VIRTIS-H CALIBRATION

	NAME	FUNCTION	SIGNATURE	DATE
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DOCUMENT CHANGE RECORD

Issue	Date	#	Paragraph	Description of the modification	Reason of the modification
1.0	12/10/06			First issue	

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Contents

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1. Scope

The purpose of this document is to describe how the science data of VIRTIS-H are calibrated from raw measurements. Spectral and radiometric calibration are performed on the level 0 data (raw cubes) with in output calibrated radiances for the observed spectra.

2. Applicable Documents

None

3. Reference Documents

None

3. VIRTIS-H radiometric calibration

To recover the calibrated spectra from raw data, a transfer function is used, which is calculated from a database of calibration data recorded during the calibration of VIRTIS-H at channel level and at instrument level. To calculate the transfer function, the optical response and the detector response are treated separately.

- the detector response
It depends on the incident flux and the integration time. This dependencies are treated via a function called RepDetecteur that uses detector calibration performed at component level. When an image goes through this function the result depends only on the transmission of the optics. This function gives the flux seen by the detector.

- the optical response
The optical transmission is obtained used the radiometric measurements performed at IAS/Orsay using calibrated blackbodies.

The process to obtain the transfer function is then described in the following synopsis:

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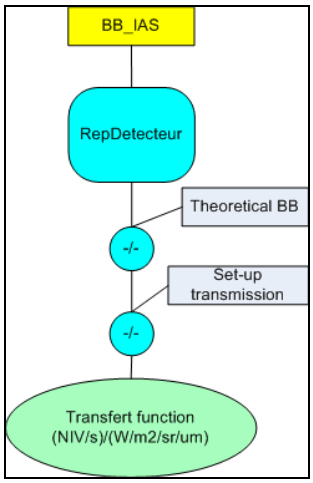
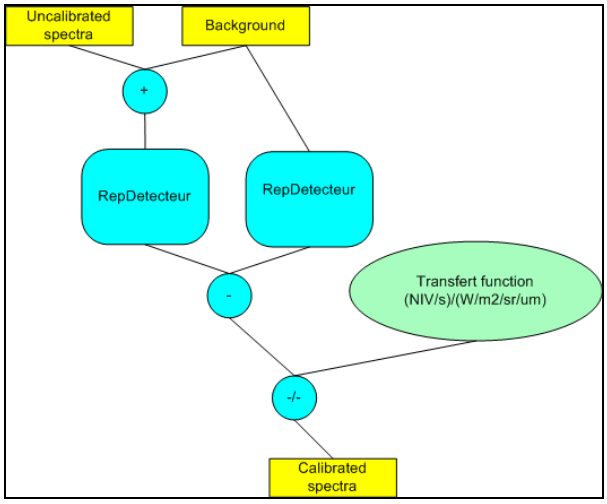


Transfer function synopsis

The Repdetecteur function is used on the blackbody measurement to obtain the incident flux trough the V-H optics without the detector dependency. The result is divided by the theoretical blackbody profile and the transmission of the set-up giving the transfer function in (NIV/s)/(W/m2/sr/um) where NIV/s is an arbitrary scale proportional to a flux.

To obtain a calibrated spectra, a given session follows the following synopsis



Calibration of spectra

The background is separated from the recorded image. Both the background and the spectra of the scene go through the RepDetecteur function to obtain the contribution of their flux seen by the detector. The results are then subtracted and divided by the transfer function giving the calibrated spectra in W/m2/sr/um.

The final step consists in correcting those results from the variation of the response of the internal radiometric calibration.

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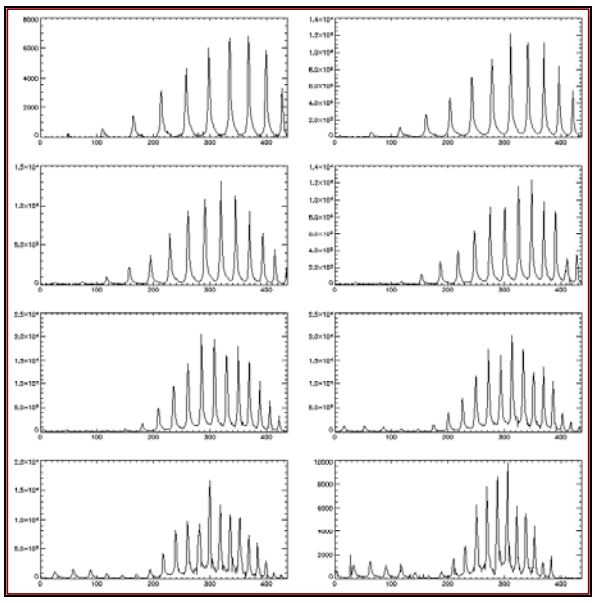
3. VIRTIS-H spectral calibration

The internal spectral calibration is made by mean of a Fabry-Perot pre-calibrated with respect to the temperature. The Fabry-Perot emission gives between 20 and 10 lines depending of the grating order. This system allows to find back the spectral registration of the instrument. The absolute position of each known spectral lines on the detector is gauss fitted for each order and used to reconstruct the spectral registration of the instrument which fits a 2 degree polynomial function.

Those polynomial functions are then used to give for each pixel the correspondence between the pixel number and the wavelength.



Emission of the Fabry-Perot spectral line in each order

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