Geophysical Research Abstracts
Vol. 15, EGU2013-11008, 2013
EGU General Assembly 2013

Simulations of nonstationary processes at quasi-perpendicular collisionless shocks

David Burgess (1), Petr Hellinger (2), Pavel Travnicek (2,3)

(1) Astronomy Unit, Queen Mary University of London, London E1 4NS, United Kingdom (d.burgess@qmul.ac.uk), (2) Astronomical Institute, AS CR, Prague, Czech Republic, (3) SSL, University of California, Berkeley, USA

Numerical simulations reveal various nonstationary processes in collisionless quasi-perpendicular shocks such as shock front oscillations, self-reformation, generation of ion-scale ripples and emission of oblique whistler waves. These phenomena and their relationship/competition are not fully understood, particularly since they have mostly been studied in the context of 1-D or 2-D simulations of strictly perpendicular shocks. We present the results of a comparative analysis of 2-D and 3-D hybrid simulations showing in detail the spatio-temporal properties of the different processes. In particular, we investigate the parameter dependencies of the various processes on the Mach number, shock angle and proton beta.