# Special Issue

# New Insights into Plasma Theory, Modeling and Predictive Simulations

## Message from the Guest Editor

First-principles-based heat, particle, and momentum transport models for thermal and energetic particles in magnetic fusion devices are complex and computationally intensive, making them almost impossible to use for predictions and control. Therefore, there is a need for reduced models that can provide efficient and accurate predictions of transport while retaining the essential physics. This strategy is currently being used to develop and improve transport models. The developed reduced transport models are validated against the results of first-principles codes and experimental data from many different types of discharges and different tokamaks, including existing conventional and spherical tokamaks. This facilitates the identification of particular transport driving mechanisms and provides a foundation for describing and regulating transport in tokamaks. Simulations are used to analyze interactions between a variety of related physical processes, to develop scenarios, to improve the performance of tokamak discharges, to plan new experiments, or to extrapolate them to future planned devices.

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