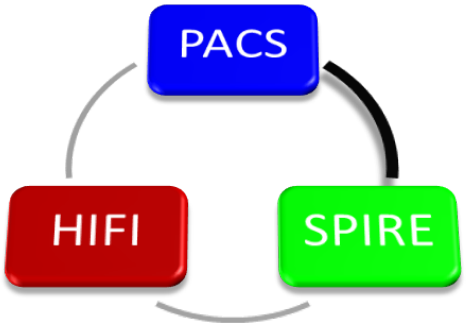
SPIRE-PACS Spectral Line Cross Calibration



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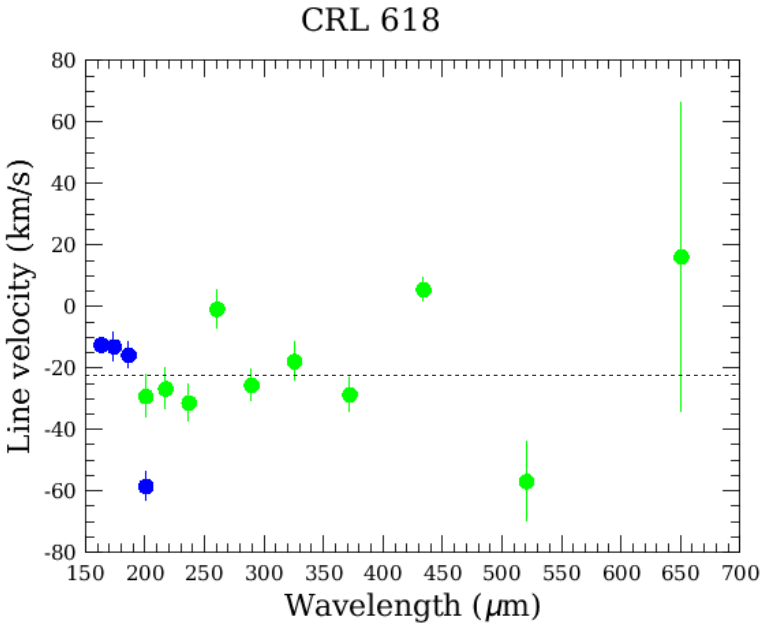
Outline:

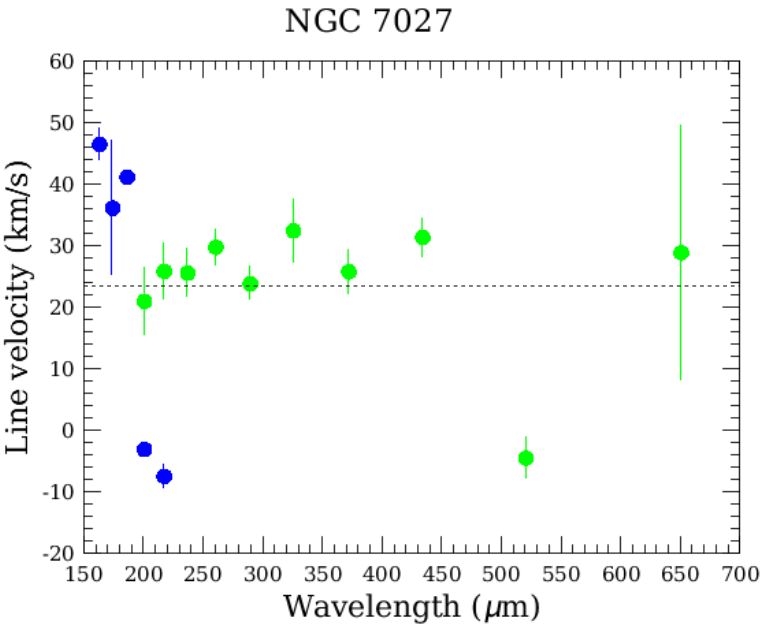
- Comparison of line fluxes in the overlap region between SPIRE & PACS at their respective native spectral resolution (CO 13-12 @ 200.27)
- Wavelength overlap range is very limited and it coincides with the PACS red leak
- Allows a very limited wavelength comparison
- PACS spectrometer red leak calibration (KUL)
- HIFI-SPIRE-PACS Broader range comparison for IRC+10216 (Ivan Valtchanov)

