Geophysical Research Abstracts
Vol. 18, EGU2016-16207, 2016
EGU General Assembly 2016

Energy dissipation and scaling of the electron diffusion region by MMS during asymmetric reconnection

Matthew Argall (1), Roy Torbert (1,2), Per-Arne Lindqvist (3), Yuri Khotyaintsev (4), Robert Ergun (5), Barbara Giles (6), Craig Pollock (6), Dan Gershman (6), Chris Russell (7), Robert Strangeway (7), and Werner Magnes (8)

(1) University of New Hampshire, Physics, Durham, United States (matthew.argall@unh.edu), (2) Southwest Research Institute, San Antonio, TX, (3) Royal Institute of Technology, Stockholm, Sweden, (4) Swedish Institute of Space Physics, Uppsala, Sweden, (5) University of Colorado, Boulder, Co, USA, (6) Goddard Space Flight Center, Greenbelt, MD, USA, (7) University of California, Los Angeles, Los Angeles, CA, USA, (8) Space Research Institute, Academy of Science, Graz, Austria

In-situ measurements of the electron diffusion region (EDR) during magnetic reconnection are essential to our understanding of energy dissipation in collisionless plasmas. The Magnetosphere Multiscale mission consists of four spacecraft in a tetrahedron formation with an average inter-spacecraft separation as small as 2-5 electron inertial lengths, allowing for the first time a multi-satellite exploration of the EDR. We study the EDR at the magnetopause under a variety of plasma and field asymmetries, particularly density, to understand how the thickness of the dissipation region scales as a function of local and upstream parameters. Current density and energy dissipation are computed using both spatial gradient techniques and individual spacecraft measurements. The thickness of the dissipation region is then compared over several encounters of the EDR.