



The Department of Physics invites you to attend a Seminar by:

ZACHARY CHABOYER

PhD Candidate

Centre for Ultrahigh-Bandwidth Devices for Optical Systems (CUDOS)
MQ Photonics - Department of Physics and Astronomy
Macquarie University, Australia

entitled

3D, laser-inscribed photonics for quantum information science and metrology

ABSTRACT:

Quantum effects like entanglement and squeezing may be harnessed to gain advantages in computation and measurement over classical methods. Photons are ideal carriers of quantum information due to their low decoherence. For this reason, photonic approaches to quantum computing and metrology have attracted significant attention. Integrated photonics promises to address the issues of size, scalability and stability encountered with bulk, table-top and fiber set-ups. Three-dimensional platforms such as circuits fabricated using the femtosecond laser direct-write (FLDW) technique combine the stability of planar photonics with the ability to manipulate optical modes in an arbitrary fashion. This has opened the way toward unique experimental investigations in quantum simulation and highly sensitive multi-arm interferometry.

In this talk I will discuss the fabrication of waveguide devices in glasses using the FLDW technique and their application. The mechanism of material modification by femtosecond laser radiation will be detailed, and the device fabrication process will be explained. I will close with a discussion of the design and quantum characterization of a 3D multi-arm interferometer fabricated at Macquarie. An enhanced visibility and reduced periodicity of measured two-photon interference fringes in the quantum case suggests the utility of the device for quantum-enhanced phase measurement.

DATE: FRIDAY, OCTOBER 17th, 2014
TIME: 10:00 a.m.
Room: CB 4056