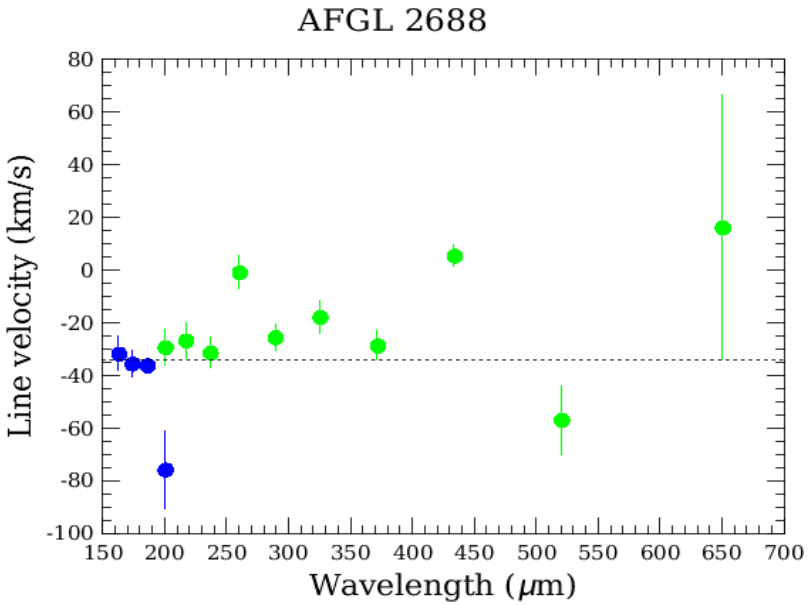
CO 13-12 @200.27 μm 1496.92

Source	PACS Flux (W m-2)	PACS Flux error (W m-2)	SPIRE Flux (W m-2)	SPIRE Flux error (W m-2)	(SPIRE/PACS)	Error (SPIRE/PACS)	
AFGL 2688	9.65E-016	5.22E-017	3.44E-015	3.86E-016	3.57	0.44	
CRL 618	1.22E-015	2.56E-017	3.03E-015	1.11E-016	2.48	0.10	
NGC 7027	7.41E-016	2.66E-017	2.04E-015	7.48E-017	2.75	0.14	
NML Tau							
o Ceti	1.07E-016	3.52E-017					
R Dor							
IRC+10216							
VY Cma							
NGC 6302			6.36E-016				
W Hya							
AFGL 3068	8.16E-017	1.87E-017					
AFGL 4106	6.26E-017	5.19E-018					
alpha Ori	7.57E-017	1.26E-017					
				MEAN:	2.93	0.48	:TOTERR
				WMEAN:	2.61	0.08	:WERROR
				STD:	0.57		

