ELECTROMAGNETIC EFFECTS IN CAPACITIVELY COUPLED PLASMA SIMULATED WITH A PIC-MCC DARWIN CODE

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To increase the efficiency of the plasma assisted material processing with help of the capacitively coupled plasma discharge frequency of the driven field and spatial size of the modern devices tend to higher values. This can lead to a stronger influence of the electromagnetic effects, which in turn can affect the plasma uniformity, one of the most important parameters in such a technology. To assess the uniformity degradation electromagnetic simulations are needed. To this end, the plasma-Maxwell system is solved numerically using a particle-in-cell (PIC) scheme with Monte-Carlo (MCC) collisions for the kinetic description of plasma and Darwin approximation for the electromagnetic fields with the light waves, otherwise demanding an unnecessary small time step due to the CFL condition, explicitly excluded from the system. First results of such a code for model parameters are presented. The code exists in two versions, one for a serial execution on a central processing unit (CPU) and the other for a massively parallel execution on a NVIDIA graphical processing unit (GPU). Speedup of the parallel version compared to the serial version is quantified.