

About MMS



Understand the microphysics of magnetic reconnection by determining the kinetic processes occurring in the electron diffusion region that are responsible for collisionless magnetic reconnection, especially how reconnection is initiated.

SMD Heliophysics Goals:

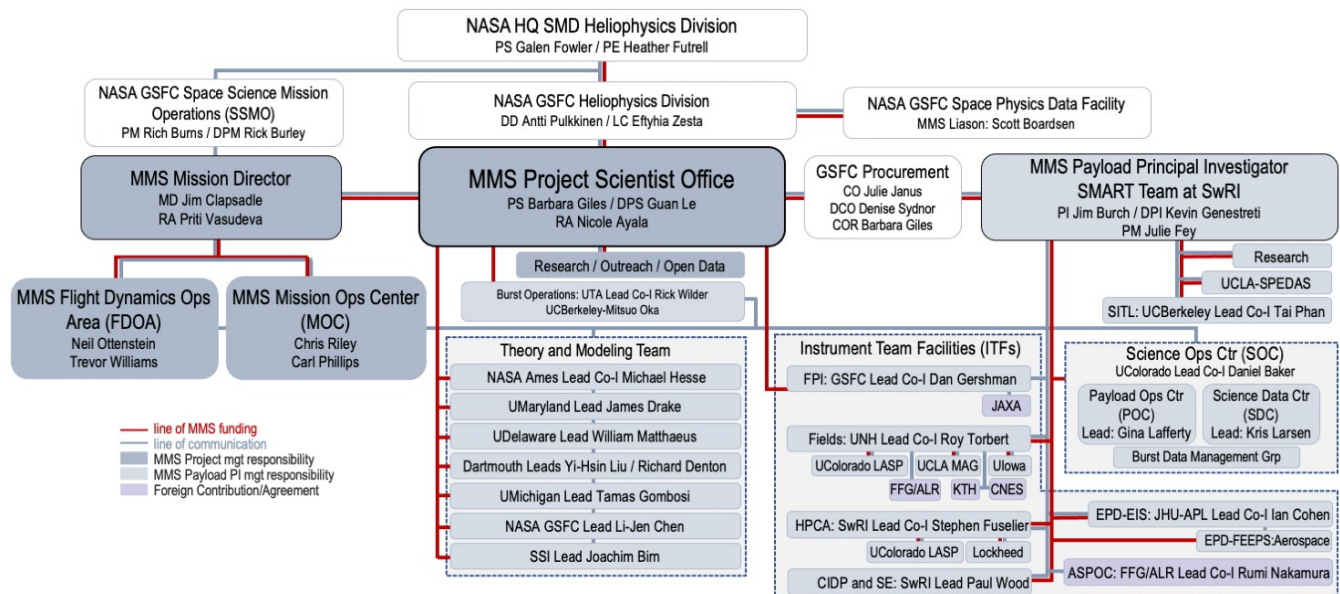
- G1:** Explore the physical processes at work in the space environment from the sun to Earth and throughout the solar system
- G2:** Advance our understanding of the connections between the sun, Earth, the planetary space environments, and the outer reaches of our solar system
- G3:** Develop the knowledge and capability to detect and predict extreme conditions in space to protect life and society and to safeguard exploration beyond Earth

MMS Goals, since and including Prime Mission:

- SG1:** Understand how reconnection works in the boundary regions of Geospace for a wide range of plasma conditions (G1, G2, G3)
- SG2:** Understand the processes that heat plasma populations and accelerate particles to large energies, especially their relationship to magnetic reconnection (G2, G1, G3)
- SG3:** Determine the nature of kinetic-scale turbulence and its role in reconnection and particle acceleration (G1, G2)
- SG4:** Investigate the microphysics of collisionless shocks (G2, G1, G3)

Objectives for FY24-FY26 Extended Mission:

- SO1:** Understand the role of kinetic physics in the strongly driven magnetosphere during intense space weather events near solar max (SG1)
- SO2:** Discover how the electron-kinetic dynamics that enable magnetic reconnection couple to the larger-scale geospace environment (SG1, SG2)
- SO3:** Understand particle acceleration processes in the magnetotail and their relationship to magnetic reconnection (SG2, SG1)
- SO4:** Understand the fundamental nature of kinetic-scale turbulence, including its coupling to larger scales (SG3)
- SO5:** Understand the role of kinetic physics in the bow shock structure and interplanetary shocks (SG4)



MMS Leadership

MMS Science Principal Investigator: Dr. James Burch, Southwest Research Institute (2005)

MMS Science Deputy Principal Investigator, Dr. Kevin Genestreti, Southwest Research Institute (2022)

MMS Science Working Group:

- Science Deputy PI, Dr. Roy Torbert, U New Hampshire (2007-2022)

