

# SEMINAR NOTICE

*Department of Physics and Engineering Physics  
University of Saskatchewan*

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**SPEAKER:** Dr. Andrei Smolyakov  
Department of Physics & Engineering Physics

**TOPIC:** *Space electric propulsion, plasma physics, and turbulence*

**DATE:** Tuesday, January 12, 2016

**TIME:** 3:30-4:30pm.

**PLACE:** Rm. 103, Physics Building

## **ABSTRACT:**

Electric propulsion is a technology which uses electric and magnetic fields to ionize and expel propellant gas creating the thrust to push objects in space. Due to much higher exhaust velocity it has exceedingly large efficiency compared to chemical rockets. Since first flights in early 60s, electric propulsion became technology of choice for long term (over decades) station orbit keeping and satellite maneuvering, and by now has been successfully employed in several hundreds space mission systems. It is the enabling technology for unique deep space missions such as DAWN space probe (launched in 2007 and currently in orbit around dwarf planet CERES) and future Asteroid Retrieve Mission (ARM). Plasma accelerators with closed electric drift, or simply, Hall effect thrusters, is the most common and widely used electric propulsion concept. Despite many successful applications, the underlying physics of Hall thrusters operation is poorly understood, in part, due to difficulties of predicting the behavior of turbulent plasmas. Critical needs of rescaling of Hall thrusters to large power (for deep space missions such as ARM) and to small satellites (such as CubeSats) are driving the worldwide interest in studies of physics of plasma turbulence in such devices. It turns out also that some plasma processing devices (such as magnetrons widely used for film deposition and materials surface modification) exhibit very similar physical phenomena. In this talk, the physical principles of electric propulsion and related magnetron devices will be discussed along with some of our results on studies of plasma instabilities and turbulence which are critical for device performance and lifetime.

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