

RAL Space Laser Spectroscopy Team

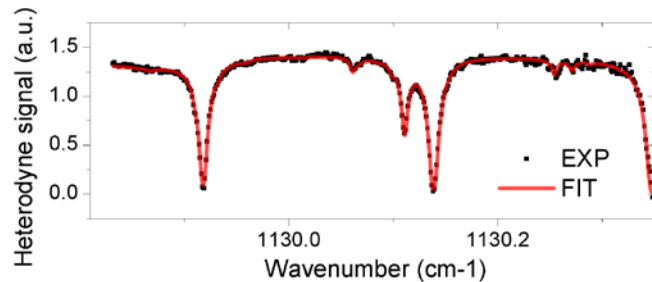
Brief Overview - damien.weidmann@stfc.ac.uk

- R&D in laser spectroscopic methods and instruments to address demanding observational challenges
 - Develop in-situ and remote sensing instruments
 - Beyond what is commercially available
 - New observational capabilities to fulfil new science requirements
 - Primarily working in the mid infrared for high sensitivity
 - Applications on Ozone observations
 - Laser heterodyne radiometer for ozone profiling
 - Concept of open path tropospheric ozone tomography
 - Highly sensitive in-situ sensors, ...

The Laser Heterodyne Radiometer

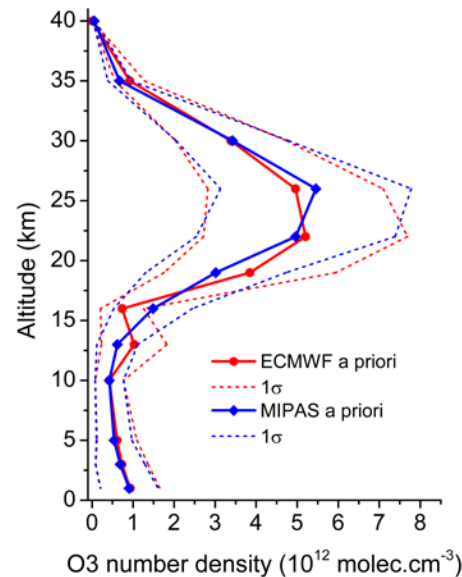
Example

- Provides high spatial and high spectral resolution in a compact package
 - Middle and far infrared operation
 - Example of ozone profiling

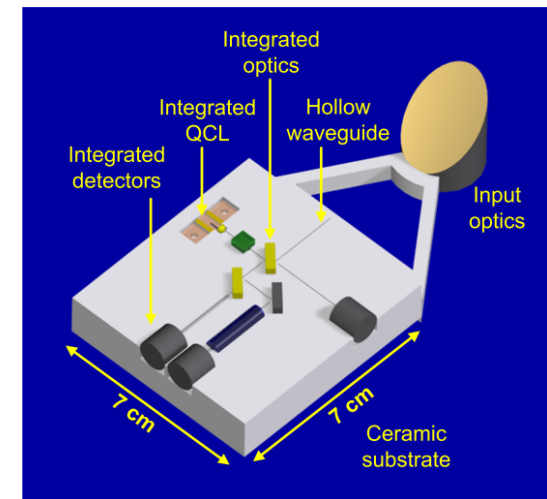


Ultra-high resolution (0.002 cm⁻¹) ozone spectrum within a narrow window

Retrieval O₃ profile up to 40 km
2 to 5 km vertical resolution



Instrument miniaturization
on-going



Applied Optics 51, 36, 8779-8792 (2012)

Optics Letters 36, 11, 1951-1953 (2011)

Applied Optics 46, 29, 7162-7171 (2007)