Geophysical Research Abstracts
Vol. 19, EGU2017-13509, 2017
EGU General Assembly 2017

Electron acceleration in the Solar corona - 3D PiC code simulations of guide field reconnection

Patricio Alejandro Munoz Sepulveda
Max Planck Institute for Solar System Research, Goettingen, Germany (munozp@mps.mpg.de)

The efficient electron acceleration in the solar corona detected by means of hard X-ray emission is still not well understood. Magnetic reconnection through current sheets is one of the proposed production mechanisms of non-thermal electrons in solar flares. Previous works in this direction were based mostly on test particle calculations or 2D fully-kinetic PiC simulations. We have now studied the consequences of self-generated current-aligned instabilities on the electron acceleration mechanisms by 3D magnetic reconnection. For this sake, we carried out 3D Particle-in-Cell (PiC) code numerical simulations of force free reconnecting current sheets, appropriate for the description of the solar coronal plasmas. We find an efficient electron energization, evidenced by the formation of a non-thermal power-law tail with a hard spectral index smaller than -2 in the electron energy distribution function. We discuss and compare the influence of the parallel electric field versus the curvature and gradient drifts in the guiding-center approximation on the overall acceleration, and their dependence on different plasma parameters.