

# SEMINAR NOTICE

*Department of Physics and Engineering Physics  
University of Saskatchewan*

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**SPEAKER:** Dr. Jason Holt, TRIUMF, and Adjunct Faculty  
McGill University

**TOPIC:** *The Atomic Nucleus as a Window to New Physics*

**DATE:** Tuesday April 2nd, 2024

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

**PLACE:** *Physics 103*

## **Abstract:**

What is the nature and mass of the neutrino? Why is there an abundance of matter over antimatter in our universe? And what is dark matter, anyway? Strangely enough, answers might very well lie, yet undiscovered, in impossibly rare nuclear decays, infinitely subtle wobbles of nuclei embedded in radioactive molecules, or the faintest recoils of nuclei colliding with dark matter. As the role of atomic nuclei in unraveling such fundamental mysteries continues to deepen, first principles quantum simulations, starting from only underlying nuclear and weak forces, are currently undergoing nothing short of a revolution. In this talk I will outline this modern ab initio approach and spotlight several recent milestones, including statistical predictions of the limits of existence and the neutron skin of  $^{208}\text{Pb}$  to constrain neutron star properties. Parallel advances also now allow first predictions of neutrinoless double beta decay, WIMP-nucleus scattering, and symmetry violating moments, with quantifiable uncertainties, for most, if not all, nuclei relevant for such searches.

There will be coffee and tim bits in the Physics lounge at 3:00pm for those attending the seminar.