[2nd Fusion HPC Workshop](#)

Objectives

The 2nd Fusion HPC Workshop will take place on December 2-3, 2021 via Zoom. It is organized under the auspices of the [Spanish Supercomputing Network (RES)](#). The official language will be English and it will be open to all.

This workshop covers all computer applications using High Performance Supercomputing (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

[Check the program of the event](#)

Speakers

Keynote talks

- Frank Jenko (Max Planck Institute for Plasma Physics) Accelerating fusion energy research through HPC
- Marina Becoulet (CEA) First principles modelling of magnetohydrodynamic instabilities and their control in magnetic fusion devices using HPC techniques
- Tomo-Hiko Watanabe (Nagoya University) Exploration of burning plasma confinement physics using the supercomputer Fugaku
- William Dorland (Princeton Plasma Physics Laboratory) *Title to be confirmed*

Invited talks

- Kenji Imadera (Graduate School of Energy Science, Kyoto University) 5D full-f gyrokinetic simulation with HPC infrastructures
- Gabriel Pedroche (Universidad Nacional de Educación a Distancia – UNED) E-lite 360º neutronics model of the ITER tokamak
- Pedro Bonilla (Barcelona Supercomputing Center) On simulation of multi-physics fusion phenomena with Alya, a multipurpose High Performance Computing software
- Helen Brooks (Culham Centre for Fusion Energy, United Kingdom Atomic Energy Authority) Scalable Multi-physics for Fusion Reactors with AURORA
- Yasuhiro Suzuki (Hiroshima University) Development of 3D equilibrium code and its application to stellarators
- James Dark (LSPM, CNRS) Modelling hydrogen transport in breeding blankets: influence of trapping effects
- Hanne Thienpondt (CIEMAT) Turbulent heat flux versus density gradient: an inter-machine study with the gyrokinetic code stella
- Jörg Riemann (Max Planck Institute for Plasma Physics) Microinstability simulations for stellarators involving kinetic electrons and realistic profiles with the global PIC code EUTERPE
- Alexey Mishchenko (Max Planck Institute for Plasma Physics) Gyrokinetic particle-in-cell simulations of electromagnetic turbulence in the presence of fast particles and global modes
- Samuele Mazzi (Aix-Marseille University / CEA Cadarache) Gyrokinetic study of transport suppression in JET plasmas with MeV-ions
- Thomas Hayward-Schneider (Max Planck Institute for Plasma Physics) Anisotropic analytical and numerical distribution functions in the global gyrokinetic particle-in-cell code ORB5

Contributed talks

- Daniel Suárez (Universitat Politècnica de Catalunya) Implementation of a Q2D turbulence model and detection of flow instabilities in liquid metal MHD flows
- Sita Sundar (SoVSAS Gautam Buddha University) Flow shear driven instability in relativistic EMHD regime
- Ezequiel Goldberg (Barcelona Supercomputing Center) Massively parallel deterministic neutron transport solver for fusion multiphysics applications
- Giovanni Lapenta (KULeuven) Full device 6D modelling of magnetically confined plasmas with fully kinetic ions and electrons
- Julita Inca (UKAEA) Scalable Solution of Linear Elasticity Equations in 3D
- Oriol Fernández (Barcelona Supercomputing Center) Experimental validation of a new HPC modelling tool for HighTemperature Superconductivity
- Antonio González-Jerez (CIEMAT) Electrostatic gyrokinetic simulations in Wendelstein 7-X geometry: benchmark between the codes stella and GENE
- Luis E. González (Universidad de Valladolid) Ab initio study of Helium in the liquid Lithium-Lead eutectic alloy
- Hussein Assadi (The University of New South Wales) A Survey of Theoretical Methods for Predicting the Thermal Properties of Materials
- Prashant Dwivedi (Czech Technical University in Prague) Hypervelocity dust impacts on plasma facing materials through molecular dynamics simulations
- Julio Gutiérrez (Barcelona Supercomputing Center) Tungsten modelling from large-scale ab-initio methods

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