What's New in HIPE 13
(SPIRE FTS)

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Highlights on Changes in HIPE 13

- Major calibration improvements:

  - The *detector nonlinearity* product was upgraded from the bolometer model-based one to an in-flight calibration data-based one, resulting in a significantly better continuum flux accuracy for those observations taken at the beginning of each cooler cycle.

  - Consequently, all the downstream calibration products (eg., RSRF) have been also updated.

- Major pipeline changes:

  - Moved all the final spectral products into the Level-2 context

  - A new *spectrum2d* product was added in the Level-2 context for all mapping observations

  - New metadata on the pointing offset from the requested position are now given in the Level-2 spectral product

- Major improvements to user's interactive analysis scripts:

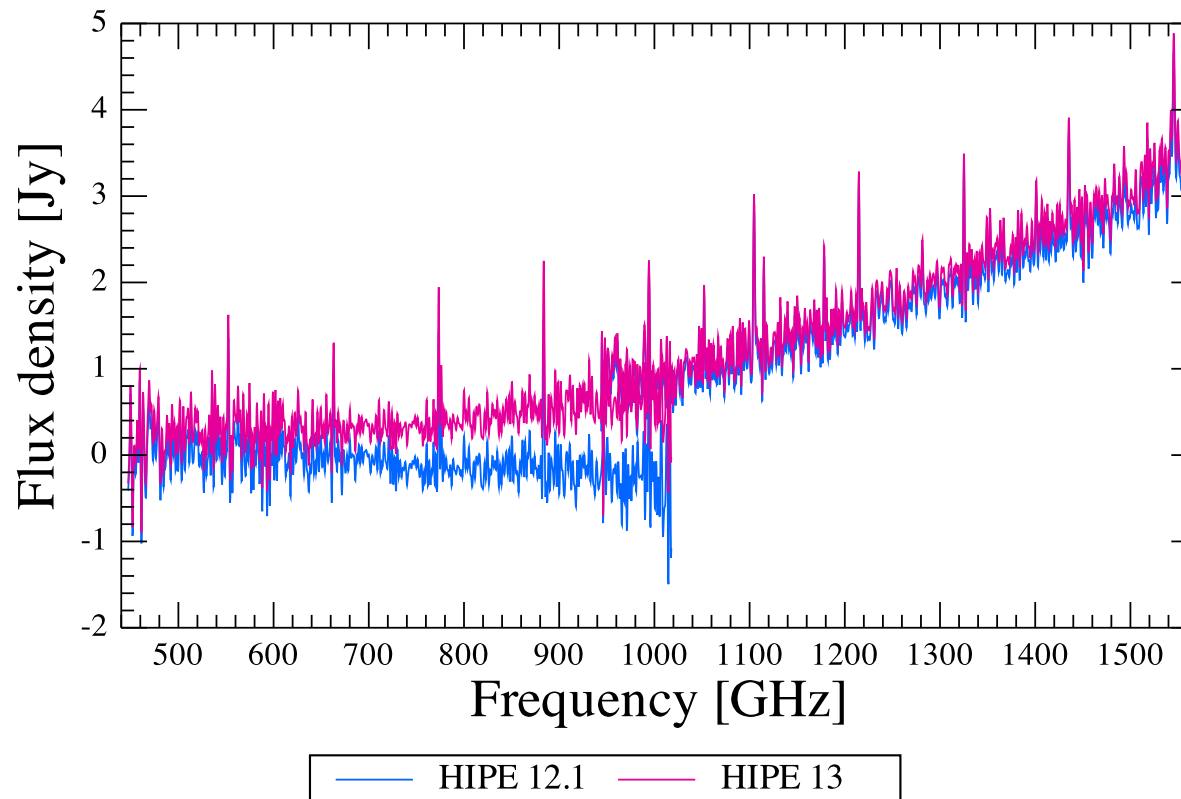 - None (except for a few minor changes/improvements)

