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Magnethydrodynamic simulation of reconnection jets and chromospheric evaporation jets

MATSUI, Yuki[1*], YOKOYAMA, Takaaki[1], HOTTA, Hideyuki[1], SAITO, Tatsuhiko[1]

[1]Univ. of Tokyo

We reproduce reconnection jets and chromospheric evaporation jets simultaneously in the oblique coronal magnetic field based on a magnetic reconnection model by the two-dimensional MHD simulations. Our simulations include the effects of the thermal conduction and radiative cooling. We assume a steady coronal heating to keep the coronal energy balance. The magnetic reconnection occurs between the oblique coronal magnetic field and the emerged magnetic flux from the convection zone. Firstly, reconnection jets are caused by the magnetic force of the magnetic reconnection. After the reconnection, a steep temperature gradient reaches the chromosphere and chromospheric evaporation jets occur. The characteristics of the reconnection jets and evaporation jets in our simulations are consistent with the theoretical model: (1) The velocities of the reconnection jets and evaporation jets are around Alfven velocity and sound speed respectively. (2) The density of the evaporation jets is higher than that of the reconnection jets. Our results show that magnetic and thermal accelerations occur simultaneously. We compare our results with the the observational characteristics and discuss the magnetic and thermal accelerations.

Keywords: solar coronal jet, MHD simulation