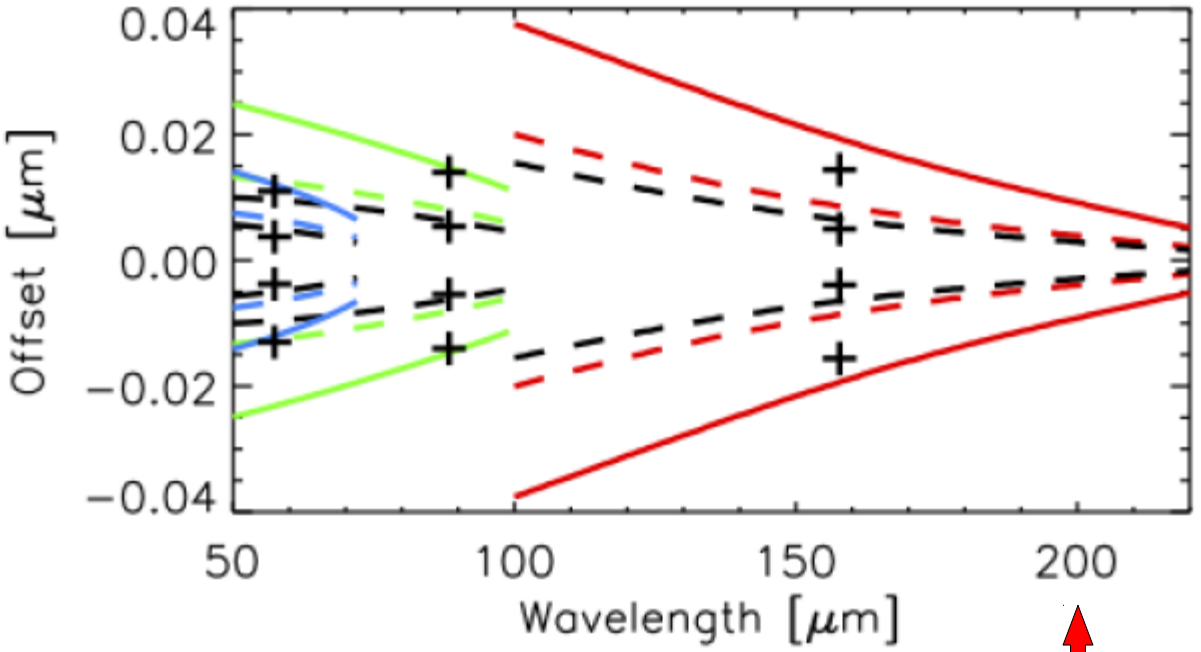
Line Peak Velocity Comparison







PACS Wavelength Offset



0.02 micron <=> 30 km/s

PACS Spectrometer

Red Leak Calibration

Direct Re-Calibration of RSRF

- HF
- Ground based, FM-ILT measurements
- Calibration sources (optical test equipment)
- λ-scans on BB @ ≠temp.

Direct Re-Calibration of RSRF

- 4 equations, 4 unknowns :

I : totalsignal(42K) = signal(1st order, 42K) + signal(2nd order, 42K)
II : totalsignal(35.4K) = signal(1st order, 35.4K) + signal(2nd order, 35.4K)

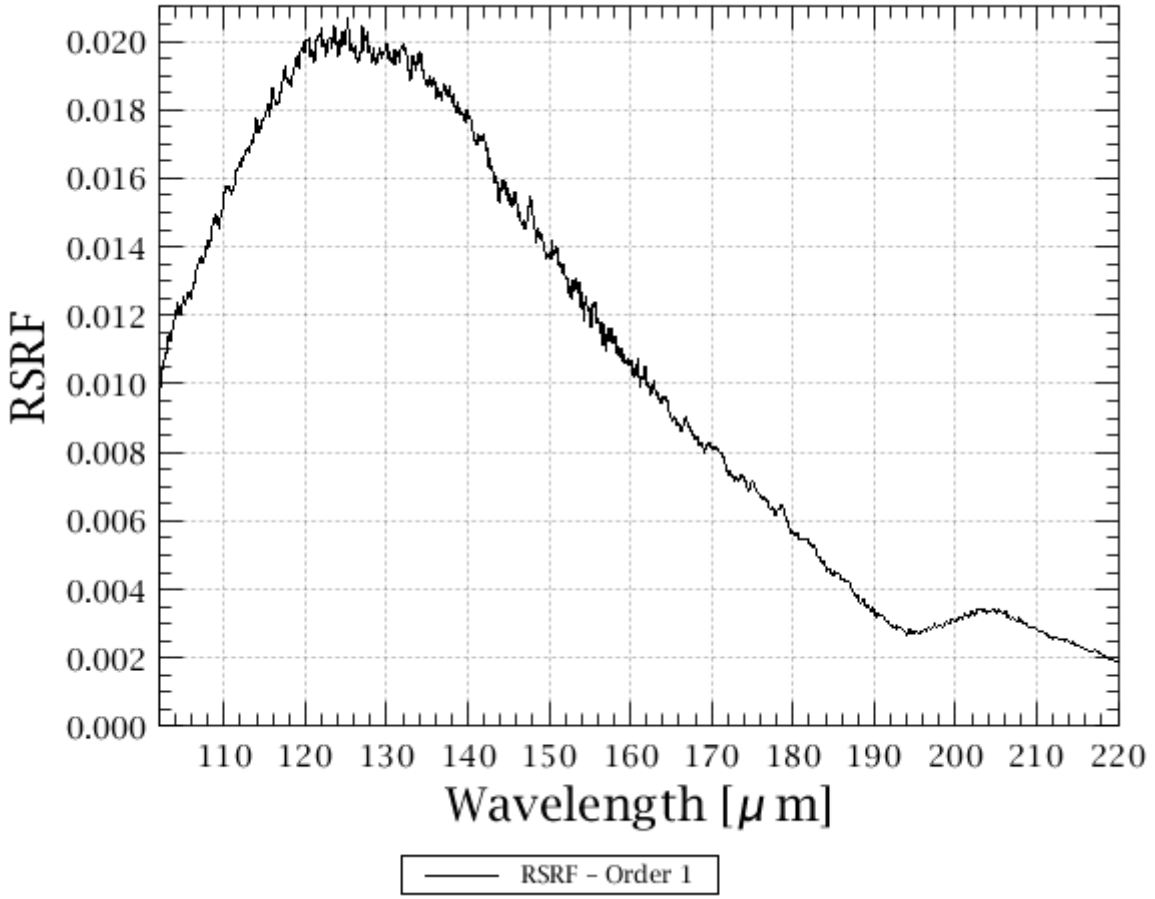
III: signal(1st order, 35.4K) = signal(1st order, 42K)/(BB@42/BB@35.4) [V/s]
(use first order wavelengths here)
IV : signal(2nd order, 35.4K) = signal(2nd order, 42K)/(BB@42/BB@35.4) [V/s]
(use 2nd order wavelengths here, $\lambda = \lambda/2$.)

