

2026 Workshop: Equatorial Ionization Anomaly and Ionospheric Irregularities

Long title

Advances in Equatorial, Low and Mid latitude Aeronomy and Ionospheric Irregularities

Conveners

Zihan Wang

Deepak Karan

Cesar Valladares

Qingyu Zhu

zihan.wang@uta.edu

Description

This workshop highlights the latest discoveries and methodological advancements in aeronomy across equatorial, low-, and mid-latitude regions. It focuses on the Equatorial Ionization Anomaly and ionospheric irregularities spanning these latitude ranges. We invite presentations on space- and ground-based measurements as well as modeling efforts. Discussions will emphasize how integrating these diverse, distributed observational resources can deepen our understanding of plasma electrodynamics, identify the seeding of ionospheric irregularities (like atmospheric waves, traveling ionospheric disturbances, and stratospheric warmings), and pave the way for robust nowcasting and forecasting tools.

Justification

Understanding the complex dynamics of the ionosphere-thermosphere system particularly the EIA and the triggering of low- to mid-latitude ionospheric irregularities remains a critical challenge for the space weather community. The highly variable nature of phenomena like Equatorial Plasma Bubbles is driven by a complex interplay of solar forcing, atmospheric waves, the equatorial dynamo, and geomagnetic storms. While these interactions have puzzled researchers for decades, recent transformative advancements in observations, modeling, and Machine Learning methods present a unique opportunity for breakthroughs. Expanding global networks of distributed ground-based observatories, satellite missions, and the deployment of next-generation radar and radio arrays are now providing

unprecedented, continuous data. This workshop is essential to convene the aeronomy community to synthesize these latest discoveries. By strategizing how to best integrate these massive new datasets with advanced numerical models, we can collaboratively transition from observation to prediction, drastically improving space weather forecasting.

Related to CEDAR Science Thrusts:

Encourage and undertake a systems perspective of geospace

Explore exchange processes at boundaries and transitions in geospace

Explore processes related to geospace evolution

Fuse the knowledge base across disciplines in the geosciences

Manage, mine, and manipulate geoscience/geospace data and models

Workshop format

Short Presentations

Keywords

Equatorial Ionization Anomaly, Ionospheric Irregularities, Equatorial Plasma Bubble,

Traveling Ionospheric Disturbances

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