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Progress of Multi-Hierarchy Simulation for the Full Understanding of Magnetic Reconnection SHUNSUKE USAMI, HIROAKI OHTANI, RITOKU HORIUCHI, MITSUE DEN, National Institute for Fusion Science — Magnetic reconnection is controlled by multi-hierarchy physics. The change in magnetic topology is global phenomenon, while microscopic kinetic process is needed to trigger magnetic reconnection. For the full understanding of magnetic reconnection, a multi-hierarchy model which deals with both microscopic and macroscopic physics consistently and simultaneously are developed. Our multi-hierarchy model is based on the domain division method, and thus is composed of two hierarchies: micro and macro hierarchies. The neighborhood of reconnection points is micro hierarchy, where microscopic kinetic effects play important roles. Dynamics in this system are solved by particle (PIC) simulation. On the other hand, the surrounding of PIC domain is macro hierarchy, and is described by MHD simulation. Between MHD and PIC domains, an Interface domain with a finite width is inserted. The applicability of our model has been examined with simulations of linear waves. Furthermore, as a first step of magnetic reconnection studies, propagation of plasma flow from MHD to PIC domains is simulated. In our presentation, these simulation results will be demonstrated.

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