Geophysical Research Abstracts, Vol. 8, 05229, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05229

Multipoint composition measurements in reconnection regions with MMS

D. T. Young (1), C. J. Pollock (1), J. L. Burch (1), S. A. Fuselier (2), K.-H. Trattner (2), S. A. Livi (3), N. Paschalidis (3), H. O. Funsten (4)

(1) Space Science and Engineering Division, Southwest Research Institute, Texas, USA, (2) Lockheed Martin Advanced Technology Center, Palo Alto, California, USA (3) Johns Hopkins University/Applied Physics Laboratory, Laurel, Maryland, USA, (4) Los Alamos National Laboratory, Los Alamos, New Mexico, USA (dyoung@swri.edu)

Kinetic processes are of critical interest in the study of collisionless magnetic reconnection. By making multipoint measurements of the velocity distributions of heavy terrestrial ions such as O^+ and lighter solar wind ions ($He^{++)}$ in the magnetosheath, it is possible to address important aspects of reconnection in two ways: 1) By determining how heavy ions decouple from flows into and out of the unmagnetized ion diffusion region, and 2) By tracing the origins of ions entering and leaving reconnection sites. Inside the ion diffusion region mass-resolved inflow and outflow velocities will help determine the location of reconnection remotely. In addition, composition measurements can be used to distinguish between plasmoids formed in the near-Earth magnetotail (where O^+ is significant) and those that form in the distant tail (where He^{++} is significant). These data will also help to distinguish between single X-line and multiple X-line modes of reconnection in the tail. In this paper we will examine the necessary measurements and discuss how the Hot Plasma Composition Analyzer (HPCA) on NASA's Magnetospheric Multiscale Mission (MMS) can be used to investigate these important issues.