

# SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

### NUCLEAR MATERIALS

## Ceramics and Ceramic-Based Composites for Nuclear Applications III

Ceramics and ceramic-based composites play an important role in nuclear applications (e.g., nuclear fission, fusion and high energy physics) due to their combined excellent physical, mechanical and chemical properties in extreme environments including radiation (such as neutrons and protons), elevated temperatures and high stresses. There is an increasing need in understanding the degradation of this class of materials with even higher proton/neutron induced radiation damage, monotonic/cyclic/varied strain rate loading, as well as aggressive chemical environments during operation, transportation and storage to support the advances in high temperature fission reactors, fusion technologies as well as the design of reliable GeV proton targets. Development of novel ceramics and ceramic composite materials are also essential. There is a strong correlation in ceramic materials between fission, fusion and high energy physics. For instance, nuclear graphite has been used widely in gas-cooled reactors, either in prismatic designs or pebble-bed configuration, as a fast-neutron moderator as well as structural components; they also serve in High Energy Physics (HEP) as production targets including in the Neutrinos at the Main Injector (NuMI) beamline and Long-Baseline Neutrino Facility (LBNF) at FermiLab, and as hadron absorber in Tokai to Kamioka (T2K) at Japan Proton Accelerator Research Complex. SiC ceramic-matrix composites, on the other hand, have been developed for use as accident tolerant fuel cladding in fission and potentially in breeder blanket for fusion. Lastly, ceramics, such as borosilicate glass, has been investigated for immobilization/storage of radioactive waste in both fission and fusion energy. This symposium aims to bring together the experts/scientists across these nuclear-related areas to share knowledge and experience on the fabrication, irradiation testing, characterization and modelling of ceramics and their composites in nuclear fission, fusion and high energy physics areas to inspire novel and transformative ideas.

The primary topics of interest to this symposium are:

- Carbon/graphite as well as their composites (e.g., reactor core components, matrix graphite, coatings, target graphites and so on)
- ZrC, SiC and other ceramics and composites
- Waste management (e.g., borosilicate glasses and other relevant materials)
- Fuels: UO2, UCO, MOX, and TRISO (including particles, compacts or pebbles)
- Ceramic coatings such as oxides, carbides and nitrides
- Irradiation and PIE facilities for characterization
- Modelling of ceramic degradation mechanisms and properties

### SPONSORED BY:

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