3rd Fusion HPC Workshop

Objectives

This workshop follows the virtual [2nd Fusion HPC Workshop](#), which took place on December 2-3, 2021, and attracted 234 registrations from all over the world.

This workshop covers all computer applications using High Performance Computing (HPC) in the field of fusion research. These include, but are not limited to, numerical simulations in the following areas:

- Energy and particle transport
- Multi-physics modelling
- Plasma turbulence and related transport processes
- Plasma hydrodynamics including linear, nonlinear and/or extended MHD
- Plasma instabilities
- Edge and plasma-material interactions
- Heating, fueling and current drive
- Laser-plasma interactions
- Fast particle physics and burning plasma issues
- Scenario development and control
- Fusion reactor materials
- Fusion reactor technology

The language of the workshop will be in English and it will be open to all.

There will be keynote, invited and contributed presentations.

Participants at the Fusion HPC Workshop will gain a broad understanding of the status of fusion HPC research internationally by attending presentations by leading researchers in a broad range of topics. Question and answer sessions will follow presentations with the option to either write or use the microphone to ask questions. Participants are encouraged to network on an individual basis, and may use the Zoom chat feature during sessions of invited and contributed presentations.

New this year! Early Career participants will receive expert reviewer feedback with an opportunity for recognition of outstanding presentations.

Similar to the process for last year's Special Issue in Plasma Physics and Controlled Fusion journal, selected presentations will be invited, by mutual agreement, to submit a journal paper after the workshop to a special issue published in [Plasma Physics and Controlled Fusion (IOP)](#).

- Further information here: https://hpcfusion.bsc.es/

Speakers

Keynote talks

Speaker: Flyura Djurabekova, University of Helsinki, Finland
Title: Materials simulations from first principles and Molecular Dynamics with application in the fusion R&D (tentative title)

Speaker: Federico Felici, EPFL, Switzerland
Title: Control of tokamak plasmas through Deep Reinforcement Learning: application to magnetic control on TCV

Speaker: Filippo Spiga, NVIDIA
Title: Accelerating time-to-science in Fusion research

Invited talks

- Martí Circuns i Duxans (Barcelona Supercomputing Center): Validating NEUTRO, a deterministic finite element neutron transport solver for fusion applications, with literature tests, experimental benchmarks and other neutronic codes
- Emily Belli (General Atomics, General Atomics, UCSD): Multiscale Gyrokinetic Analysis in the Tokamak Pedestal
- Jesús Domínguez-Palacios (University of Seville): Hybrid kinetic-MHD multi-n simulations of ELMs in the ASDEX Upgrade tokamak with MEGA
- Jacobo Varela (UC3M): Optimization of plasma heating efficiency in fusion systems through suppression of energetic particle instabilities

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