



Test particle simulation of the Double Star perpendicular shock

E. Lee, G. K. Parks and M. Wilber

University of California, Berkeley, CA, USA (eslee@ssl.berkeley.edu)

The Double Star spacecraft encountered the Earth's bow shock on 24 February 2004. The observed ion velocity space distributions show both transmitted and reflected populations across the shock ramp and overshoot. The reflected ions form a partial ring distribution perpendicular to the magnetic field. In order to gain insight into the basic ion dynamics responsible for the observed features, we have conducted test particle simulations using measured velocity moments and magnetic field. Ions are injected into the upstream using observed solar wind proton and alpha populations. This steady-state, semi-empirical model reproduces some of the observed ring distribution, and provides a starting point for understanding the contribution of secondary ion mixing to the partially thermalized distributions seen just downstream of the shock. Additional simulation will examine the effects of the cross shock potential on the ion dynamics.