- Solving for signal @ 42K in both orders

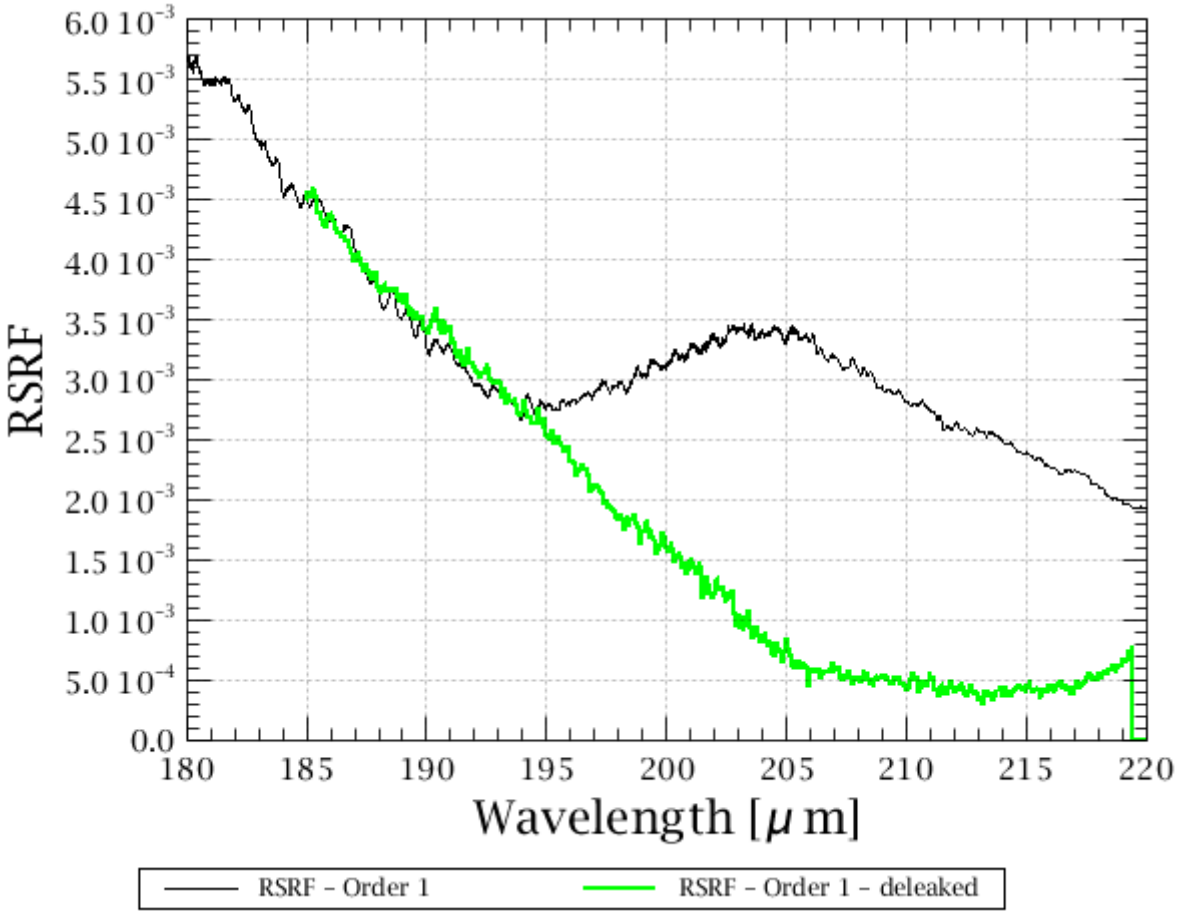
signal(1st order, 42K) =
[-totalsignal(42K)/(BB@42/BB@35.4 for $\lambda/2$.) + totalsignal(35.4K)]/
((BB@35.4/BB@42 for λ)-(BB@35.4K/BB@42K for $\lambda/2$.))

