



# **PACS Spectrometer response estimates from unchopped OFF-position scans**

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PACS spectrometer pipeline & calibration  
meeting

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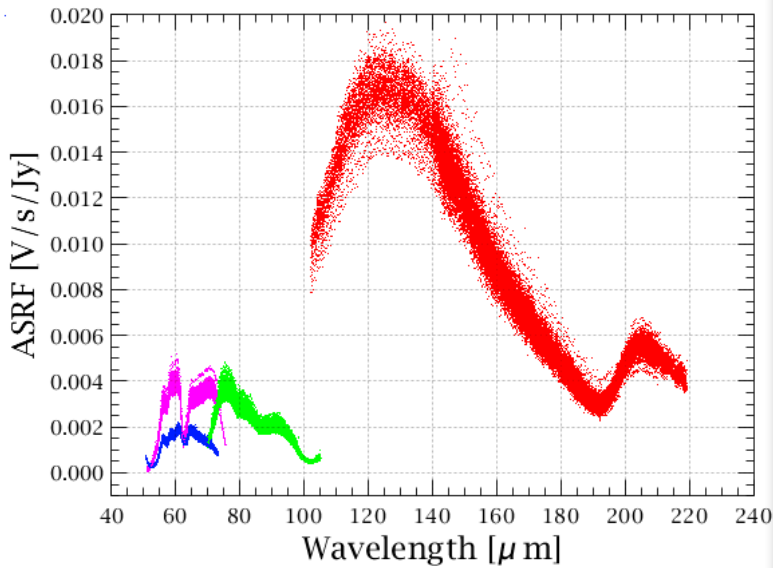
# ASRF and response from off-scans



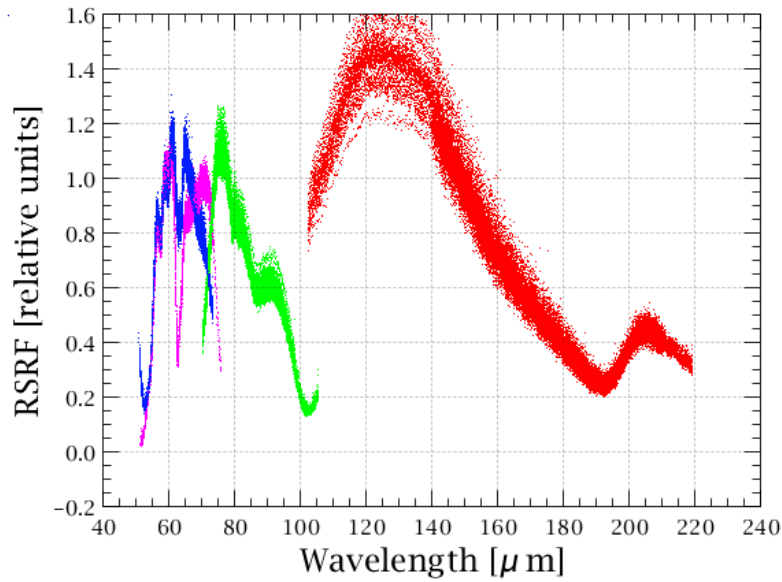
- Goal: calculate response (in V/s/Jy) from 160 unchopped off-position observations and compare with calBlock response estimates
- Standard mode science- and calibration observations, only Nyquist spectral sampling
- $ASRF(x,y,\lambda,t) = [S(x,y,\lambda,t) - D(x,y)]/Tel(x,y,\lambda,t)$ ,  $D(x,y)$  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



