The 2014 CAP lecture

(Canadian Association of Physicists)

will be given by

Jeff Lundeen

University of Ottawa

on

Thursday, March 13, 2014

12:30 pm to 2:00 pm

Hennings 201

"Seeing is Believing: Direct Observation of the Wavefunction"

Abstract:

Textbooks introduce the quantum wavefunction without really explaining what it is. Is it just a powerful abstract notion that we use for calculations? Is a particle's wavefunction the shape of the particle? Does a single particle even have a wavefunction, or is it only something we should apply to collections of many particles? If you're confused, you are not alone. These questions have perplexed many famous physicists over the last century but, recently, researchers have made some progress towards answers. I will introduce you to this new research. I will also present my contribution, a general experimental method to directly observe the wavefunction. The method gives the wavefunction a plain and general meaning in terms of straightforward operations in the lab. I will describe our experiment, in which these operations amount to measuring the position and momentum of a photon. I will explain why this does not violate Heisenberg's uncertainty principle but, surprisingly, does directly give both the real and imaginary parts of the wavefunction.

Short biography:

Dr. Jeff Lundeen received his undergraduate degree in Physics from Queen's University, Kingston, Canada. He then completed a Ph.D. in experimental Quantum Optics and Quantum Information at the University of Toronto, on the subject of Quantum Measurement. As an NSERC postdoctoral fellow, he joined the Clarendon Laboratory at the University of Oxford. There, he led a Photonic Quantum Information subgroup, developing ways to generate, manipulate and characterize quantum light. After a brief stint as a visiting post-doctoral fellow performing experiments with squeezed light at the Institute of Photonic Sciences in Barcelona, he returned to Canada and became a Research Officer in Quantum Radiometry at the National Research Council in Ottawa Canada. In 2013, he became an Assistant Professor in Quantum Photonics in the Physics Dept. at the University of Ottawa. With two energetic kids at home and a research group to run, he sometimes wishes he could be in a quantum superposition.

Light refreshments (donuts/coffee/pop) will be served!