Gyrokinetic simulations of magnetic reconnection in bounded plasmas

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Since research on magnetic reconnection is mainly motivated by astrophysical phenomena, the modelling is often based on an MHD description of an infinite system, where magnetic field lines are assumed to have a closed configuration in order to have well defined (periodic) boundary conditions. This is not the case for all natural and laboratory environments, e.g. many magnetic field lines in the solar atmosphere are bounded by the conducting surface of the sun [1]. In the present study, the influence of different boundary conditions on the formation of the current sheet and reconnection rate is studied. For this, a gyrokinetic Particle-in-Cell (PIC) code [2] was adapted to study driven magnetic reconnection in the strong guide field limit.

References