Physical Model of Effective resistivity in collisionless magnetic reconnection

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Abstract. The well-known physical mechanism for fast magnetic reconnection in collisionless plasmas is that the off-diagonal terms of the electron pressure tensor give rise to a larger electric field in the reconnection region. The electron pressure tensor fully associated with electron kinetic effects is difficulty implemented into the MHD model. In this talk, we proposed a simple physical model of effective resistivity in collisionless magnetic reconnection. It is found that estimated effective resistivity based on our model is in a good agreement with that from Particle-in-Cell (PIC) simulation. Reconnection dynamics in MHD with inclusion of our effective resistivity model is consistent with that in PIC. The applications of our model in laboratory and space plasmas are discussed.