Overall Flux Calibration Stable Over HIPE 11-13

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Legend: HIPE7, HIPE8, HIPE9, HIPE10, HIPE11, HIPE12.1, HIPE13
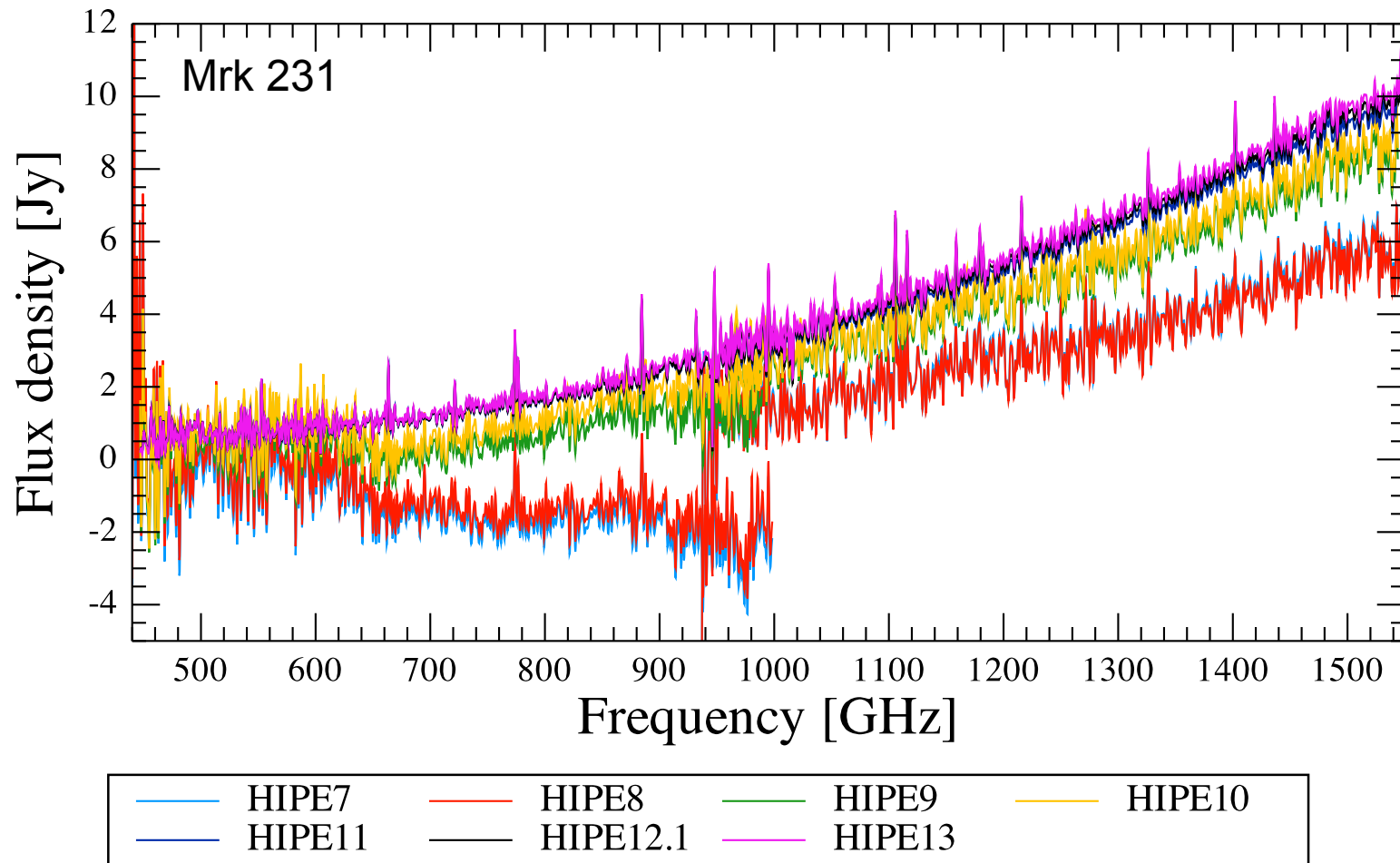
But Improved Continuum Calibration in HIPE 13 for About 20% Observations

- Affecting the observations taken right after a cooler recycle, when the detectors are at colder-than-normal temperatures.
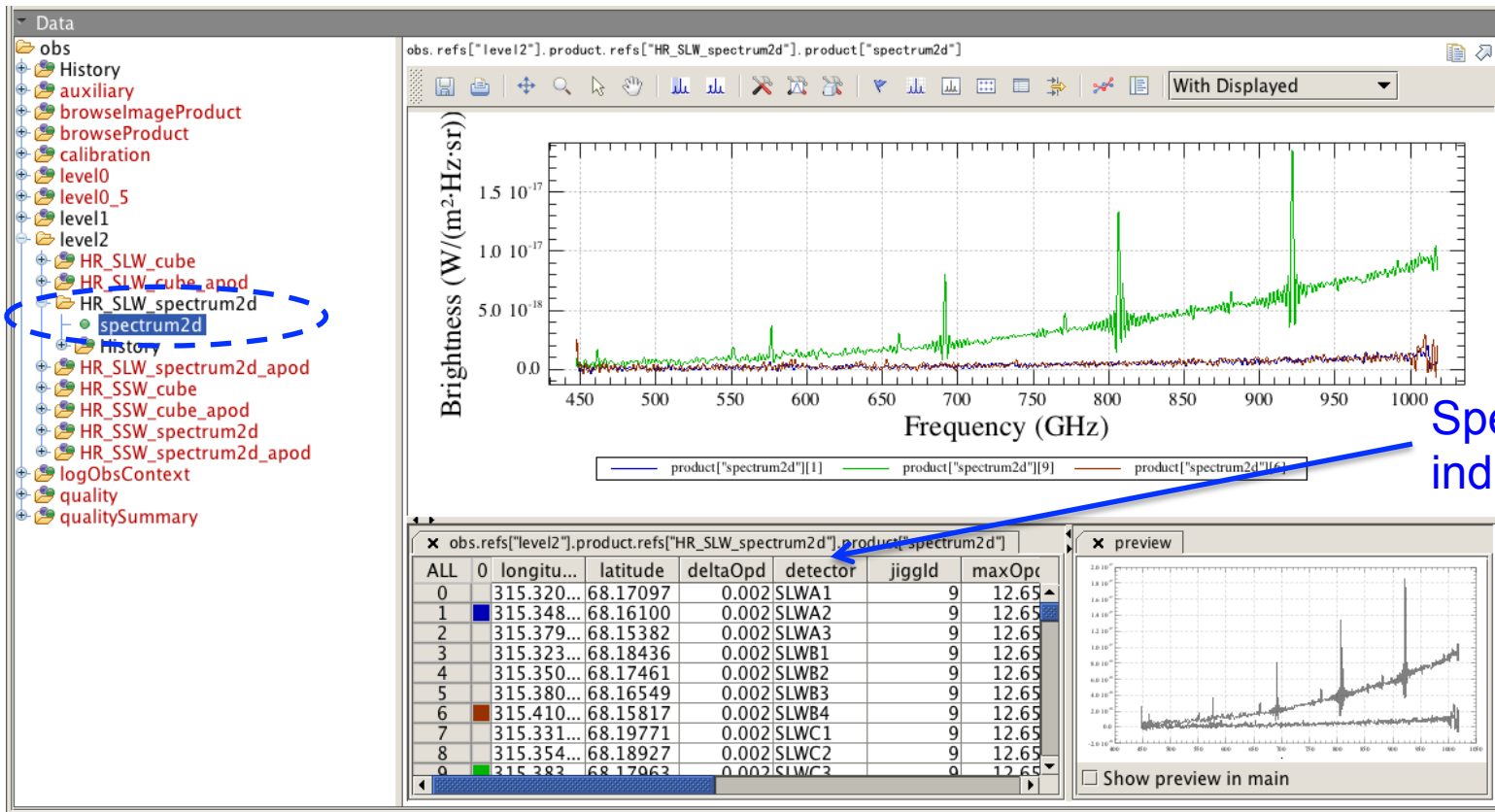
New Level-2 Product Structure