signal(2nd order, 42K) =
[totalsignal(42K)/(BB@42K/BB@35.4K|λ) - totalsignal(35.4K)]/
(((BB@35.4/BB@42|λ)+(BB@35.4K/BB@42K|$\lambda/2$.))

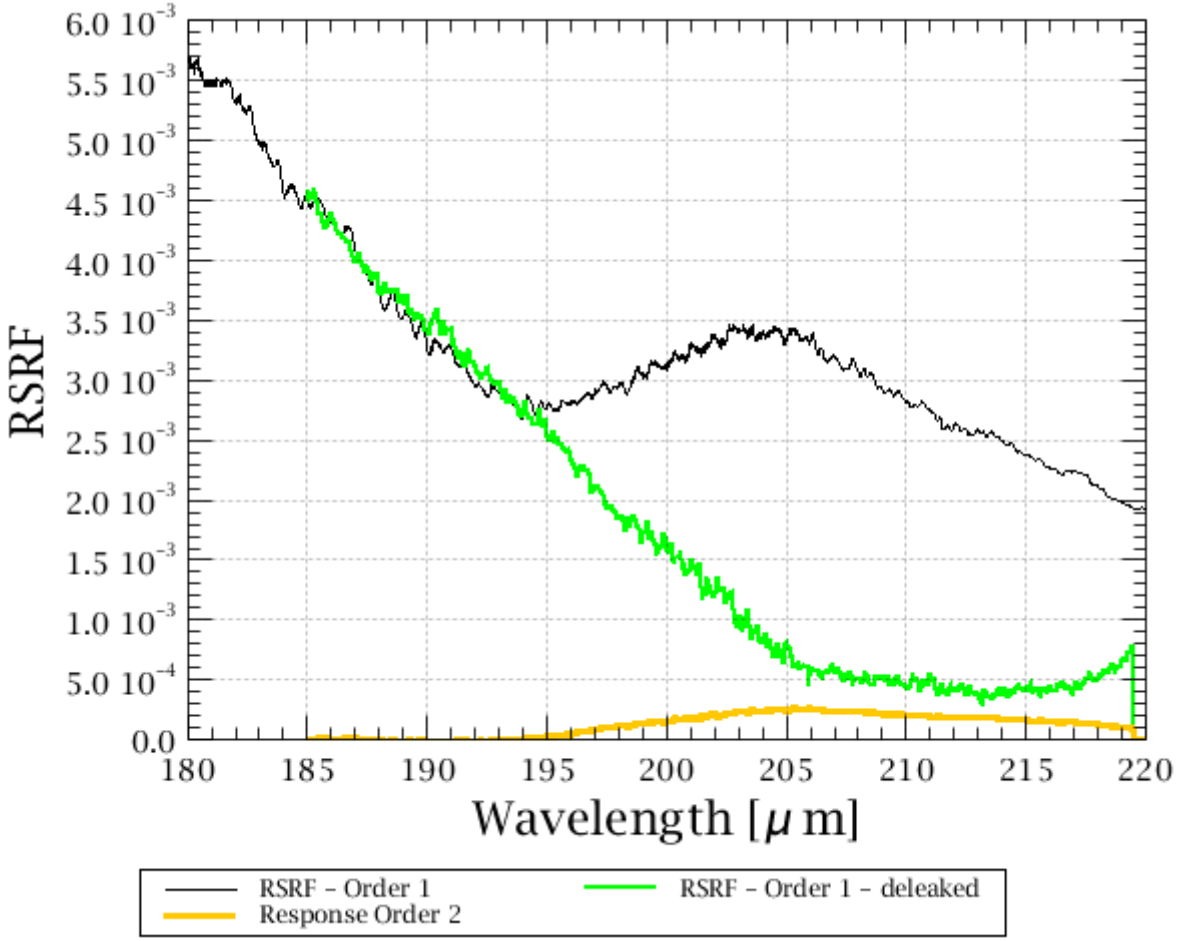
Direct Re-Calibration of RSRF



Direct Re-Calibration of RSRF



