BOSTON UNIVERSITY

Boston University College of Arts & Sciences
Center for Space Physics

2023—2024 SPACE PHYSICS SEMINAR SERIES

The shape of plasma turbulence in the lower ionosphere: a *point-cloud* approach

The auroral E-region is the natural terminus for an enormous amount of energy during disturbed times, where only a small fraction of that energy appears as auroral light emissions. Increased ionization combined with strong electric fields create an environment characterized by fast plasma drifts, and kinetic instability processes cause the growth of turbulence. However, observations of the exact interplay between auroral emission regions and turbulent structuring remain scarce, as this interplay often involves small-scale dynamics in a part of the ionosphere that is inaccessible to many modes of observation.

In this talk, I will present a fresh look at the small-scale plasma turbulence that is produced in the E-region during strong auroral activity. The advent of 3D radar data allows for *point-cloud* techniques to be applied to collections of coherent scatter radar echoes. Point-cloud analysis is essential for many modern technologies, and sophisticated algorithms from those industries can readily be adapted for the analysis of ionospheric radar data. I will give a tutorial of how several point-cloud techniques can be applied to data from the new Canadian ICEBEAR 3D radar. I will present results that detail the rapidly evolving spatial relationship between auroral emission regions and small-scale turbulence, as well as the internal structure of the turbulent regions.

Thursday, Februrary 8th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Magnus Ivarsen

University of Saskatchewan