SEMINAR NOTICE

Department of Physics and Engineering Physics
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SPEAKER: Dr. Pasha Ponomarenko, Professional Research Associate
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TOPIC*:* ***Unexpected SuperDARN: sea-ice, earthquakes etc.***

DATE: January 23rd, 2018

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 environment from ~90-100 km and up to several tens of thousands km above the ground, which plays an important role in operation of space-born and ground-based communication, navigation and surveillance systems. The near-Earth plasma dynamics is governed by interaction between the geomagnetic field and 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 polar regions and stimulate plasma circulation at the ionospheric heights ~100-400 km. The "mapping" of the distant solar wind/magnetosphere interface 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 spatial distribution of ionospheric plasma drifts at high latitudes by the Super Dual Auroral Radar Network (SuperDARN). The network consists of more than thirty over-the-horizon short-wave (10-15 MHz) radars monitoring ionospheric plasma movements at 200-400 km heights. Similar to the meteorological maps, SuperDARN combines multi-radar observations into plasma velocity maps over the polar caps.

SuperDARN is a truly international scientific consortium. Its radars are operated by a number of institutions from Australia, Canada, China, France, Italy, Japan, South Africa, UK and US. The SuperDARN group in the Institute for Space and Atmospheric Studies plays a pivotal role in development and operation of the network since its inception in the early 1990s. Currently, the group operates five SuperDARN radars and maintains a server storing all historic data generated by the network. Our engineers continuously work on improving radar hardware and operational software. Furthermore, during the last decade significant efforts were made within the group in order to improve quality of the data products and to extend SuperDARN diagnostics in general. These efforts led us to realisation that SuperDARN is capable of doing much more than just mapping high-latitude plasma drifts. A recent progress in improving SuperDARN diagnostics and developing its novel applications, some of which may look rather unexpected, will be discussed in the talk.

Coffee and Cookies will be served in Physics lounge at 3:00 p.m. for those attending the seminar.