

IRACproc: Software for *Spitzer*/IRAC Data

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Overview

- IRACproc Synopsis
- Variations in the sampled PSF between successive frames
 - Effects on outlier rejection and photometric accuracy
- Effective outlier rejection with only 2 overlapping frames
- PSF subtraction and masking for saturated stars
- Example IRACproc processing
- Questions, open discussion

IRACproc Synopsis

- Facilitates the co-addition of dithered/mapped IRAC images
 - Application to a wide variety of IRAC observing programs
 - Acts as a wrapper for the SSC's MOPEX
 - Improved outlier rejection during co-addition
 - Additional scripts for analyzing data
 - PSF fitting, subtraction, masking of saturated stars

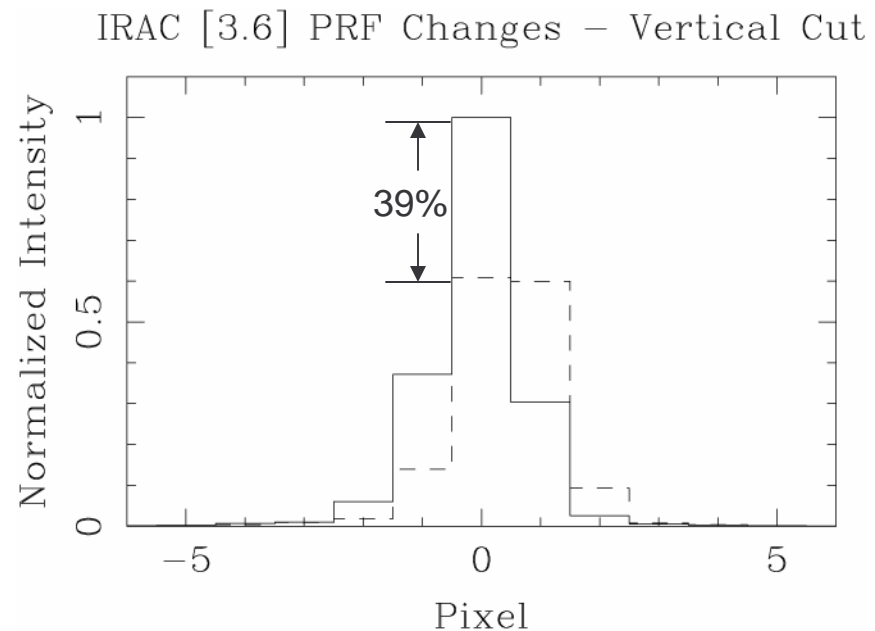
IRAC Pixel Response Function Variations

- Sampled IRAC PSF \rightarrow PRF
- Large variations in shape between successive frames
- Spatial derivative images map source location and structure
- Improved outlier rejection
 - Maintains the structure and photometric reliability of the PSF
 - Low-level outliers are more effectively removed from background

- Photometric Precision

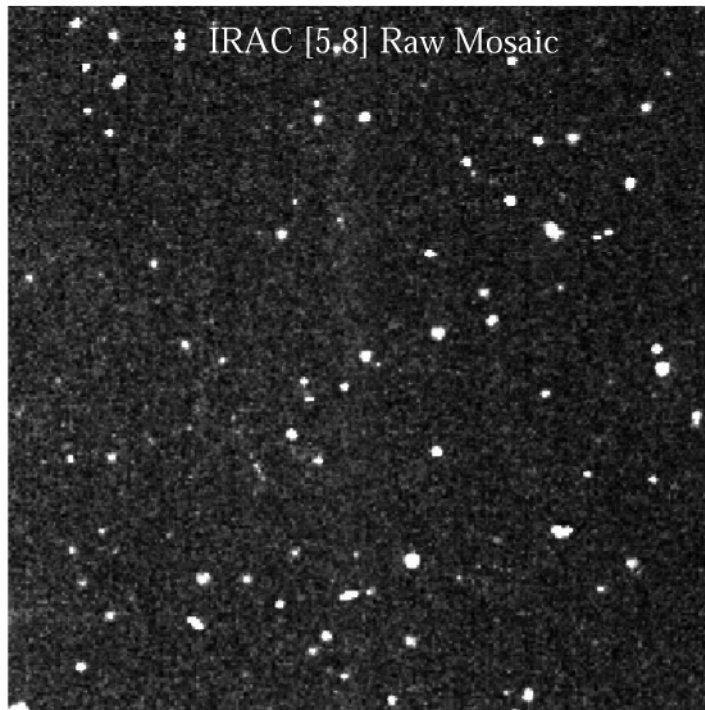
Common Processing Methods
up to $\sim 11\%$ at 3.6 and 4.5 μm
up to $\sim 6\%$ at 5.8 and 8.0 μm

