



Ion Acceleration at Martian Bow Shock

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Using ASPERA ion data on board Mars Express, we examined acceleration direction of ions outside the Martian bow shock. All ion counts of more than 1 keV outside the bow shock are manually classified into the solar wind, the ring distribution, and the others. Ions in the last category are found to be accelerated beyond the ring distribution. By plotting these ions in velocity space, we found the acceleration direction and its history. We show two examples. In the 2005-6-3 event, ions are accelerated in the perpendicular direction in the same phase angle (very quick without gyration), and then formed the second ring distribution. In the 2005-8-5 event, ions are first accelerated to both the parallel and anti-parallel directions, and then further accelerated to the perpendicular direction while experiencing the gyro motion. This spiral motion in turn help estimating the magnetic field polarity.