#### Development of a Cryogenic Far-infrared Post-dispersed Polarizing Fourier Transform Spectrometer

Matthew A. Buchan<sup>1,2,\*</sup>, David A. Naylor<sup>1</sup>, Brad G. Gom<sup>1,2</sup>, Adam J. Christiansen<sup>1,2</sup>, Alicia M. Anderson<sup>3</sup>, Alain Cournoyer<sup>4</sup>, Éric Carbonneau<sup>4</sup>, and Martin Larouche<sup>4</sup> <sup>1</sup>Institute for Space Imaging Science, Department of Physics and Astronomy, University of Lethbridge, Lethbridge, Alberta T1K 3M4, Canada <sup>2</sup>Blue Sky Spectroscopy Inc., Lethbridge, Alberta T1J 0N9, Canada, <sup>3</sup>University of Cambridge, Astrophysics Group, Cavendish Laboratory, JJ Thomson Avenue, Cambridge, UK <sup>4</sup>ABB Inc., Measurement & Analytics Division, 3400 Rue Pierre-Ardouin, Québec, Québec G1P 0B2, Canada \*matthew.buchan@uleth.ca









## **PDPFTS Integration**

- Double decker compact design.
- 8x mechanical to OPD multiplier.
- System fully integrated at room temperature.
- Cryogenic integration imminent.





# Preliminary Results

Room Temperature PDPFTS Integration



1.0

960

12.0

### **Future Results**

**Cryogenic PDPFTS Integration** 

- Finished assembly of a large volume 4 K cryogenic test facility.
- Tested all ancillary subsystems of the PDPFTS.
- Integrated PDPFTS into cold volume of cryostat.
- Cryostat and instrument are currently cooling down



### Summary

- We have developed a fully cryogenic PDPFTS to better understand the challenges presented by this hybrid instrument.
- We have achieved first light results with a room temperature integration.
- Fully cryogenic instrument integration now completed.
- Expecting cryogenic results next week.



#### Acknowledgements

This research was funded in part by ABB, Alberta Innovates, Blue Sky Spectroscopy, CFI, CMC, CSA, NSERC, NTCO, SRON, Cardiff University, the University of Groningen, and the University of Lethbridge.

