

SEMINAR NOTICE

*Department of Physics and Engineering Physics
University of Saskatchewan*

SPEAKER: Robert Bauer, PhD Candidate
Physics & Engineering Physics

TOPIC: *Probing matter with photons and electrons: A study of Water and Flax*

DATE: Tuesday January 21, 2020

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

PLACE: Physics 103

ABSTRACT:

The arrangement of atoms and molecules greatly affects the properties they elicit. Here the development of an organic semiconducting material derived from flax oil will be discussed along with the formation of ice and, another water structure, clathrates. Organic semiconductors offer several benefits compared to their inorganic counterparts, from flexibility to relative ease of fabrication. Bio-organic materials go one step further enabling the use of organisms as bio-factories. Linus orbs are peptides with a cyclic structure that can be found in several plants, e.g. extracted from flax oil. Water is a molecule with many hidden secrets, various properties of water do not conform to standard conventions. This is evident when observing the density of the phases of water, and the variety of crystalline forms. In this talk, I start by discussing the organic semiconducting devices, focusing on solar cells. To guide design of a light sensitive Linus-orb based device, I will discuss initial calculations preformed, and devices fabricated. I will discuss the choice to use nano-gold spheres of 5nm diameter plasmonic absorbing centers bound to several surrounding molecules. I will then discuss the resulting devices fabricated using this material, and further characterization of the Linus orb nanoparticle complex. Then I will move onto looking at the nucleation of ice and clathrates, and a few crystalline forms. I will then look at our experimental apparatus that allows us to measure the nucleation of ices and clathrates from amorphous solids. I will then discuss the results and stacking in the comparison between ice Ih and ice Ic. I will then discuss the results from the search for homogeneous nucleation of clathrates.

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