

KINETIC SIMULATIONS OF MICROPLASMAS USING GRAPHICS PROCESSING UNITS*

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A particularly important tool to investigate technological plasmas are Particle-in-Cell (PIC) simulations. However, the majority of work in this field deals with low-pressure plasmas. Microplasmas give rise to new challenges for simulation tools and theory. High collision frequencies and the treatment of electron-electron interactions lead to an increase of simulation time by several orders of magnitude. By utilizing Graphics Processing Units (GPUs) to optimize the PIC algorithm, this loss of simulation speed can almost be compensated. This work shows concepts and benchmarks for kinetic simulations of microplasmas based on parallel GPU algorithms.

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