

Development and evaluation of a new plasma simulation based on the Discrete Event Simulation method

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The full-particle plasma simulation is commonly used to study electron kinetics. However, it is difficult to handle large-scale phenomena because the traditional full-particle simulation requires quite large computational resource.

Our new method based on the Discrete Event Simulation (DES) method, have possibilities to simulate inhomogeneous multi-scale systems efficiently, while the traditional particle simulation is based on the time-stepped method where the whole system is updated with a fixed time step.

In the DES method, a simulation run is driven by asynchronous and aperiodic 'events' instead of regular time step, and needs to update only 'what needs to be updated'. We have developed one-dimensional electro-static particle DES code and found that its calculation time and accuracy is quite sensitive to threshold parameters of the cell-activation.