Level 1 now contains only the interferograms

All astronomical spectra are now in Level 2

Level-2 New *Spectrum2d* Product for Mapping Observations

Spectra of all individual detectors

New Level-2 Meta Data: Pointing Offsets

name	value	unit
instMode	SOF1	
obsMode	Single Pointing	
pointingMode	Basic-fine	
missionConfig	MC_H64ASTR_P60ASTR_S61ASTR_RP	
equinox	2000.0	
raDeSys	ICRS	
ra	253.2458221166802	deg
raNominal	253.245375	deg
dec	2.4009447037026552	deg
decNominal	2.4009444444444443	deg
posAngle	98.61399285393887	deg
pmRA	0.0	"/year
pmDEC	0.0	"/year
raDecOffset	3.2350942646728065	arcsec
bsmOffset	1.72	arcsec
origin	Herschel Science Centre	
engConvCalVersion	spire_cal_13_1	
calVersion	spire_cal_13_1	
level	20	

- **raDecOffset** = the offset of the the actual pointing from the requested position.

- **bsmOffset** = 1.7" for early (sparse-mode) observations, 0" for all later observations.
  Note: this has been taken into consideration in the flux calibration, and is also part of "raDecOffset."

New or Improved Documentation

- Updates made to the SPIRE Data Reduction Guide (DRG) and the SPIRE Handbook (formerly, SPIRE Observers' Manual).

- A new SPIRE/FTS calibration paper was just published:

Overall calibration papers:

New ➡

- Systematic Characterization of the Herschel SPIRE Fourier Transform Spectrometer (Hopwood et al. 2015, MNRA, 449, 2274)
- Calibration of the Herschel SPIRE Fourier Transform Spectrometer (Swinyard et al. 2014, MNRAS; or arXiv:1403.1107)
- Herschel SPIRE/FTS: Calibration of its Bright-source Mode (Lu et al. 2014, Exp. A.; or arXiv: 1401.2045)

Papers on specific subjects (2014, Exp. Astro.):

- Herschel SPIRE FTS Relative Spectral Response Calibration (Fulton et al. 2014, ExA, 37, 381)
- Herschel SPIRE FTS Telescope Model Correction (Hopwood et al. 2014, ExA, 37, 195)
- Relative pointing offset analaysis of calibration targets with repeated SPIRE/FTS observations (Valtchanov et al. 2014, 37, 207)
- Herschel SPIRE FTS Spectral Maping Calibration (Benielli et al. 2014, ExA, 37, 357)
- Observing extended sources with the Herschel FTS (Wu et al. 2013, A&A, 556, 116)
- Beam profile for the Herschel-SPIRE FTS (Makiwa et al. 2013, Applied Optices, 52, 3864)

What's New to Come in HIPE 14?
(Targeted release date: the end of 2015?)

- Improved calibration for the FTS low resolution (LR) mode

    ➤ *More analysis in progress on long explosure LR observations as well as the LR part of HR+LR observations.*

    ➤ *This will lead to better continuum flux accuracy*

- A searchable catalog of the lines detected (at S/N > 5) in all the FTS observations

- Final documentations

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