Decadal Survey for Solar and Space Physics (Heliophysics) 2024-2033: Panel on the Physics of Magnetospheres

Committee

Lynn M. Kistler

Chair

LYNN M. KISTLER is a professor of physics at the University of New Hampshire's Department of Physics and Astronomy, and director of the Space Science Center. Kistler's research interests and activities include the impact of heavy ions on dynamics of the magnetosphere, particularly the ring current and the magnetotail, and the space instrumentation to measure ion composition. Kistler has been involved in developing instruments for Cluster, Fast Auroral Snapshot Explorer (FAST), Equator-S, Advanced Composition Explorer (ACE), Solar Terrestrial Relations Observatory (STEREO), and Solar Orbiter missions. Kistler is an AGU Fellow and has been involved in various NASA committees including: NASA Heliophysics Advisory Committee, NASA Sun-Earth Connections Roadmap Committee, the NASA Heliophysics Lunar Science Subpanel, and the NASA Heliospheric Mission Planning Working Group. Kistler served as the secretary for the AGU Space Physics and Aeronomy subsection on Magnetospheric Physics. Kistler earned a Ph.D. in physics from the University of Maryland, College Park. Kistler previously served as a member of the previous decadal survey’s Panel on Solar Wind-Magnetosphere Interactions.

Lauren W. Blum

Member

LAUREN BLUM is an assistant professor in the Astrophysical and Planetary Sciences Department and the Laboratory for Atmospheric and Space Physics at the University of Colorado Boulder. Prior to joining the University of Colorado Boulder, Blum was a research astrophysicist at NASA Goddard Space Flight Center, and a postdoctoral scholar at the University of California Berkeley. Blum’s research interests include heliospheric physics and the coupled nature of plasma populations in planetary magnetospheres. Recent work has focused on wave-particle interactions, solar wind-magnetosphere interactions, and energetic particle dynamics in Earth’s Van Allen radiation belts. Blum’s experience includes analysis of particle and field measurements from satellites, balloons, and ground stations, as well as instrument and small satellite development. Blum is the recipient of numerous award, including AGU's Basu US Early Career Award for Research in Sun-Earth Systems Science. Blum earned a Ph.D. in aerospace engineering sciences from the University of Colorado Boulder.

Ian J. Cohen

Member

IAN J. COHEN is a senior professional staff member and assistant group supervisor of the Geospace & Earth Science Group at The Johns Hopkins University Applied Physics Laboratory. Cohen primarily focuses on energetic particle dynamics, planetary magnetospheres; magnetosphere-ionosphere coupling, and particle flight instrumentation. Cohen currently serves as deputy lead for the Energetic Particle Detector investigation on the Magnetospheric Multiscale (MMS) mission and deputy project scientist on the Interstellar Mapping and Acceleration Probe (IMAP) mission. Cohen chairs the AGU Space Physics and Aeronomy section's Advocacy Committee. Cohen is serving on both the NSF Geospace Environment Modeling Steering Committee and the NASA Living With a Star Executive Committee. Cohen earned a Ph.D. in physics from the University of New Hampshire.

Robert W. Ebert

Member

ROBERT W. EBERT is a principal scientist at the Southwest Research Institute and an adjoint faculty at the University of Texas at San Antonio. Ebert’s areas of expertise are ion and electron properties and dynamics in Jupiter’s magnetosphere and auroral regions; solar wind interactions at Jupiter’s magnetopause; solar wind physics: spatial variations and long-term trends; origin, acceleration, and transport of energetic heavy ions in interplanetary space; solar wind instrument development for space weather applications; and graphene foil technology for advanced plasma and energetic neutral atom instruments. He has been involved in mission concept development for heliophysics and planetary science. Ebert received a Ph.D. in space physics from the University of Texas at San Antonio.

Christine Gabrielse

Member

CHRISTINE GABRIELSE is a research scientist at The Aerospace Corporation. Gabrielse’s research interests includes studying both the magnetosphere and ionosphere and how they couple, using satellite constellations and ground-based data to study particle energization and precipitation. Gabrielse is currently on a NASA Geospace Dynamics Constellation (GDC) interdisciplinary scientist team and is the deputy observations section head of the Community for the Unified Study of Interhemispheric Asymmetries (CUSIA) DRIVE Center studying asymmetries in the geospace system. Previous mission teams include NASA's Time History of Events and Macroscale Interactions (THEMIS), Magnetospheric Multiscale Mission (MMS) Energetic Particle Detector Suite (EPD), and Van Allen Probes Magnetic Electron Ion Spectrometer (MagEIS) teams. Gabrielse is the particle detector instrument PI for Goddard’s Geosynchronous Transfer Orbit Satellite (GTOSat) mission. Gabrielse is the vice chair of NSF's Geospace Environment Modeling community and a focus group leader on the topic of magnetotail dipolarizations (and associated mesoscale phenomena). Gabrielse received a Ph.D. in geophysics and space physics from the University of California Los Angeles.

