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Title:

The compression effect of an optically-thin synchrotron radiation in the Petscheck type reconnection process

Abstract:

In recent studies, relativistic magnetic reconnection processes are investigated by relativistic resistive magnetohydrodynamic (RRMHD) simulations. In the classical reconnection model, the inflow magnetic energies are converted to the outflow thermal and kinetic energies of outflow plasmas. For relativistic plasmas in a strong magnetic field, the synchrotron radiation has an important role for cooling plasmas. In our study, we investigated effects of the radiation cooling in the Petscheck type reconnection process, using RRMHD simulations. In our simulations, for simplicity, we assumed an optically-thin radiation and introduced a radiation cooling rate as source term. As a result, we found that the reconnection outflow is more compressed and collimated.