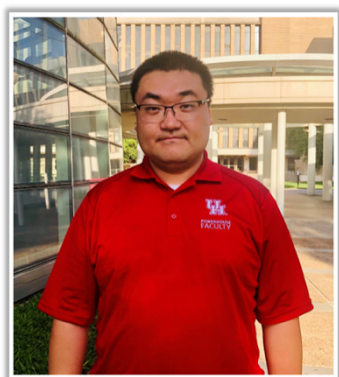
Research Scientist, Idaho National Laboratory

Thursday, August 29, 2024

12:00 p.m. – 1:00 p.m. *Sandwiches provided.*

In Person: Houston Science Center (HSC), Room 102

Advanced Materials for Fusion Energy



ABSTRACT: Achieving sustainable fusion energy relies heavily on the development of advanced materials capable of withstanding the extreme conditions within a fusion reactor. This presentation will explore the latest advancements and challenges in plasma-facing materials (PFMs), which are crucial for the success of fusion technology. Traditional materials, like tungsten, encounter significant difficulties such as high thermal loads, neutron irradiation, and intense plasma interactions. To address these issues, we are investigating innovative materials and structural designs that promise enhanced performance and durability. High Entropy Alloys (HEAs) and nanostructured materials are at the forefront, offering superior mechanical properties and radiation resistance

compared to conventional PFMs. We will also delve into the potential of silicon carbide fibers, which can reinforce PFMs with their exceptional thermal conductivity and mechanical strength. In addition, the role of high temperature superconducting tapes in fusion reactors will be highlighted, focusing on advancements in YBCO tapes. These tapes are critical for magnetic confinement and promise higher current densities and improved operational efficiency. This presentation will shed light on the interdisciplinary research efforts aimed at overcoming current challenges and moving closer to realizing practical and sustainable fusion power.

BIO: Dr. Di Chen joined Idaho National Laboratory as a Research Scientist in 2023. From 2018 to 2023, he worked as a Research Assistant Professor in the Department of Physics at the University of Houston's ion beam laboratory. Prior to that, he was a post-doctoral associate at Los Alamos National Laboratory from 2015 to 2018. Dr. Chen earned his Ph.D. in Nuclear Engineering from Texas A&M University in 2014. His research primarily focuses on nuclear materials under extreme conditions, defect engineering, and understanding radiation damage evolution. He aims to irradiate and investigate advanced nuclear materials, including structural materials (HT9, T91, ODS, W, SiC, etc.) and advanced nuclear fuels like UZrPu to improve their performance under neutron irradiation, addressing challenges in both fusion and fission reactors. Additionally, Dr. Chen has conducted research on carbon nanotube systems, metallic glass, superconductors, and semiconductors. He has a strong background in operating and maintaining accelerators and extensive experience with microscale characterization techniques such as TEM, FIB, SEM, and nano-indentation. He is also interested in computational simulations using Molecular Dynamics and Kinetic Monte Carlo.

Persons who require special accommodations to attend this lecture should call 713-498-9703.