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WEEKLY CALENDAR

April 2-6, 2012

DEPARTMENTAL COLLOQUIUM

"Quantum Information and Optical Communication"

3:40 PM, April 5, 2012
109 Nicholson Hall

Mark Wilde
McGill University

Host: Jonathan Dowling

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

The first quantum revolution began in the early part of the last century, and it introduced curious features to physics such as indeterminism, uncertainty, superposition, quantum interference, and entanglement. The founding fathers of quantum mechanics realized that these features were strange indeed (said to be part of "quantum weirdness"), and many thought that they might not serve any practical purpose. We are now in the midst of a second quantum revolution (the quantum information revolution), in which we are realizing the power of these features and putting this quantum weirdness to use. In this overview talk, I will begin by highlighting many of the strange aspects of the quantum theory, including superposition, entanglement, and uncertainty. For each of these, I will discuss a modern way of interpreting them from the quantum-information viewpoint (entanglement games and entropic uncertainty relations). I will then highlight many of the notable contributions from quantum information theory, including ideas such as teleportation, super-dense coding, quantum data compression, classical and quantum communication capacities, and the "superactivation" of quantum capacity. Finally, I will discuss some of my own contributions to this field, where I have attempted to put "quantum weirdness" to use to enhance tasks such as communication over optical channels and the reading of an optical disc (such as a DVD).

Bio: Mark M. Wilde received the Ph.D. degree in electrical engineering from the University of Southern California in 2008. Currently, he is a Postdoctoral Fellow at McGill University. He has published over 55 articles and preprints in the area of quantum information processing. His current research interests are in quantum error correction, quantum Shannon theory, and applications of these ideas to other areas of physics. He is the author of the textbook "Quantum Information Theory" to be published by Cambridge University Press later this year.

ANNOUNCEMENT:

Due to the Easter Holiday the University will be closed on Friday, April 6, 2012.

Due to Spring Break there will be no classes beginning Monday April 9 – 13, 2012. Classes resume 7:30 am on Monday April 16.