



Contribution ID: 811

Type: **Poster contribution**

Magnetic field amplification by high Alfvén Mach number shocks in partially ionized plasmas

Tuesday, August 4, 2015 4:00 PM (1 hour)

The interstellar medium and ejecta of supernova are not always completely ionized. Such partially ionized plasmas are thought to be unsuitable for cosmic ray acceleration. In order to study shock structures of collisionless shocks in partially ionized plasmas, we perform two-dimensional hybrid simulations. We find that large density fluctuations and large magnetic field fluctuations are generated both in the upstream and downstream regions for high Alfvén Mach number shocks. For the shock velocity $V_s = 1333 \text{ km/s} = 57 V_a$, the strong turbulence is generated in the downstream region by the upstream density fluctuations and the downstream magnetic field is amplified over 30 times the initial upstream magnetic fields. In addition, we find that the velocity distribution of downstream hydrogen atoms has three components for $V_s = 1333 \text{ km/s}$. Observed shock structures suggest that diffusive shock acceleration can operate at perpendicular shocks propagating into partially ionized plasmas in real three-dimensional systems. If possible, we will present results of three-dimensional simulations.

Collaboration

– not specified –

Registration number following "ICRC2015-I"

708

Primary author: OHIRA, Yutaka (Aoyama Gakuin University)**Presenter:** OHIRA, Yutaka (Aoyama Gakuin University)**Session Classification:** Poster 3 CR**Track Classification:** CR-TH