

Spacecraft Environment Simulation via Space Simulator

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Achieving practical simulation of space plasma environment is getting more and more realistic as the computational resource increases rapidly day by day. Plasma particle simulations play more important role in regions such as reconnection physics and wave-particle interactions as well as the spacecraft-plasma interactions.

On the other hand, flexible and highly practical simulation environment is still under development. Space simulator project aims at constructing simulation environment achieving wide variety of the space plasma phenomena including MHD scale, hybrid scale as well as particle scale phenomena. The particle simulation team develops particle simulator with the following targets.

Plasma particle simulator has

- (1) capabilities of utilizing high performance computer resources with less machine dependencies.
- (2) capabilities of not only simulating fundamental plasma physics but also simulating scale coupling phenomena.
- (3) capabilities of not only simulating basic scientific target but also modeling practical spacecraft plasma environment.

The plasma particle simulator has been developing by using the computational resources in universities and research institutes as well as the Earth Simulator. The fundamental performance has already been checked for several computer systems. The figure shows the parallel efficiency of the simulator measured at the Earth Simulator and the mainframe at the NIPR. We will show the performance and the feature of the simulator and will discuss initial results obtained by the simulator.

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