MONTANA STATE UNIVERSITY | College of LETTERS & SCIENCE

# Physics Colloquium

**Friday, September 16, 2016**
**4:10 – 5:00 PM**
**Barnard/EPS 103**

## Quantum optics for quantum networks, fundamental tests, and biology

**Dr. Christoph Simon**
**Department of Physics and Astronomy**
**Institute for Quantum Science and Technology**
**University of Calgary**
**Calgary, Canada**
http://wcmprodlb.ucalgary.ca/phas_info/profiles/christoph-simon
http://www.iqst.ca/people/peoplepage.php?id=225

**Abstract:**

Quantum optics studies the interaction of light and matter at the quantum level. It is a fascinating field with applications to a wide range of topics, including quantum technology, fundamental tests of quantum physics, quantum biology, and imaging. I will illustrate these topics with examples from my own recent and not so recent research. In particular I will discuss ideas for the non-destructive detection of photons using rare-earth ions in solids, which would be useful for global quantum networks using quantum communication satellites; I will briefly review the history of the first loophole-free test of Bell's inequality using nitrogen vacancy centers in diamond and its relevance for quantum networks; I will argue that axons in the brain might serve as optical fibers, with potential implications for quantum biology; and I will describe quantum-inspired and fully quantum approaches to optical imaging.

**Hosts: Rufus Cone and Charles Thiel**

****** Refreshments served in the EPS second floor atrium at 3:45 ******