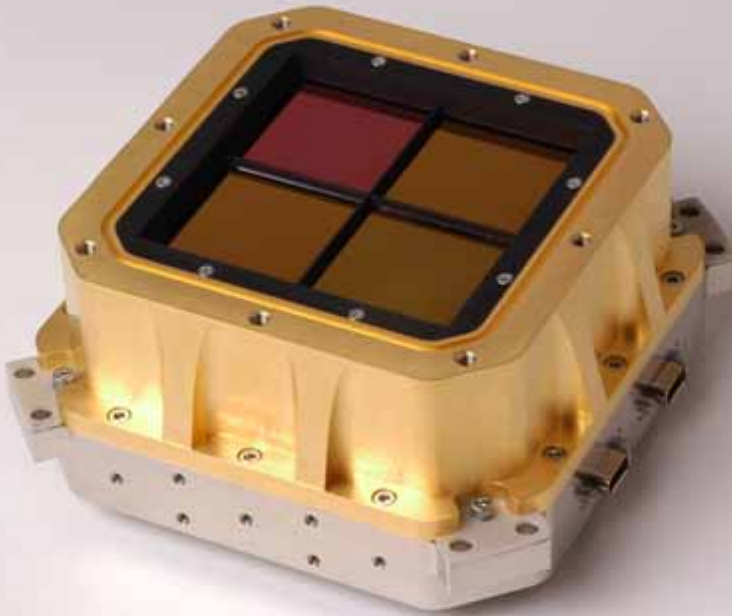




WIRCam data reduction @ TERAPIX



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IAP

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Technical informations



Number of detectors	4 = 2 x 2
Detector size (pixel)	2040 x 2040 active pixels (2048 x 2048 with reference pixels)
Camera field of view	21.5 arcminute
Field distortion	<0.8% in the corners
Gaps between CCDs (arcsec)	45
Magnitude system	AB
Available filters	



Processing steps

- image cubes splitting, if necessary;
- quality assessment and weight maps production;
- precise astrometric and photometric calibrations;
- stack generation;
- catalogs and final quality assessment delivery.



Quality assessment

Using QualityFITS:

- ❑ bad pixel identification is made using an ad-hoc sextractor filter (built using EyE), cosmic_Wircam.ret;
- ❑ a .reg file is also introduced in building weight maps, masking edge zones strongly affected by bad pixels;
- ❑ Sextractor parameters are optimised to eliminate spurious detections:
 - ✓ DETECT_THRESH 4
 - ✓ INTERP_TYPE NONE

