



A Fast-Fermi acceleration at Mars bow shock

Karim Meziane (1), Christian Mazelle (2), Abdelhaq Hamza (1), David L. Mitchell (3), Jared R. Espley (4), Jasper S. Halekas (5), Emmanuel Penou (1), and Bruce Jakosky (6)

(1) IRAP CNRS-University of Toulouse-UPS-CNES, PEPS, Toulouse, France (christian.mazelle@irap.omp.eu), (2) Physics Department, University of New Brunswick, Canada, (3) Space Sciences Laboratory, University of California, Berkeley, USA, (4) NASA Goddard Space Flight Center, Greenbelt, USA, (5) Department of Physics and Astronomy, University of Iowa, Iowa City, Iowa, USA, (6) Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, Colorado, USA

We have recently reported for the first time strong evidences that a fast-Fermi mechanism is taking place at the Mars bow shock. MAVEN spacecraft observations from SWEA instrument show electron flux spikes with energy up to ~ 1.5 keV. These spikes are associated with sunward propagating electrons and appear when the interplanetary magnetic field line threading the spacecraft is connected near the Martian bow shock tangency point. The loss cone distribution is a salient feature of these backstreaming electrons as the phase space density peaks on a ring centered along the magnetic field direction. Moreover, the data show no evidence of any effect due to a hypothetical cross potential on the observed angular distributions. Although similar distributions are seen at the terrestrial bow shock, the quantitative analysis of the measurements strongly indicates that the electrons are produced at the shock foot and escape upstream before exploring the entire shock structure.