SEMINAR NOTICE

Department of Physics and Engineering Physics
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SPEAKER: Dr. Pasha Ponomarenko, Professional Research Associate
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Studies.

TOPIC*:*   *Improving the diagnostic capabilities of the Super Dual
Auroral Radar Network.*

DATE: Tuesday October 7th, 2025

TIME: 3:30-4:30 p.m.

PLACE: *Physics 103*

Abstract:

The term "Space Weather" generally refers to the state of the ionised part of the Earth's environment from ~90-100 km and up to several tens of thousands km above the ground, which plays an important role in the operation of space-born and ground-based communication, navigation and surveillance systems. The near-Earth plasma dynamics is governed by interaction with the solar wind occurring at ~60,000-70,000 km away from the Earth. The resulting large-scale electric fields are mapped along the dipole-like geomagnetic field lines down to the high-latitude regions and stimulate plasma circulation at the ionospheric heights ~100-400 km. Such a projection of the distant interface region onto a relatively small area of the Earth's ionosphere provides an opportunity for remote sensing of Space Weather from the ground. This is achieved by analysing the spatial distribution of ionospheric plasma drifts at mid and high latitudes by the Super Dual Auroral Radar Network (SuperDARN). Currently, the network consists of more than forty over-the-horizon high-frequency (10-18 MHz) ground-based radars, with the University of Saskatchewan running five radars probing the ionosphere above Arctic Canada. While the network operations remain essentially the same since its inception in 1993, in the last 10-15 years, significant efforts were made both to improve the quality of the data products and to extend SuperDARN diagnostics in general. In this talk, a comprehensive description of SuperDARN principles and operations will be followed by examples of such advances. The talk will be concluded with a discussion of future work on improving SuperDARN performance.