2023 Workshop: Mid-Latitude Geospace Experiments

Long title
Current and Future Instrumentation and Experiments at Mid-latitudes
Conveners
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Description

This workshop will explore current and future experimental capabilities for the study of the mid-latitude Geospace environment. Instrumentation used at mid-latitudes needs to combine detailed plasma and neutral atmosphere measurements with the meso-scale fields of view necessary to specify boundary conditions. Scientific progress requires co-located networks of instrumentation that include both radio and radar systems, optical imaging arrays, orbital platforms, and in-situ measurements made using rocket instrumentation. Experimental measurement of physical parameters of the ionosphere and neutral atmosphere are critical to scientific progress in key areas such as ionospheric variability, storm response and recovery, plasma instabilities, sporadic-E layer formation, sub-auroral polarization streams and drifts, and atmospheric coupling. We will discuss what is possible with current instrumentation systems, near term developments that are currently underway, and longer term visions for a comprehensive set of experimental capabilities at mid-latitudes. Efforts relevant to the upcoming Eclipse in April of 2024 are of particular interest.

Agenda

Tuesday, June 27, 2023

Join Zoom Meeting
https://mit.zoom.us/j/92811784463?pwd=U3hvaWxaaWNrZm5DNnJGeDJIcW4xQT09

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13:30 - 13:38 LT **- HamSCI Eclipse Science** (Nathaniel Frissel)

13:39 - 13:43 LT **- HF Doppler with Personal Space Weather Stations**, (Rachel Boedicker)

13:44 - 13:52 LT **- Vector Sensor MIMO HF Radar** (John Swoboda)

13:52 - 14:00 LT **- Alternative instrumentation for studies of mid-latitude ionospheric irregularities and scintillation** (Josemaria Gomez Socola)

14:01 - 14:09 LT **- Gravity Wave Tracking System** (Matt Cooper)

14:10 - 14:18 LT **- Mid Latitude Ionospheric Irregularity Studies** (Dave Hysell)

14:19 - 14:27 LT **- SAPS Observations** (Alex Chartier)

14:28 - 14:36 LT **- A Next Generation Wallops Geophysical Observatory** (Frank Lind)

14:37 - 14:45 LT **- Ocean Going All Sky Imager** (John Noto)

14:46 - 14:52 LT **- Observing Sporadic E using LWA and Digisondes** (Ken Obenberger)

14:53 - 15:01 LT **- FUV remote sensing from the ISS STP-H9 Mission** (Bruce Fritz)

15:02 - 15:10 LT **- Making the Invisible Visible with a Reestablished Arecibo HF Facility** (Paul Bernhardt)

15:10 - 15:30 LT **- April 2024 Eclipse Planning Discussion** (F. Lind moderator)

Justification

The mid-latitude ionosphere is an exciting domain for space science research with many open and unresolved questions. Several major topical areas have developed over the last several decades of research and together they present a frontier ready

for further systematic investigation. While many Geospace science research efforts have focused on equatorial and high latitudes, a large number of critical systems rely on a highly detailed understanding and specification of the ionospheric physics and state at mid-latitudes. Key physical mechanisms related to phenomena at mid-latitudes are also not fully understood. Our ability to detect, quantify, and forecast such phenomena are also very limited.

Instrumentation for providing physical measurement of Geospace phenomena at mid-latitudes is highly diverse. Different sensor systems often measure different aspects of phenomena or the boundary conditions and context of specific events may only be possible with specific techniques or systems. Combining these diverse systems into a coherent whole and utilizing them in an effective manner requires coordination between community members and the development of new approaches to experimental investigations. Additionally, many efforts are underway to enhance existing instrumentation and deploy new systems and these efforts need to be visible to the larger CEDAR community. Coordination of efforts to justify and develop future instrumentation rests critically on the ability of the CEDAR community to advocate for such efforts in a focused manner. We will provide a forum for such discussions as part of the overall workshop agenda.

Summary

Discussion of mid-latitude Geospace experimental capabilities, plans, and the upcoming April 2024 Eclipse.

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