



Proudly Presents The



Canadian Association of Physicists (CAP) Lecture Series

Speaker:

Dr. Lindsay LeBlanc



“Exploring the Secrets of Many-Particle Quantum Systems Using Laser-Cooled Quantum Gases”

Though it's counterintuitive at first, lasers can be used to make things cold -- colder, in fact, than almost anything else in the universe. By eliminating the randomness associated with thermal kinetic energy, laser cooling techniques let us explore the fundamental quantum mechanical properties of matter. In my research, I am especially interested in studying how individual quantum particles act together, almost as if in community, to exhibit effects that benefit the whole system. In ultracold atomic systems, arbitrary control over the interactions and potential energies open up possibilities for implementing "quantum simulation," where a nearly ideal quantum system can be engineered to model systems that are either too difficult to calculate or too complicated to create. Recently, techniques that selectively transfer momentum from laser light to these ultracold atoms have been developed and used to mimic the effects of magnetic fields and "spin-orbit coupling" (where the spin and the motion of the atoms are correlated). I will discuss several experiments in which these techniques have been used to simulate magnetic and superfluid systems, and explain how we can push these techniques in new experiments to explore otherwise inaccessible systems. Here, we can learn about the relationships between different types of communal behaviour, and the mechanisms by which this "many-body order" is created and preserved.

Short Bio

Lindsay LeBlanc is an Assistant Professor at the University of Alberta's Department of Physics. In 2014, she was named the Canada Research Chair in Ultracold Atoms for Quantum Simulation and the Alberta Innovates Strategic Chair in Hybrid Quantum Systems. After growing up on the Prairies, Lindsay was first came to the University of Alberta as an undergraduate student, then moved on to the University of Toronto for her graduate studies. Just before moving back to Alberta, Lindsay spent three years as a post-doctoral fellow at the National Institute for Standards and Technology and the Joint Quantum Institute in Gaithersburg, MD. Throughout her research, she's studied systems of laser-cooled ultracold atoms to explore the fundamental mechanisms leading to many-body physics; when she's not in the lab, she spends time on her bike, baking bread, and figuring out how to make a teapot that doesn't drip.

DATE: **Thursday, MARCH 12, 2015**
TIME: **11:00 am**
Room: **RC 1003**

Event and Refreshments Generously Sponsored by NSERC