Fourier-Transform Transmission Spectrometer at LPG

This *spectrophotometer* is equipped with optical cells specially designed to measure the transmission spectra at low temperature of volatile materials over the visible to far-IR ranges.

- Location / owner : Laboratoire de Planétologie de Grenoble
CNRS - Université J. Fourier
Saint Martin d'Hères, France

- Persons in charge :
- Scientific : Bernard Schmitt, Research director
- Technical : Olivier Brissaud, Engineer

- Type : Laboratory

- Spectrometer :
- type: Fourier transform
- model : Nicolet 800
- Spectral range : 0.4 - 200 µm (0.4-0.64 µm: lower S/N)
in four beamsplitter /detector sets
- Spectral resolution : variable, mini : 0.09 cm^{-1} (2 cm^{-1} for far-IR)

- Transmission :
- beam incidence : 0° ± 5° to 0° ± 15° (depend on aperture)
- spot diameter (focus): 2 to 10 mm (depend on aperture)

- Sample :
- compartment : ultrahigh vacuum cryogenic optical cell
  - pressure 10^{-9} to 10^{-4} mbar
- Sample holder #1
  - type transparent substrate (KBr, CsI or MgF_2 window)
  - sample type thin films of volatile molecular solids (condensed under vacuum)
    minerals (thin layers on substrate, or free thick slice)
  - texture : amorphous or polycristals (optical quality)
  - sample size : ≤20 mm (diameter)
  - sample thickness < 0.1 µm to 100 µm
  - temperature : 10 - 350 K (limited by sublimation temperature)
  - pressure 10^{-9} to 10^{-4} mbar
- Sample holder #2
  - type closed cell (MgF_2, Al_2O_2, CaF_2 windows)
  - sample type crystals of volatile molecular solids (grown from liquid or gas)
  - texture : monocrystal to polycristals (optical quality)
  - sample size : 15 mm (diameter)
  - sample thickness 50 µm to 10 mm
  - temperature : 15 - 350 K (limited by saturation pressure)
  - pressure 10^{-4} mbar to 5 bar

- Photometry : absolute: better than 0.1%
- Signal to Noise : > 5000 over most of the range (resolution dependent)

- Experiment control : PC/Linux fully software controlled.

- Acquisition time : typical 1 mn for 100 scans @ 1 cm^{-1} resol. in near-IR (S/N dep.)

- Current state of system : to end-2002 : not operational (dismounted)

- Availability to community : > oct 2002 : installation in new laboratory (100%).
2003 : technical tests and improvements (25%)
LPG + associated laboratories measurements (70%)
open to specific collaborations w. funding (5%)
> 2003 Technical improvements/calibration (15%)
LPG + associated laboratories measurements (70%)
open to specific collaborations w. funding (15%)

General view of the Fourier-Transform Transmission Spectrometer at LPG

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