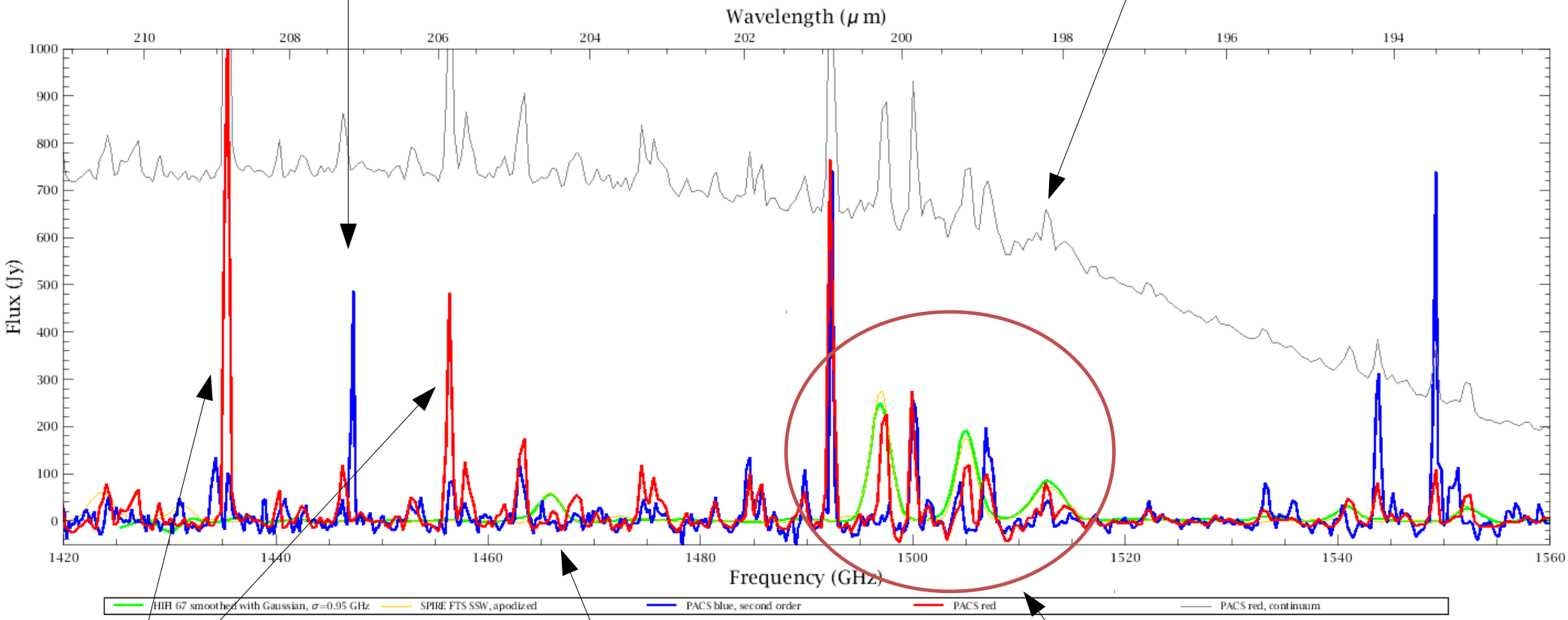
Direct Re-Calibration of RSRF



CW Leo

PACS blue, second order

PACS red, the actual continuum level.



PACS red:
No HIFI & SPIRE
No 2nd order?

HIFI & SPIRE
No PACS.

Only ~4 lines in common
Most (3/4) contaminated
with PACS-blue.