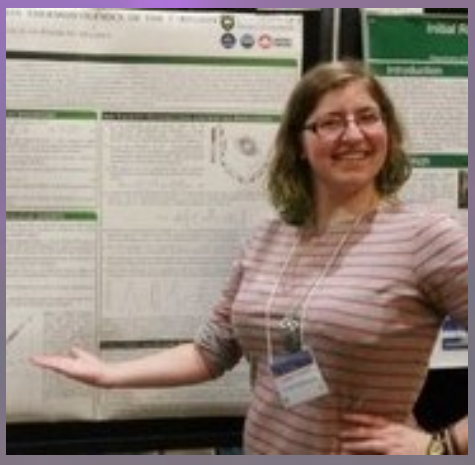
BOSTON UNIVERSITY

Boston University College of Arts & Sciences Center for Space Physics

2020—2021 SPACE PHYSICS SEMINAR SERIES

Using radars to characterize terrestrial high-latitude ionospheric plasma density structures

The Earth's high-latitude ionosphere is filled with plasma density structures that are generated and altered through a variety of mechanisms. These structures can have properties uniquely different from their surroundings, and can alter the propagation of radio waves. By impacting radio communication and global navigation systems, plasma density variations play an important role in our modern lives. Although plasma density structures are a critically important space weather effect, the dominant drivers of these irregularities, as well as their favorable conditions, locations, and scale-sizes, remains unclear. High-latitude advanced modular Incoherent Scatter Radars (ISRs), such as Resolute Bay ISR-Canada (RISR-C), Resolute Bay ISR-North (RISR-N), and Poker Flat ISR (PFISR), provide a unique opportunity to supply multiple measurements of a given plasma irregularity. By leveraging phased array ISR technology, and using the facts that cross-field diffusion is slow at scale lengths greater than 10 km, and that geomagnetic field lines are nearly vertical at high-latitudes, we develop and apply a novel technique for ISR measurements to resolve high-latitude ionospheric irregularity spectra at a high spatial-temporal resolution. From these irregularity spectra, we quantify the abundance and scale-sizes of plasma structures in the high-latitude ionosphere, as well as their drivers. In this presentation, we will motivate the newly developed ISR technique, describe its methodology, demonstrate its effectiveness, and provide irregularity spectra developed from AMISR data.



Thursday, February 25th

4:00-5:00 p.m.

See website for Zoom information

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