

# DOCTORAL SCHOOL “ MATERIALS, RADIATION AND ENVIRONMENTAL SCIENCES ” (ED 104)

**UNIVERSITY** : Lille , 1 – Sciences et Technologies

**Scientific domain** : Optics and Lasers, Chemical Physics, Atmosphere.

**Title of the thesis** : Atmospheric composition study from solar occultation infrared measurements.

**Supervisor(s)**: Hervé Herbin

**Laboratory** : Laboratoire d'Optique Atmosphérique (LOA)

**Research project (international/national/regional)** : CPER Climibio, Labex Cappa

## ABSTRACT

The high spectral resolution infrared instrumentation is a powerful tool to analyze gaseous and particulate atmospheric species. Therefore in recent years, several instruments of this type have been embedded on satellite platforms such as: TES/AURA, IASI/MetOp, or TANSO-FTS/GOSAT. The intrinsic qualities of these instruments can provide daily vertical distributions at global scale of many gas species. However, they suffer from two major drawbacks: 1- their spatial resolution is very limited, and 2- their measurements have very weak sensitivity to the lower atmospheric layers (between 0 and 2 km altitude).

The LOA has recently acquired a unique instrument to record atmospheric infrared spectra with high spectral resolution from the ground. This has the advantage of being portable and therefore can make accurate measurements locally with a very good sensitivity to physical and chemical constituents of the lower troposphere.

The objective of this PhD is to achieve the complete characterization of this instrument in terms of spectral and radiometric calibration, as well as performed the first experiments/analysis to retrieve geophysical products.