Michael Hartinger

Member

MICHAEL HARTINGER is a research scientist at the Space Science Institute. Hartinger studies ultra low frequency waves and other phenomena related to solar-wind-magnetosphere-ionosphere coupling - how energy flows between the Sun and different regions in the near-Earth space environment. Hartinger’s recent research focuses on wave-particle interactions in the Earth's radiation belts and north-south hemisphere asymmetries in the solar wind-magnetosphere-ionosphere system, and co-managing an array of autonomous instruments in Antarctica. Hartinger received a Ph.D. in geophysics and space physics from the University of California Los Angeles.

Raluca Ilie

Member

RALUCA ILIE is an associate professor at the University of Illinois Urbana-Champaign. Ilie’s research interests include kinetic theory and modeling, multi-physics large scale simulations of plasma transport and dynamics, and developing theoretical and predictive models of the space environment. Ilie is the recipient of numerous awards and honors including the NSF Geospace Environment Modeling Postdoctoral fellowship, the International Space Science Institute Early Career scientist award, the Air Force Office of Scientific Research Young Investigator Program, the NSF CAREER award, and the NASA Heliophysics Early Career Investigator award. Ilie received a Ph.D. in space and planetary physics from the University of Michigan.

Michael Shay

Member

MICHAEL A. SHAY is professor in the Department of Physics & Astronomy, University of Delaware. Shay studies plasma physics using analytical theory and massively parallel computer simulations. Shay's work is applicable to a diverse set of phenomena: solar flares and coronal mass ejections on the sun, the Earth's magnetosphere and space weather, star formation in astrophysical molecular clouds and accretion disks, and controlled fusion devices such as the tokamak. Shay's research focuses on multiscale phenomena in which short scales (length and time) are intrinsically linked to long scales, making them extremely difficult to simulate using conventional brute force methods. Shay has extensively studied one multiscale process called magnetic reconnection, in which large amounts of magnetic energy is explosively released in the form energetic particle acceleration, heating, and plasma flows and is also studying novel simulation techniques which may provide a means to directly simulate multiscale phenomena. Shay received a Ph.D. in plasma physics from the University of Maryland College Park. Shay served as a member of the previous decadal survey's Panel on Solar Wind-Magnetosphere Interactions.

Peter D. Spidaliere

Member

PETER D. SPIDALIERE is a retired NASA mission systems engineer and served as the lead engineer on the First Hubble Servicing Mission, Landsat 7, Earth Observing 1, Magnetospheric Multiscale Mission, and Plankton, Aerosol, Cloud, Ocean Ecosystem Mission. Spidaliere was the systems engineering manager for the International Space Station and the Shuttle upgrades program. Currently Spidaliere is an independent consultant for Redwire Space and Southwest Research Institute. Spidaliere received a B.S. in mechanical engineering from Virginia Tech.

Dimitris Vassiliadis

Member

DIMITRIOS VASSILIADIS is a physical scientist at the National Oceanic and Atmospheric Administration (NOAA). Prior to NOAA, Vassiliadis was a space physicist at NASA Goddard Space Flight Center conducting research on magnetospheric and geomagnetic physics. Research interests include solar wind-magnetosphere coupling, high-latitude ionospheric electrodynamics, inner magnetosphere current and particle dynamics. Vassiliadis' responsibilities at NOAA include projects in space weather physics and space mission development at NOAA National Environmental Satellite, Data, and Information Service. Vassiliadis received a Ph.D. in plasma physics from the University of Maryland College Park.

Brian Walsh

Member

BRIAN WALSH is an associate professor of mechanical engineering at Boston University. Walsh’s research interests include space and plasma dynamics in planetary space environments, including the plasma interactions in the near-Earth environment and the coupling of energy from the sun into Earth’s magnetic system. Walsh is involved in the NASA missions Time History of Events and Macroscale Interactions (THEMIS) and Magnetospheric Multiscale Mission (MMS), and is part of the development of space-based instrumentation including small spacecraft and soft x-ray technology that takes images of the interaction of the sun and solar wind with the Earth’s plasma environment to provide a global picture. Walsh received a Ph.D. in astronomy from Boston University.

Shasha Zou

Member

SHASHA ZOU is an associate professor in the Department of Climate and Space Sciences and Engineering at the University of Michigan. Zou's research focuses on the dynamic interactions between the Earth’s magnetosphere, ionosphere, and thermosphere during geomagnetic disturbances and their space weather impacts. In addition, Zou is an editor for the American Geophysical Union (AGU) journal Space Weather. Zou was awarded the University of Michigan Ted Kennedy Family Faculty Team Excellence Award in 2019, URSI (The International Union of Radio Science) Young Scientist Award in 2014. Zou received a Ph.D. in space physics from the University of California Los Angeles.