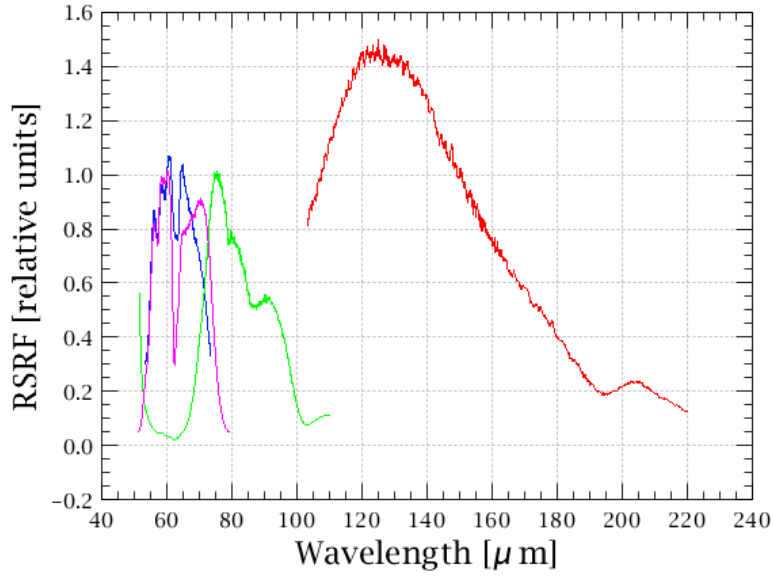
PACS Unchopped ASRF



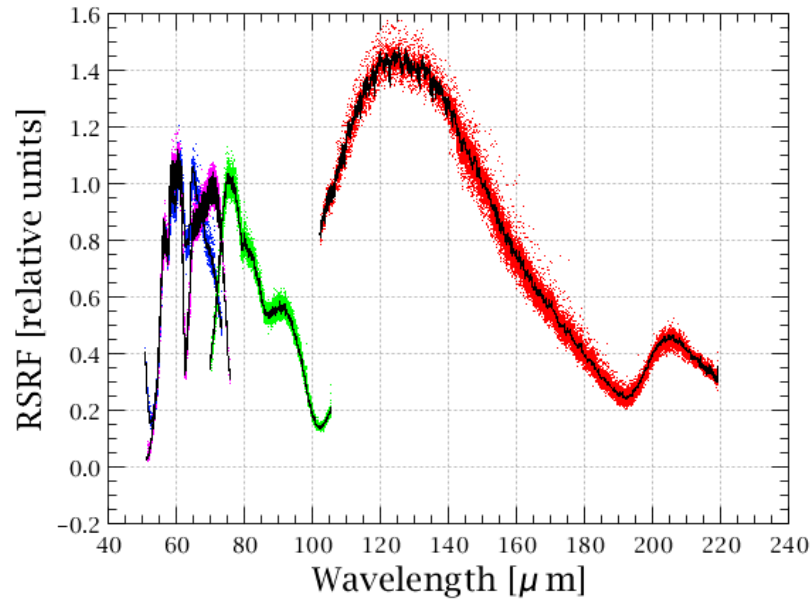
