# **2023 Workshop: Equatorial Ionization Anomaly** (EIA) and ionospheric irregularities

Long title

Recent advances in the understanding of Equatorial Ionization Anomaly (EIA) and ionospheric irregularities (e.g., Scintillations, Equatorial Plasma Bubbles, Spread-F) over low and mid latitudes using ground and satellite measurements and modelling studies Conveners

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Note: this workshop will be "Recent advances in the understanding of Equatorial Ionization Anomaly (EIA) and ionospheric irregularities, part 1" in 2023 CEDAR Workshop agenda due to a merging with another proposed workshop.

This session invites presentations related to space and ground-based measurements and modeling efforts that contribute to a better understanding of the development and variability of EIA and ionospheric irregularities (e.g., Scintillations, Equatorial Plasma Bubbles, Spread-F) over low and mid-latitudes.

Agenda

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Join Zoom Meeting https://cuboulder.zoom.us/j/9326582431 Meeting ID: 932 658 2431

1. [10:00 to 10:09 AM] - Richard Eastes

Title: "Improving Prediction of the Equatorial Ionization Anomaly's Peak Density and Latitude"

[10:09 to 10:12 AM] - Discussion

# 2. [10:12 to 10:21 AM] - Xuguang Cai

Title: "Equatorial Ionization Anomaly Discontinuity Observed by GOLD, COSMIC-2, and Ground-Based GPS Receivers' Network"

[10:21 to 10:24 AM] - Discussion

## 3. [10:24 to 10:33 AM] - Kun Wu

Title: "Investigation of the GOLD observed Merged Nighttime EIA with WACCM-X Simulations during a storm"

[10:33 to 10:36 AM] - Discussion

# 4. [10:36 to 10:45 AM] - Anastatia Newheart

Title: "The Effect of Prompt Penetration Electric Fields on Plasma Bubble Growth Rates"

[10:45 to 10:48 AM] - Discussion

# 5. [10:48 to 10:57 AM] - **Joe Huba**

Title: "Modeling the Development of an Equatorial Plasma Bubble during a Midnight Temperature Maximum with SAMI3/WACCM-X"

[10:57 to 11:00 AM] - Discussion

#### 6. [11:00 to 11:09 AM] - Qian Wu

Title: "GOLD observations of bubbles and COSMIC 2 geolocation of scintillations"

[11:09 to 11:12 AM] - Discussion

## 7. [11:12 to 11:21 AM] - Shantanab Debchoudhury

Title: "Multi-layer observations of plasma blobs and bubbles using ICON, GOLD and ISS FPMU"

[11:21 to 11:24 AM] - Discussion

## 8. [11:24 to 11:33 AM] - David Knudsen

Title: "Swarm-based evidence of significant EPB structure parallel to B"

[11:33 to 11:36 AM] - Discussion

## 9. [11:36 to 11:45 AM] - Ercha Aa

Title: "A new Bubble Index and multi-day periodicity of EPBs from GOLD observations"

[11:45 to 11:48 AM] - Discussion

## 10. [11:48 to 11:53 AM] - Zihan Wang

Title: "Simulation of super bubbles during Sep 7, 2017 storm with GITM-SAMI3"

[11:53 to 11:55 AM] - Discussion

[11:55 to 12:00 AM] - Concluding Remarks

Justification

Equatorial Ionization Anomaly (EIA) and ionospheric irregularities (e.g., Scintillations, Equatorial Plasma Bubbles, Spread-F) have been a major focus of the low and midlatitude ionospheric research community. The behavior of the IT system is influenced by the solar forcing from above, wave activities from below, traveling atmospheric/ionospheric disturbances (TADs/TIDs) from mid/high latitudes, and the equatorial dynamo process. These factors along with the dynamic processes manifest various thermospheric and ionospheric irregularities (e.g., Scintillations, Equatorial Plasma Bubbles, Spread-F). Further, the geometry (such as magnetic declination angle, terminator alignment), geomagnetic activities, and other conditions (e.g. winds and wave activity) regulate the morphology and variability. Determining these conditions and understanding their interactions have challenged the research community for decades. New and existing satellite measurements (GOLD, ICON, COSMIC), ground-based observations (e.g., GNSS TEC, incoherent/coherent scatter radar, all-sky imagers, ionosonde), and modeling approaches have revealed several new, interesting characteristics about the EIA variability and ionospheric irregularities.

Related to CEDAR Science Thrusts:

Explore processes related to geospace evolution Develop observational and instrumentation strategies for geospace system studies Workshop format Short Presentations Keywords Equatorial Ionization Anomaly, Plasma Irregularities, Thermospheric-Ionospheric Coupling,Observations and Modelings <u>View PDF</u>