Herschel Spectrometers Workshop
PACS Spectrometer Session #4

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Outline

- Session #4: Combining PACS and SPIRE spectra
  1. Point sources
  2. Slightly extended sources (modify useful script to contain both parts, but just show figure for photometry)

PACS and SPIRE for Point Sources

Point Source Calibrated Spectra

- PACS: After level 2 + post-processing steps
- SPIRE: level 2 already contains the point source calibration
- Stitching PACS+SPIRE spectrum is contained in a useful script in HIPE

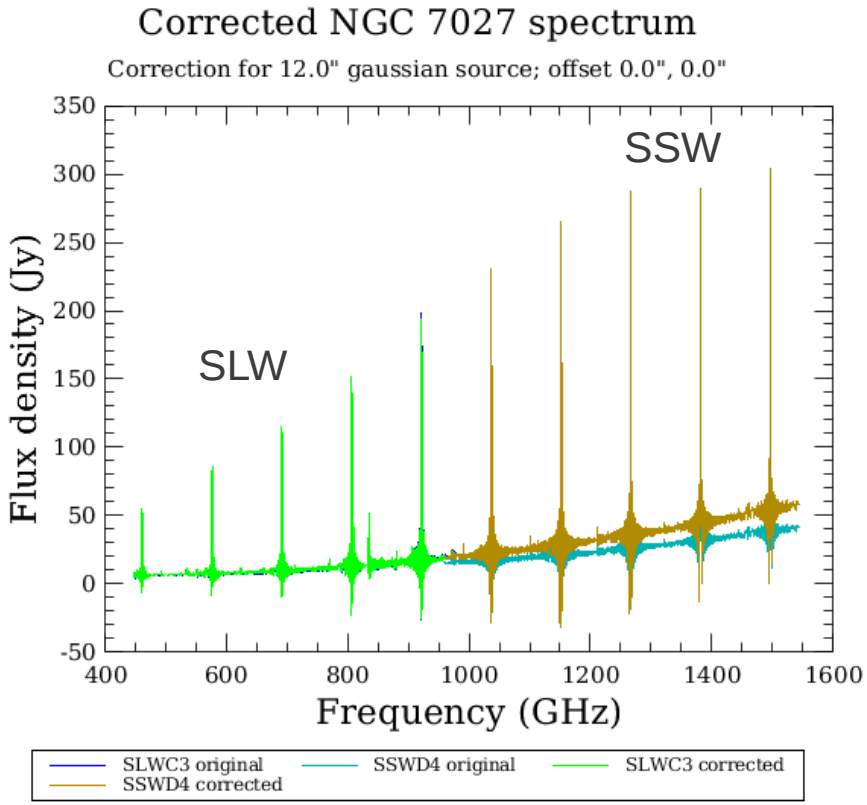
Hands-on #1

- Stitching PACS and SPIRE spectra of a point source
- Scripts >> PACS Useful Scripts >> Spectroscopy: Combine PACS and SPIRE spectra
- Source: (default) CRL 618

PACS and SPIRE for Semi-extended Sources

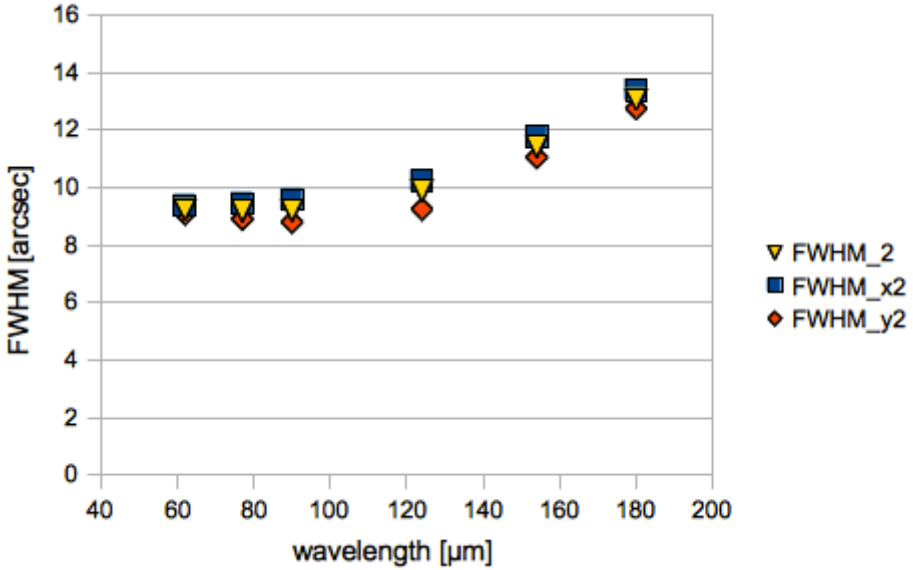
Semi-extended Sources

- Semi-extended source corrections in HIPE:
  - PACS: specExtendedToPointCorrection (E2P)
  - SPIRE: Semi-Extended Correction Tool (SECT), see full presentation tomorrow by Ed Polehampton