RSRF = ASRF / R\_calBlock



PACS RSRF

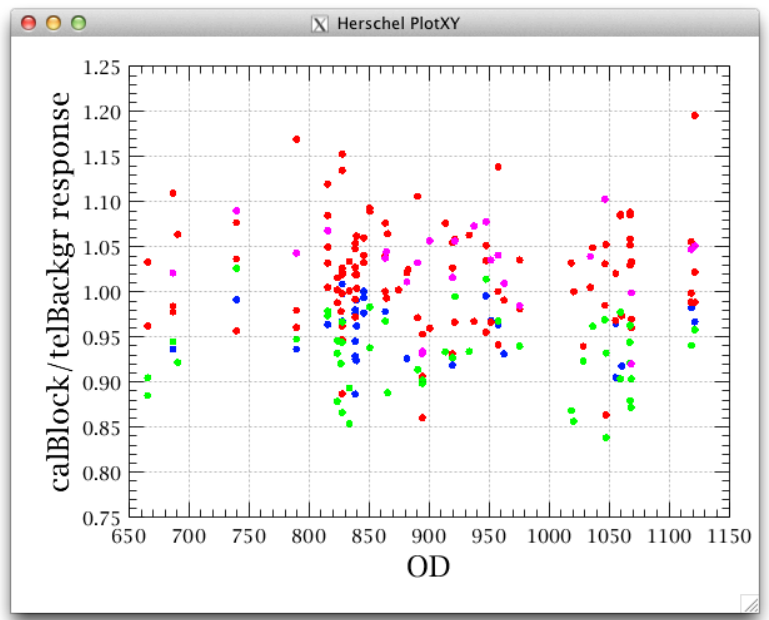
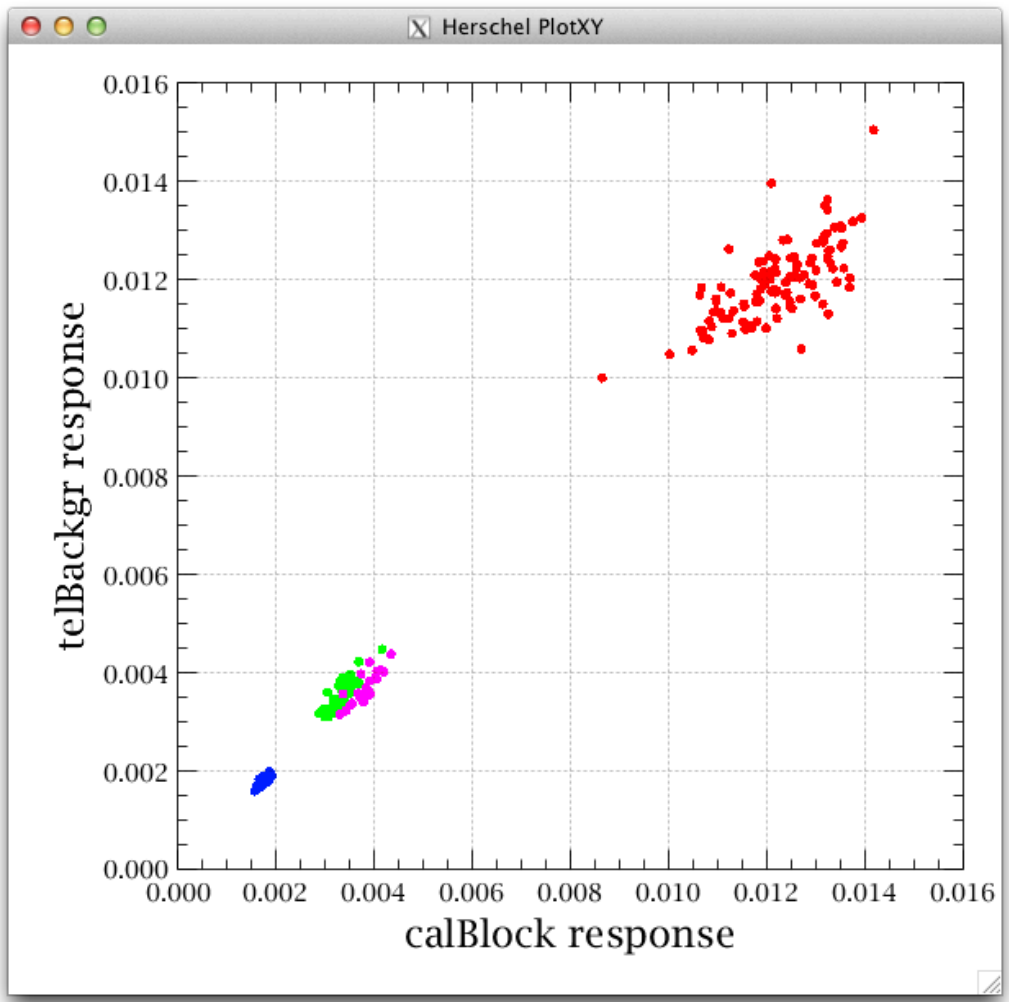


