

Special Session Description

Session Title: **Multi-scale Simulations for Fusion Plasmas**

Subject Area: 11. Modeling and Simulation for Fusion Energy Systems

Organizer

Name: Yong-Su Na

Affiliation: Seoul National University

Phone Number: +82-2-880-7204

Email: ysna@snu.ac.kr

Description

In order to understand the complex physics phenomena of fusion plasmas which involve a remarkably broad range of spatio-temporal scales, multi-scale modelling and simulations are required. The time scales of plasma interactions span about 15 orders of magnitude, from the 10^{-11} second period of electromagnetic waves to the plasma-wall equilibration time about 10^4 seconds. The relevant spatial scales also cover a broad range of several orders of magnitude. This special session will cover simulations of physics phenomena within specific scales as well as integrated multi-scale simulations of fusion plasmas:

- Turbulence and transport
- Magnetohydrodynamics
- Wave-plasma interactions
- Integrated modelling and simulation

The session will consist of presentation on theoretical foundations of reduced equations, mathematical modeling, numerical methods, code verification & benchmarking, and experimental validation.