IRACproc
1 – 2%

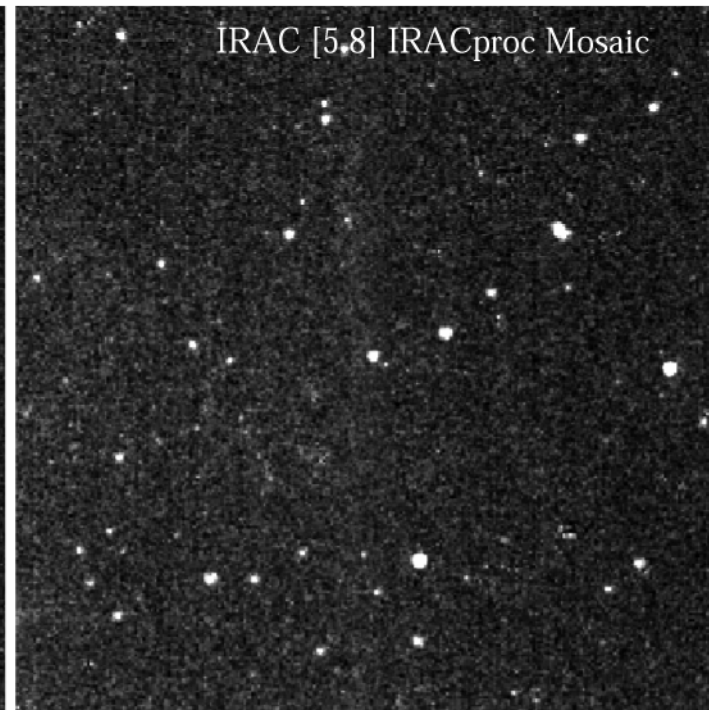


IRACproc Outlier Rejection Example

- Only 2 overlapping frames – can still remove cosmic rays that look like stars

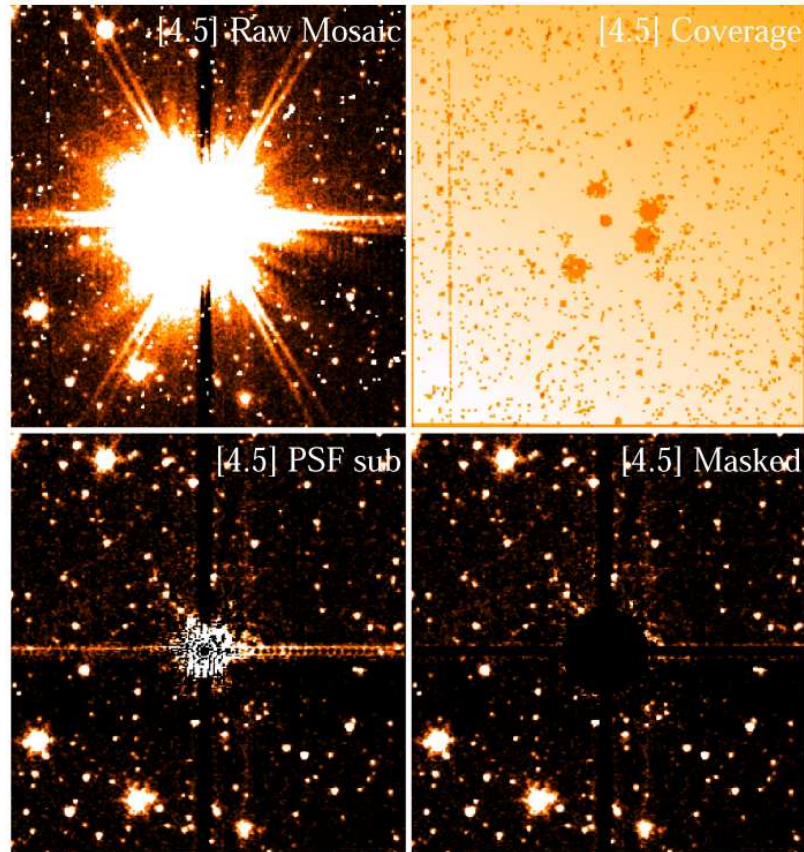


Before outlier rejection



After IRACproc outlier rejection

PSF Subtraction for Saturated Stars



GJ 832 at 4.5 μm : $m_{4.5} = 4.25$, $d = 5$ pc

PSF subtraction extends companion search closer to primary

References

- Documentation
 - IRACproc paper: SPIE: Astronomical Telescopes and Instrumentation, Schuster, Marengo & Patten, 2006
 - Supplied documentation: HOWTOs, SETUP, etc.
- IRACproc
 - /data/irac9/IRAC_proc/IRACproc-4.1.2.tgz
- HDR IRAC PSFs
 - /data/irac9/IRAC_proc/IRAC_psf-1.0.tgz