RSRF = ASRF / R\_offScan



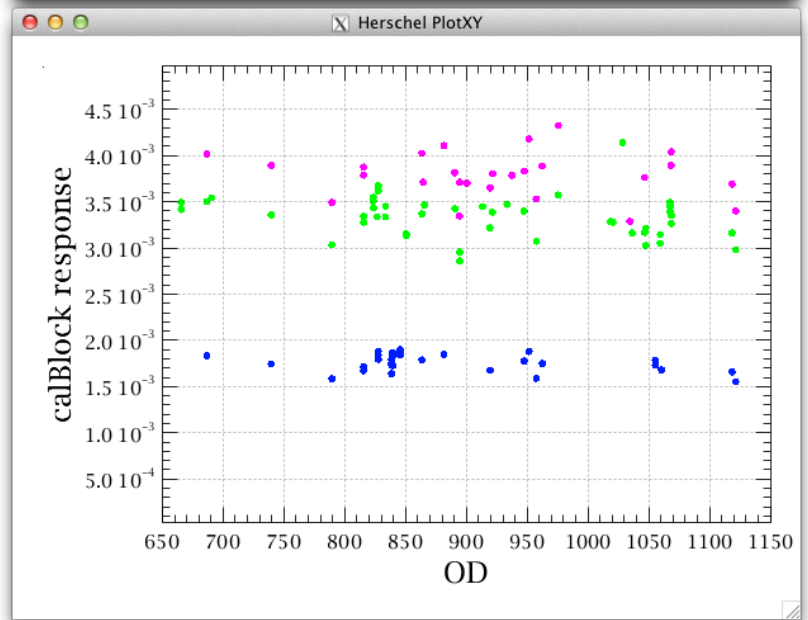
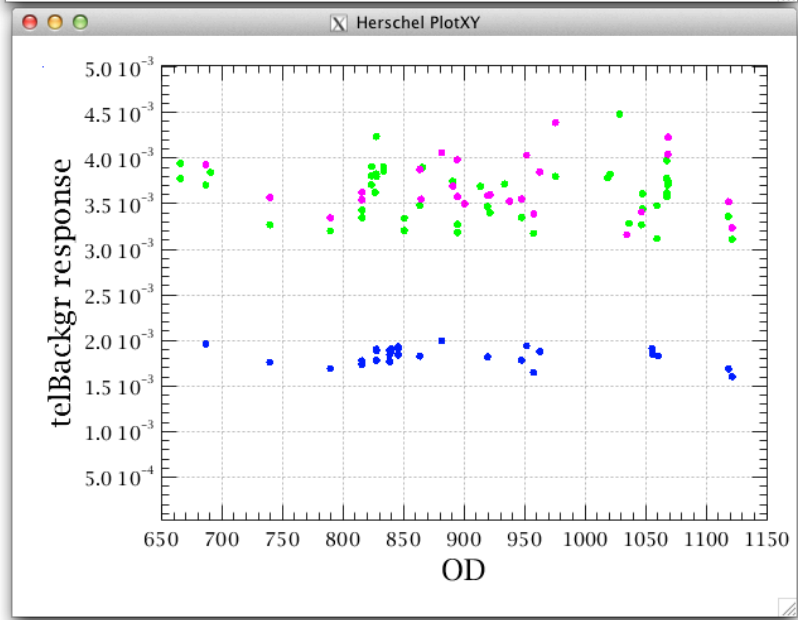
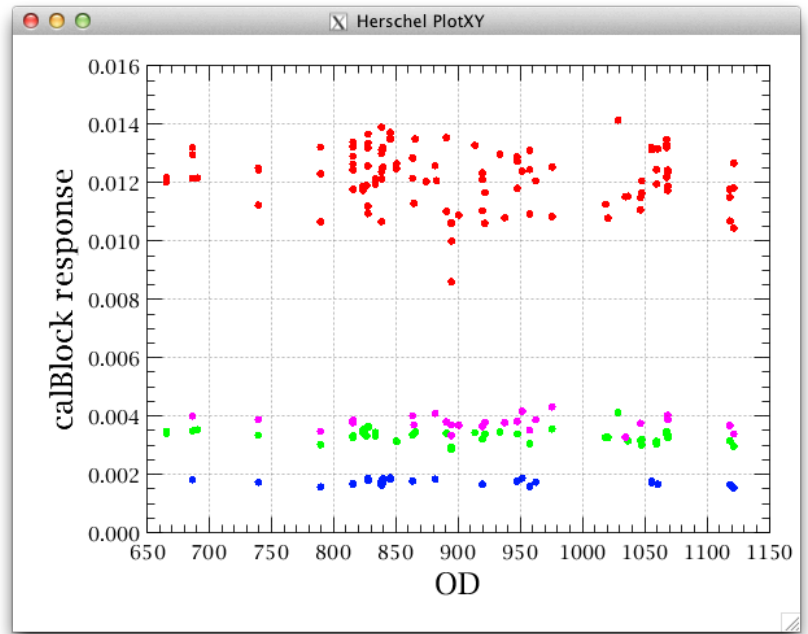
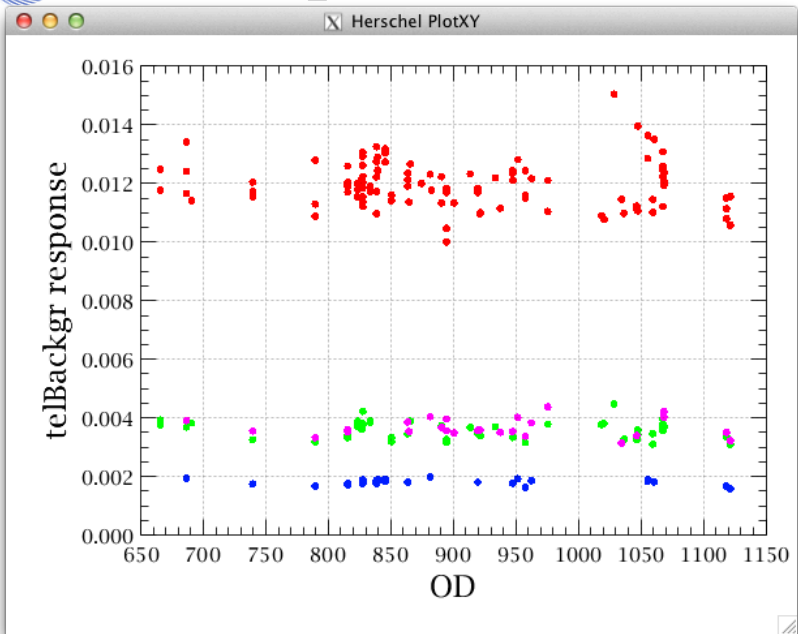


# Response offScan vs. calBlock





# 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 ( $\sim 1$  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 calBlock data over an OD.
- The consequence for unchopped range spectroscopy is more severe, a large set of fainter targets ( $\sim 10$ - $20$  Jy) show negative continuum (PACS-4991). The on-off product suffers the squared sum error of two calBlocks.