MMS Program Scientist, Dr. Galen Fowler, NASA HQ

MMS Project Scientist, tbd, NASA GSFC (2023)

- Project Scientist, 2019-2023: Dr. Barbara Giles, NASA GSFC (retired)
- Project Scientist, Phase C - 2019: Dr. Thomas E. Moore, NASA GSFC (retired)

MMS Deputy Project Scientist, Dr. Guan Le, NASA GSFC

MMS Mission Director, James Clapsadle, NASA GSFC

MMS Instrument Lead Co-Is:

FIELDS Lead Co-I: Prof. R. B. Torbert, U New Hampshire (2005)

- Fluxgate Magnetometers (FGM) Lead Co-I: Prof. C. T. Russell, UCLA (2005)
- Axial Double Probes (ADP) and Burst Data System Lead Co-I: Prof. R. E. Ergun, LASP/U. Colorado (2005)
- Spin-plane Double Probes (SDP) Lead Co-I: Dr. P.-A. Lindqvist, KTH Stockholm (2005)
- Search Coil Magnetometer (SCM) Lead Co-I: Dr. O. Le Contel, LPP, France (2005)
- Electron Drift Instrument (EDI) Lead Co-I: Dr. R. B. Torbert, U. New Hampshire (2005)

Fast Plasma Investigation (FPI) Lead Co-I, Phase E: Dr. Daniel Gershman, NASA GSFC (2020)

- Fast Plasma Investigation Lead Co-I, Phase E-2020: Dr. B. L. Giles, NASA GSFC (2015-2020)
- Fast Plasma Investigation Lead Co-I, Phase C-D: Dr. C. J. Pollock, NASA GSFC (retired)
- Fast Plasma Investigation Lead Co-I, Phase A-B: Dr. Thomas E. Moore, NASA GSFC (retired)

Hot Plasma Composition Analyzer (HPCA) and Orbit Design Lead Co-I, Phase D-E: Dr. S. A. Fuselier, SwRI

- Hot Plasma Composition Lead Co-I, Phase A-C: Dr. D. T. Young, SwRI (retired)

Energetic Particles Detector (EPD) Lead Co-I: Dr. Ian Cohen, JHU/APL (2019)

- Energetic Particles Detector Lead Co-I, Phase A-E: Dr. Barry Mauk, JHU/APL (retired)

Active Spacecraft Potential Control Devices (ASPOC) Lead Co-I, Phase E: Dr. R. Nakamura, IWF (2009)

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Science Operations Center (SOC) Lead Co-I: Dr. D. N. Baker / LASP, CU Boulder (2005)

Theory and Modeling Team (TMT) Lead Co-I: Dr. M. Hesse / NASA GSFC (2005)

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Vice-Chair, PS - Barbara Giles
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ASPOC Team Lead - Rumi Nakamura
Fields Team Lead - Roy Torbert
FPI Team Lead - Dan Gershman
EPD Team Lead - Ian Cohen
Theory and Modeling Lead - Michael Hesse
Science Operation Center Lead - Daniel Baker
Science Operations Team Lead - Tai Phan
Burst Mode Lead - Robert Ergun

see charter at http://lasp.colorado.edu/galaxy/display/mms/SWG_Charter

MMS Mission Operations Team

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*all are original to proposal team except as noted

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Interdisciplinary Science Team Leads

(These teams, selected by NASA HQ separately from the mission team, were not continued into extended mission and are listed for reference. Many continue their work on the mission and are now associated with the instrument teams above.)

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Theory and Simulation of Basic Kinetic Physics of Magnetic Reconnection in Support of MMS

- Lapenta, Giovanni ; Co-I; United States Department of Energy
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- Eriksson, Stefan ; Co-I; University of Colorado
- Andersson, Laila ; Co-I; University of Colorado
- Newman, David L.; Co-I; University of Colorado
- Gosling, John T.; Co-I; University of Colorado

Tai Phan, Univ. of California, Berkeley

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- Eastwood, Jonathan P; Co-I; UC Berkeley
- Oieroset, Marit ; Co-I; University of California
- Fujimoto, Masaki ; Co-I;Tokyo Institute of Technology
- Chaston, Christopher C; Co-I; University of California
- Bonnell, John W; Co-I; University of California
- Mozer, Forrest ; Co-I; Space Sciences Laboratory
- Shay, Michael A; Co-I; University of Delaware
- Bale, Stuart D.; Co-I; University of California

Melvyn Goldstein, GSFC (with Lead Institutional Co-I, M. Ashour-Abdalla, UCLA)

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- Farrell, William; Co-I;NASA/GSFC
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- Peromian, Vahe; Co-I; University of California Los Angeles;