

Drift-Fluid Simulations for Studies of Plasma Edge Turbulence

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An overview will be given on the drift-fluid approach to numerical investigations of plasma edge turbulence.

Drift-fluid models are widely used to study basic non-linear plasma turbulence in three-dimensional magnetic field configurations. The numerical simulations based on these models can support transport simulations by providing detailed transport coefficients. They allow to study basic processes of micro-scale plasma dynamics and even more can be extended to a global approach offering the possibility to study a concise picture of the interplay of large and small scale dynamics.

An introduction will be given on basic model assumptions leading to the standard set of local drift-fluid equations. The limitations and implications of the model derivation will be elucidated and details of the numerical implementation explained.

In order to demonstrate the versatility of the theoretical and numerical approach, examples of applications in studies of intermittent plasma transport, statistical analysis of characteristics of plasma flows, geodesic acoustic modes and plasma dynamics in the presence of resonant magnetic field perturbations will be presented.

In a concluding part the ongoing work on extensions to global models and simulations will be sketched and illustrated by numerical results for linear devices.