Contribution ID: **1384** Type: **Poster (Student, In Competition) / Affiche (Étudiant(e), inscrit à la compétition)**

Entangled photon pair source towards quantum spectroscopy

Tuesday 14 June 2016 19:12 (2 minutes)

In nonlinear spectroscopy, measuring weak nonlinear signals generated from feeble signal and probe fields in a nonlinear material can be quite difficult, especially with photosensitive materials. The field of quantum spectroscopy has long theorised applications of photon pairs from Spontaneous Parametric Down-Conversion sources for enhancing two-photon nonlinear spectroscopy through the utilization of quantum properties. Using the high frequency correlations between photons in a pair as well as the tight pair creation times, it has been shown that two-photon frequency conversion processes such as two-photon absorption and sum-frequency generation are linear in input flux rather than quadratic, as with classical laser light. Building off of the established experimental foundation of entangled two-photon absorption and entangled photon pair up-conversion, I present a source of entangled photon pairs based off of periodically-poled magnesium oxide-doped lithium niobate capable of single-photon-level frequency conversion. This source is optimized for high photon fluxes and low chromatic dispersion which can be verified through sum-frequency generation in an identical, second crystal. This is a first step towards demonstrating time-domain quantum spectroscopy in biological media.

Author: Mrs GUNTHER, Aimee (Institute for Quantum Computing, University of Waterloo)

Co-author: Dr JENNEWEIN, Thomas (Institute for Quantum Computing, University of Waterloo)

Presenter: Mrs GUNTHER, Aimee (Institute for Quantum Computing, University of Waterloo)

Session Classification: DAMOPC Poster Session with beer / Session d'affiches avec bière DPAMPC

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)