PACS Spectrometer response estimates from unchopped OFF-position scans

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ASRF and response from off-scans

• Goal: calculate response (in V/s/Jy) from 160 unchopped off-position observations and compare with calBlock response estimates

• Standard mode science- and calibration observations, only Nyquist spectral sampling

• ASRF(x,y,λ,t) = [S(x,y,λ,t) – D(x,y)]/Tel(x,y,λ,t), D(x,y) is the nominal dark

• AlPog telescope background model with aging (9 July 2012)
  – TM1 is adopted from T331 sensor (CCUA) reading (+Z-axis position) for the observation half-time
  – Epoch of observation (for aging effect) is adopted at t=00.00z of the OD

• up/down scans are averaged out per observation on standard waveGrid

• Response is evaluated from the ASRF for key-wavelengths (same wavelengths as calBlock response estimates

• Only for spaxel 12 (averaged over the 16 spectral pixels)

• Note: response might be overestimated due to flux contamination in the OFF-position
PACS Unchopped ASRF

RSRF = ASRF / R_calBlock

PACS RSRF

RSRF = ASRF / R_offScan
Response offScan vs. calBlock
Response offScan vs. calBlock
Preliminary results and todos

- The ASRF-based response estimates look very reliable.

- The R1 calBlock response might have some room for improvement, it shows a larger scatter than the telBackgr response, although in some cases outliers in both estimates are well correlated (solar flare events?). Due to eventual flux contamination in off-fields one should expect $\text{var}(R_{\text{telBackgr}}) \geq \text{var}(R_{\text{calBlock}})$.

- The blue-band calBlock response estimates are reliable and better correlated with $R_{\text{telBackgr}}$

- Hints for yearly variation in blue response but no clear sign of long-term linear response drop (based on module 12)

- To be followed up: on the timescale of a typical observation (~1 hr) the true response drift or the uncertainty of the cal-block response is larger?

- In the latter case would be better to fit and estimate response from calBock data over an OD.

- The consequence for unchopped range spectroscopy is more severe, a large set of fainter targets (~10-20 Jy) show negative continuum (PACS-4991). The on-off product suffers the squared sum error of two calBlocks.