

Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Kinetic simulations of turbulent magnetic-field growth by streaming cosmic rays TOM STROMAN, MARTIN POHL, Iowa State University, JACEK NIEMIEC, Polish Academy of Sciences — The acceleration of cosmic rays to high energies is thought to occur at supernova-remnant shocks via the mechanism of diffusive shock acceleration. Efficient acceleration requires turbulent, amplified magnetic fields in the shock's upstream region. I will present results of multidimensional particle-in-cell simulations aimed at observing the magnetic field amplification that is expected to arise from the cosmic-ray current ahead of the shock. We find that the initial structure and peak strength of the amplified field is somewhat sensitive to the choice of parameters, but that the field growth saturates in a similar manner in all cases: the back-reaction on the cosmic rays leads to net transfer of momentum to the interstellar medium, substantially weakening their relative drift while also implying the development of a modified shock.

Martin Pohl
Iowa State University

Date submitted: 06 Jan 2009

Electronic form version 1.4