

# SEMINAR NOTICE

*Department of Physics and Engineering Physics  
University of Saskatchewan*

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**SPEAKER:** Dr. JP St-Maurice, Department of Physics & Engineering Physics  
University of Saskatchewan

**TOPIC:** *Velocity Distributions in the Ionosphere and Upper Atmosphere.*

**DATE:** Tuesday, September 22, 2015

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

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

## **ABSTRACT:**

When strong thermodynamical equilibrium conditions hold, the velocity distribution of a gas should simply have a Gaussian shape. The term "Maxwellian velocity distribution" is used to describe this situation. However, in the upper atmosphere and ionosphere the ion gas and, ultimately, the bulk of the atmospheric gas become so tenuous that local thermodynamic equilibrium conditions do not hold. As the local collision frequency decreases, increasingly large departures from a Maxwellian can take place. A particularly striking example that will be discussed in this presentation is the ion velocity distribution created when strong electric fields accelerate the ions through the background neutral atmosphere, sometimes at large supersonic speeds. Other examples of interesting situations with large departures from a Maxwellian apply to light constituents like Hydrogen and Helium while they escape from the upper atmosphere. Chemistry in the upper atmosphere can also give rise to energetic tail populations. I will show how velocity distributions are linked to the transport properties of a gas and describe the challenge they present to the determination of temperatures by satellites and the spectrum of radio waves scattered by the ionosphere.

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