Computer experiments for magnetotail reconnection via multi-scale simulations: hybrid code and KEMPO code

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In the study of magnetic reconnection, artificial resistivities were assumed in MHD simulations. We attempt to perform quasi-self consistent simulations to study the mechanism of the anomalous resistivity. For this study, two simulation codes are combined: a 2-D hybrid code and a 1-D full particle code (KEMPO). First, We reproduce a plasma sheet thinning via compression of plasma sheet via 2D hybirid code. On the first step, an unstable condition occurs such as two-stream instability, in the vicinity of the neutral sheet. Using the obtained hybrid parameters as initial conditions, we perform a second simulation; full particle simulation. We found that electric current decrease in the second simulation. Such a current decrease is caused by wave-particle instabilities.