Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Particle dynamics and energization at the earth bow shock.[1] RICHARD MARCHAND, FRANCES MACKAY, JIANYONG LU, KONSTANTIN KABIN, ROBERT RANKIN, University of Alberta — Simulation results are presented for the dynamics and energization of plasma particles as they cross the earth bow shock. The model is based on a kinetic description of particle dynamics, in which single particle trajectories are calculated using a symplectic integration scheme. Particle distribution functions are calculated at different positions in the magnetosheath using Louville's theorem with a Hamiltonian formulation of single particle equations of motion and time reversed particle tracing. As a first approximation, the bow shock is assumed to be represented by a prescribed local plane shock. A more detailed representation of the shock and magnetosheath regions is then considered, as obtained from a global MHD simulation model. Comparisons are made between the two models, for different possible angles between the incident plasma flow velocity and the shock front. Various scenarios of energization are also considered for majority (H) and minority (He and heavier elements) ion species.

[1]This work was supported by the National Sciences and Engineering Research Council of Canada, the University of Alberta and the Canadian Space Agency.

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Date submitted: 23 Jul 2006 Electronic form version 1.4