# Cold ion heating in the vicinity of the Hall field region in dayside magnetic reconnection

*Sergio Toledo Redondo[1], Mats Andre[2], Yuri Khotyaintsev[2], Benoit Lavraud[3,4], Wenya Li[2], Denise Perrone[1], Daniel Gershman[5], Barbara Giles[5], Craig J Pollock[5], Stephen Fuselier[6], Per-Arne Lindqvist[7], Roy torbert[8], Christopher T Russell[9]

1. European Space Agengy (ESA), Spain, 2. Swedish Institute of Space Physics, Uppsala, Sweden, 3. Institut de Recherche en Astrophysique et Planétologie, Université de Toulouse, Toulouse, France, 4. Centre National de la Recherche Scientifique, Toulouse, France, 5. NASA Goddard Space Flight Center, Greenbelt, Maryland, USA, 6. Southwest Research Institute, San Antonio, Texas, USA, 7. Department of Space and Plasma Physics, Royal Institute of Technology, Stockholm, Sweden, 8. Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, New Hampshire, USA, 9. Department of Earth and Space Sciences, University of California, Los Angeles, California, USA

Magnetic reconnection is a plasma process that enables exchange of mass and energy between the solar wind and the Earth’ s magnetosphere. The magnetospheric side of the subsolar magnetopause is often populated by cold (10 eV) plasma of ionospheric origin, in addition to the common hot (10 keV) magnetospheric plasma. We present MMS observations of magnetic reconnection with the presence of ionospheric cold plasma and investigate the heating mechanisms as well as their implications for the global energy budget. It is found that cold ions are pre-heated already inside the magnetospheric separatrix region before entering the exhaust, in the vicinity of the Hall electric field. The temperature increases one order of magnitude and the heating is mainly perpendicular to the magnetic field.

Keywords: Magnetic reconnection, cold ions, magnetosphere

 