

PIC model for magnetic reconnection interlocked simulation model

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In order to investigate the relationship between particle kinetic effects and anomalous resistivity due to plasma instabilities in collisionless driven reconnection, we develop a three-dimensional Particle Simulation code for Magnetic reconnection in an Open system (PASMO)[1,2,3], in which a distributed parallel algorithm is integrated for a distributed memory and multi-processor computer system using a programming paradigm, High Performance Fortran (HPF)[3] and Message Passing Interface (MPI). By using this PASMO, we clarified the dynamics of collisionless reconnection which takes place in the thin current sheet (the width of the current sheet is much the same as ion Larmor scale).

PASMO is also desined to connect the microscopic region, where PASMO is used, with the macroscopic region, where MHD is used, through the interface region for a multi-hierarchy simulation model[4]. Information from the macroscopic region, for example, temperatur T , flow velocity v , magnetic field B and electric field E , is converted into the microscopic physical variables at the upstream boundary.

In this presentation, we will report how to make the boundary condition, and discuss the simulation results of magnetic reconnection from the microscopic view point only using PASMO.

[1]R.Horiuchi et al: *Earth, Planets and Space* **53** (2001) 439.

[2]W.Pei et al: *Phys.Plasmas* **8** (2001) 3251.

[3]H.Ohtani et al: *Lecture Notes in Computer Science* **4759** (2008) 329.

[4] S. Usami, H. Ohtani, R. Horiuchi, and M. Den, *Comm. Comput. Phys.* **4**, (2008) 537.