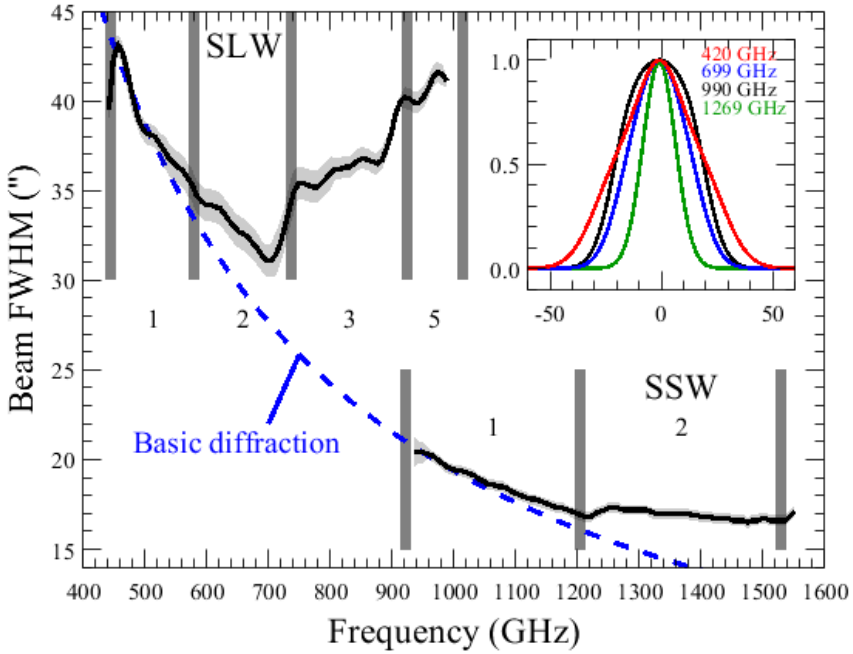


PACS and SPIRE Beams

PACS



SPIRE



Are these two corrections comparable?

- SPIRE-FTS

Following the details of SECT are in Wu et al. 2013:

$$F_s = I_{ext} . C_{point} . \eta_c(\nu, \Omega_{source}) . \frac{\iint_{2\pi} P_\nu(\Psi)\delta_\nu(\Psi) d\Psi}{\iint_{2\pi} P_\nu(\Psi - \Omega_0) D_\nu(\Psi) d\Psi} . \iint_{2\pi} P_{ref}(\Psi) D_\nu(\Psi) d\Psi$$

...SECT introduces a limitation of the flux density to that within a reference beam (default Gaussian beamSize=42” for SECT)

- PACS-S

$$F_s = I_{ext} . C_{point} . \eta_c(\nu, \Omega_{source}) . \frac{\iint_{i,j} P_\nu(\Psi)\delta_\nu(\Psi) d\Psi}{\iint_{i,j} P_\nu(\Psi - \Omega_0) D_\nu(\Psi) d\Psi} . \iint_{i,j} D_\nu(\Psi) d\Psi$$

A reference beam that does not encompass the entire source spatial extent, preserves the corrected shape of the SPIRE-FTS spectrum, but at a smaller absolute level → when comparing with PACS spectra, make reference beam large enough, compared to the source extent.

Hands-on #2

- Merging PACS and SPIRE spectra of a semi-extended source
- Source: NGC7027 protoplanetary nebula
- PACS
  - Local data, Ipipe processing: Telescope Background Normalization, flatfield(excludeLeaks=1)
  - Obsids: 1342186968, 1342186969
  - Source model: Gaussian FWHM 12”
- SPIRE-FTS
  - Local data: cal_spire_11_0
  - Obsid: 1342259592
  - Source model: Gaussian FWHM 12” and gaussRefBeamDiameter=60.0”

Additionally

- Photometric points, with and without color correction
- ISO LWS