

Ion acceleration at the Earth's parallel bow shock: what can we learn from Cluster?

A. Kis¹, M. Scholer², B. Klecker², O. Agapitov³, V. Krasnosselskikh⁴, E. Kronberg⁵, P. Daly⁵,
I. Dandouras⁶, I. Lemperger¹, V. Wetztergom¹ and A. Novak¹

¹ Research Centre for Astronomy and Earth Sciences, Sopron, Hungary

² Max-Planck-Institut fuer extraterrestrische Physik, Garching, Germany

³ University of California, Berkeley, USA

⁴ LPC2E, CNRS, France

⁵ MPS, Goettingen, Germany

⁶ CNRS, IRAP, Toulouse, France

Using simultaneous multi-spacecraft Cluster data we present individual events that illustrate the details of ion acceleration mechanism and show how the mechanism can differ from event to event. We also analyze the three important requirements of the first order Fermi ion acceleration: injection, diffusive scattering and the way how the ions might be able to escape the system.