

SEMINAR NOTICE

*Department of Physics and Engineering Physics
University of Saskatchewan*

- SPEAKER:** Dr. Devin Huyghebaert, Candidate for Faculty Position
Department of Physics and Technology
UiT The Arctic University of Norway
- TOPIC:** Radar Measurement Techniques to Investigate the Lower
Thermosphere-Ionosphere Region
- DATE:** **Monday, March 10, 2025**
- TIME:** 3:30-4:30 p.m.
- PLACE:** **Rm. 159, Thorvaldson Building**

ABSTRACT: The Lower Thermosphere-Ionosphere (LTI) Region refers to altitudes of approximately 100-200 km above the surface of the Earth where many different atmospheric phenomena occur, including the northern lights and meteors. The atmospheric density in the LTI is low enough for plasma to persist for extended periods of time, but at the same time dense enough that there are interactions between the plasma and the neutral atmosphere. This provides a mechanism for electric currents to flow perpendicular to the geomagnetic field in the lower LTI region due to the corresponding neutral-to-ion and neutral-to-electron collision rates. The atmospheric density also makes the LTI a difficult region to measure in-situ, where satellites are unable to orbit consistently due to atmospheric drag and aircraft are unable to fly due to the low atmospheric density. Relatively expensive sounding rockets are used for in-situ measurements, but these are sparsely launched. There is therefore a need for remote sensing techniques to make consistent measurements of the atmospheric and plasma characteristics in the LTI region.

Some of the atmospheric and ionospheric phenomena that can be detected in the LTI region will be described and some different techniques to measure this region with radars will be highlighted. The radar techniques that will be presented include using measurements of ionospheric Thomson scatter from plasma density fluctuations to determine the plasma properties and using measurements from meteors as tracers for atmospheric characteristics. A description of how SuperDARN can contribute to these measurements in the present and future will also be presented.

Coffee and Donuts will be served in the Physics lounge at 2:45 pm. for those attending the seminar.