

VIRTIS-Venus Express spectral registration from internal calibrations: approach and results

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The current spectral registration of VIRTIS-M on Venus Express, that defines the central wavelength for each band, has been evaluated from the calibration on ground. We have performed an ad-hoc study in order to check and eventually refine it. and, in addition, to evaluate the full width at half maximum (FWHM). The study is important to evaluate the effect of critical events, like launch and orbit insertion, and the stability of the instrument along the course of the mission. During an in-flight internal calibration of VIRTIS-M, the radiation coming from the internal source crosses a polystyrene thin layer that has an absorption structure between 3.2 and 3.6 micron. We have performed in the lab a transmittance measurement of a polystyrene filter very similar to the onboard film, and fitted the in-flight measurement with the laboratory data. The first step of our algorithm is the computation of a raw spectral registration. We fit then the polystyrene band from the internal source measurement and from the laboratory lamp, with a first guess of spectral profile, Gaussian like. The fit gives us two set of parameters, in particular the central peak position, the FWHM, and the central intensity. The second step is an optimization of the parameters using a grid approach. The results show that from the cruise mission phase to the nominal mission there is a shift of about one band, and that there is a systematic shift in the wavelength that increase linearly with the spectrometer temperature.