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# COMPUTATIONAL FORMULATIONS AND SOLUTION METHODS FOR MULTIPHYSICS/MULTISCALE PLASMA MODELS

## TRACK NUMBER: 300 MULTISCALE AND MULTIPHYSICS SYSTEMS

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## ABSTRACT

The modelling of plasma systems is a non-trivial computational endeavour owing to their inherent scale disparity, physics complexity, and asymptotic richness. While macroscopic behaviour of plasmas can often be captured with resistive magnetohydrodynamics, such a description breaks down in weakly collisional conditions, where electron Hall dynamics, electromagnetic wave/plasma interactions, charge separation, and non-local-thermal-equilibrium dynamics may play a significant role [1,2,3]. Treating such physics is necessary, for instance, to study important phenomena in the natural world (e.g., Earth's magnetosphere, solar flares) and in science and technological applications (e.g., tokamaks, reversed field pinches, laser- and magnetically-driven inertial confinement concepts), but it is highly complex computationally. Recently, there has been substantial progress in the development of advanced continuum plasma models (extended MHD and multifluid EM plasmas), kinetic methods (discretization- and particle-based descriptions), and hybridized approaches for such systems. The purpose of this session is to bring together researchers working on advanced kinetic and multiscale computational formulations, temporal and spatial discretizations, and iterative solution methods for these challenging multiphysics/multiscale plasma physics models.

## REFERENCES

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