EGU22-9556
https://doi.org/10.5194/egusphere-egu22-9556
EGU General Assembly 2022

Study of a dayside magnetopause reconnection event detected by MMS and related to a large-scale solar wind perturbation.

Mohammed Baraka[1], Olivier Le Contel[1], Patrick Canu[1], Soboh Alqeeq[1], Mojtaba Akhavan-Tafti[2], Alessandro Retino[1], Thomas Chust[1], Alexandra Alexandrova[1], Dominique Fontaine[1], and the MMS Team[*]

[1]CNRS, Laboratoire de physique des plasmas (LPP UMR7648), Paris, France
[2]Climate and Space Sciences and Engineering, Ann Arbor, MI, USA
[*]A full list of authors appears at the end of the abstract

Magnetic reconnection is a fundamental process that is ubiquitous in the universe and allows the conversion of the magnetic field energy into heating and acceleration of plasma. It's also very important as it is responsible for the dominant transport of plasma, momentum, and energy across the magnetopause from the solar wind into the Earth magnetosphere. Coronal Mass Ejections (CMEs) and Corotating Interaction Regions (CIRs) are the primary large-scale propagating structures and important drivers of unusual space weather disturbances causing magnetospheric activity. The present study reports on a magnetic reconnection event detected by the Magnetospheric Multiscale mission (MMS) on 21 October 2015 around 04:40 UT and related to a large-scale solar wind (SW) perturbation impacting the Earth's magnetopause. Based on OMNI data, the event impacting the Earth's magnetosphere is ahead of weak CIR (SW beta=~7 and Alfvénic Mach number~15) where the density of solar wind is about ~20 cm $^{-3}$ (compared with average SW density ~3-10 cm $^{-3}$). Furthermore, the magnetosheath (MSH) density measured by MMS just after the crossing of the magnetopause is about ~95 cm $^{-3}$ (compared with average MSH density ~20 cm $^{-3}$). Reconnection signatures such as ion and electron jets, Hall field, and energy conversion are compared with a "classical" reconnection event observed during quiet solar wind conditions.

MMS Team: Y. Khotyaintsev (3), N. Ahmadi (4), H. Y. Wei (5), D. Fischer (6), D. J. Gershman (7), J. L. Burch (8), R. B. Torbert (9), B. L. Giles (7), S. A. Fuselier (8), R. E. Ergun (4), P.-A. Lindqvist (10), C. T. Russell (5), R. J. Strangeway (5), K. Bromund (7)