

Abstract Submitted
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**Multi-Hierarchy Simulation
of Magnetic Reconnection - Hierarchy-Interlocking in the Downstream
Direction**

SHUNSUKE USAMI, HIROAKI OHTANI, RITOKU HORIUCHI, National Institute for Fusion Science, MITSUE DEN, National Institute of Information and Communications Technology — In order to understand magnetic reconnection as a multi-hierarchy phenomenon, we have developed a multi-hierarchy simulation model which solves macroscopic and microscopic physics simultaneously and self-consistently. In our multi-hierarchy model, the domain decomposition method is employed. The physics in the macro-hierarchy is calculated by the MHD algorithm (MHD domain), and the dynamics in the micro-hierarchy is expressed by the PIC algorithm (PIC domain) [1]. Recently, with the hierarchy-interlocking in the upstream direction, we succeeded in the demonstration of multi-hierarchy simulation of magnetic reconnection. Aiming to apply our multi-hierarchy model to a larger system of magnetic reconnection in the future, we develop the hierarchy-interlocking model in the downstream direction. Using this model, we perform a multi-hierarchy simulation in which one-fluid plasma flow with a Maxwellian velocity distribution propagates from PIC to MHD domains. We can see that plasma is smoothly and continuously injected from PIC to MHD domains. In our presentation, these multi-hierarchy simulation results and future plan will be demonstrated.

[1] S. Usami, H. Ohtani, R. Horiuchi, and M. Den, *Comm. Comput. Phys.* 11 (2012) 1006.

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