



Contribution ID: 548

Type: **Oral (Non-Student) / orale (non-étudiant)**

## **CLS Synchrotron FIR Spectroscopy of High Torsional Levels of CD<sub>3</sub>OH: The Tau of Methanol**

*Monday, June 15, 2015 4:15 PM (15 minutes)*

Structure from high torsional levels of the CD<sub>3</sub>OH isotopologue of methanol has been analyzed in Fourier transform spectra recorded at the Far-Infrared beamline of the Canadian Light Source synchrotron in Saskatoon. Energy term values for *A* and *E* torsional species of the third excited torsional state,  $v_t = 3$ , are now almost complete up to rotational levels  $K = 15$ , and thirteen substates have so far been identified for  $v_t = 4$ . The spectra show interesting close groupings of strong high- $v_t$  sub-bands related by Dennison's torsional symmetry index */tau*, rather than *A* and *E*, that can be understood in terms of a simple and universal free-rotor "spectral predictor" chart. The energy curves for the  $v_t = 3$  and 4 ground-state torsional levels pass through several of the excited vibrational states, and a number of anharmonic and Coriolis interactions have been detected through perturbations to the spectra and appearance of forbidden sub-bands due to strong mixing and intensity borrowing.

**Primary author:** Dr LEES, Ronald (Centre for Laser, Atomic and Molecular Sciences, Department of Physics, University of NB)

**Co-authors:** Dr BILLINGHURST, Brant (Canadian Light Source Inc.); Dr XU, Li-Hong (Centre for Laser, Atomic and Molecular Sciences (CLAMS), Department of Physics, University of NB)

**Presenter:** Dr LEES, Ronald (Centre for Laser, Atomic and Molecular Sciences, Department of Physics, University of NB)

**Session Classification:** M2-10 Atomic and Molecular Spectroscopy: microwave to X-ray (DAMOPEC) / Spectroscopie atomique et moléculaire: des micro-ondes aux rayons X (DPAMPC)

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