

SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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NUMERICAL SIMULATION OF CHARGE-EXCHANGE PROPAGATION IN THE PLUME OF ION
THRUSTER**Abstract**

The charge-exchange produced by ion thruster will influence panels and other instruments. So, it is very important to evaluate the propagation character of charge-exchange. In this paper, a numerical model based on particle-in-cell with Monte Carlo collision(PIC-MCC) method are developed to simulate the charge-exchange propagation in the plume of ion thruster. Simulations are performed to investigate the current density near the solar array and the spacecraft surface. The single link storage structure is used to conserve the information of charge-exchange. The finite difference method is employed to solve the Poisson's equation. Graphics processor units (GPU) have emerged as massively-parallel "co-processors" to the central processing unit (CPU), High performance parallel computing with NVIDIA's Compute Unified Device Architecture (CUDA) has already attracted various scientists in several disciplines. To speed up the computation, multi-GPUs were equipped on our PC. CUDA programming model was used to modify the code to solve Poisson's equation and simulation the charge-exchange generation process on GPU.