



The effect of polarisation electric field on particle acceleration in a 3D current sheet

V.V.Zharkova and T. Siversky

Department of Computing and Mathematics, University of Bradford, Bradford BD7 1DP, UK

Electron and proton acceleration in a reconnecting current sheet (RCS) has been studied by using 2D-3V particle-in-cell (PIC) simulation code. The particles mass ratio was chosen as small as $m_p/m_e=10, 100, 200$, which allows us to simulate the dynamics of both (fast) electrons and (slow) protons. The size of the simulation domain has been chosen to be large enough to include the particles trajectories during their acceleration inside the RCS. The background electromagnetic field configuration is adopted from an MHD model.

The acceleration rate for protons is lower than for electrons, which leads to a surplus of the protons about the mid-plane. These protons induce an electric field perpendicular to the current sheet. The effects of the induced electric field on particle trajectories and energy spectra of the accelerated particles for different magnetic field topologies and reconnection rates.