



## **Physics Colloquium**

Friday November 20, 2020, 4 pm, PSC 3046

### **Catherine Boisvert**

Department of Physics, Saint Francis Xavier University

#### **“Parallelizing time”: Decreasing the wall-clock time to reach equilibrium in materials simulations**

We often employ molecular dynamics or Monte Carlo computer simulations to study systems at equilibrium. Normally, we use a single long run (SLR) to analyze the system’s observables and detect the attainment of equilibrium. However, as we will discuss, such runs can take a long time. In this talk, we introduce a new method called swarm relaxation, in which a large number of independently initialized runs is analyzed in order to detect the onset of equilibrium within a much shorter wall-clock time than is possible in a SLR. We discuss the potential increase in efficiency this method could provide for a liquid water system in which a small cluster of ice has been introduced.



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**Noah Tessema**

Department of Physics, Saint Francis Xavier University

### **Measuring the Boost Vectors of Belle II Detector at SuperKEKB accelerator**

The Belle-II experiment hosted by the Japanese High-Energy Accelerator Research Organization (KEK) is at the forefront of New Physics (NP) research in the world. This super B-factory operates at the SuperKEKB accelerator using antisymmetric beam collisions - the electron beam (7 GeV) collides head-on with the positron beam (4 GeV). Due to the asymmetric beam, the laboratory frame is not the center-of-mass (COM) frame in the collision, and it causes the decay products to be boosted in the forward laboratory frame. As an institutional member of the collaboration, St. Francis Xavier University is responsible for measurements of the precision boost vector and other related energy correction measurements throughout the lifespan of the experiment. We use principles that were formerly applied to the BaBar experiment to account for and correct this systematic error.