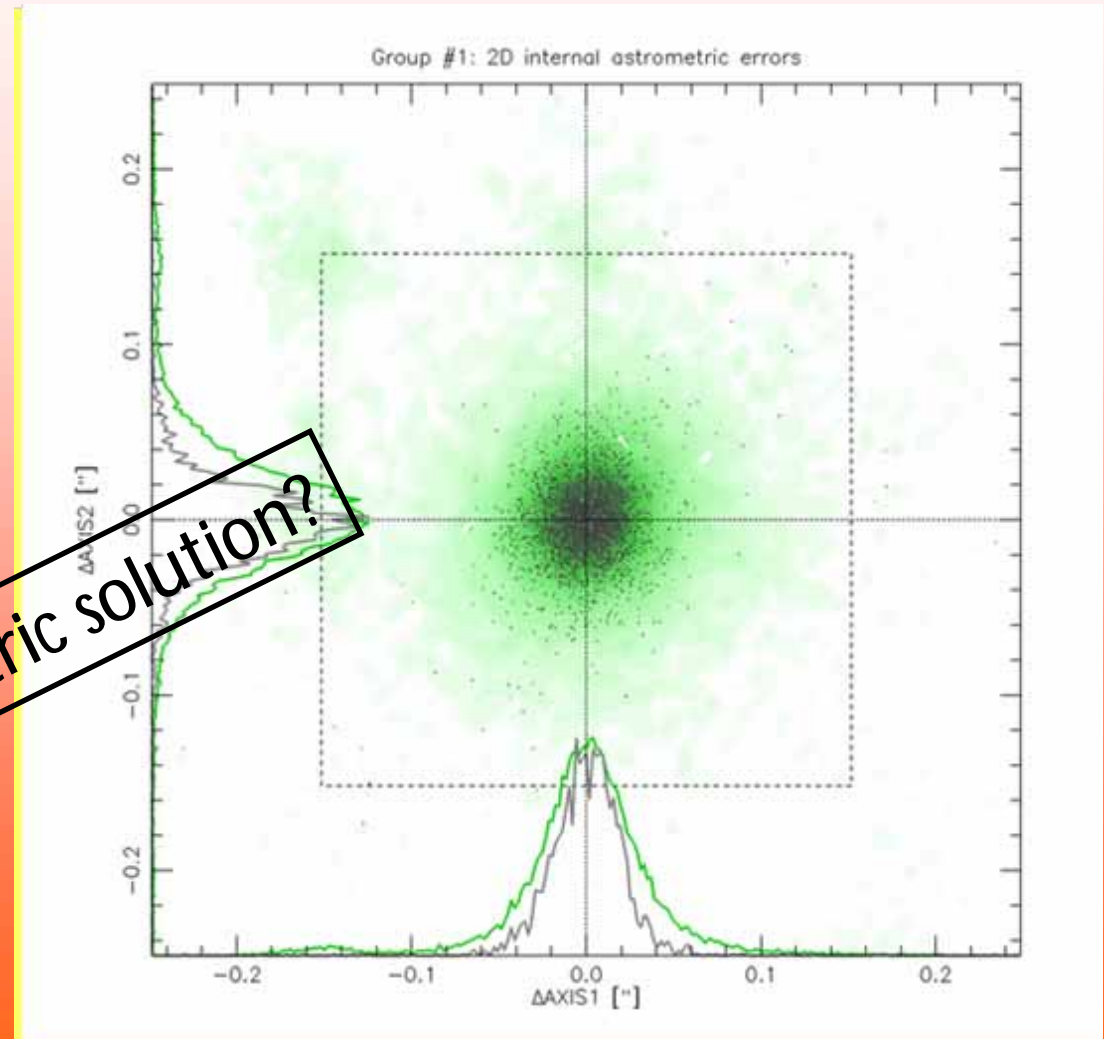


Astrometry

Using SCAmP:

- with a focal plane model (wircam.ahead)
- SAME_CRVAL option
- 2MASS astrometric reference

¿After CFHT astrometric solution?

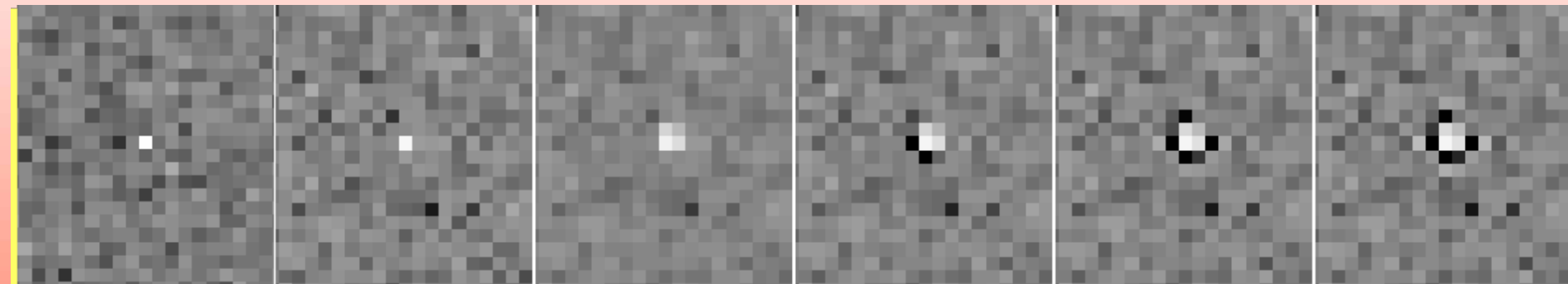




Stacking

Using SWarp:

RESAMPLING_TYPE LANCZOS2, in order to avoid under-sampling effects.



original

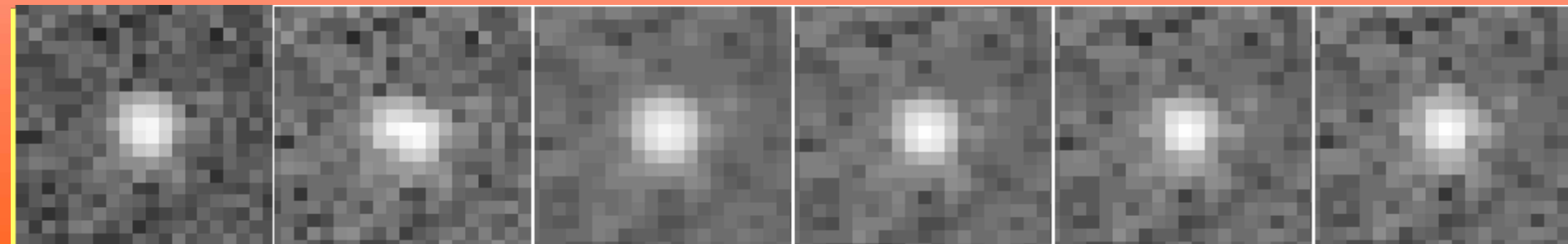
NEAREST

BILINEAR

LANCZOS2

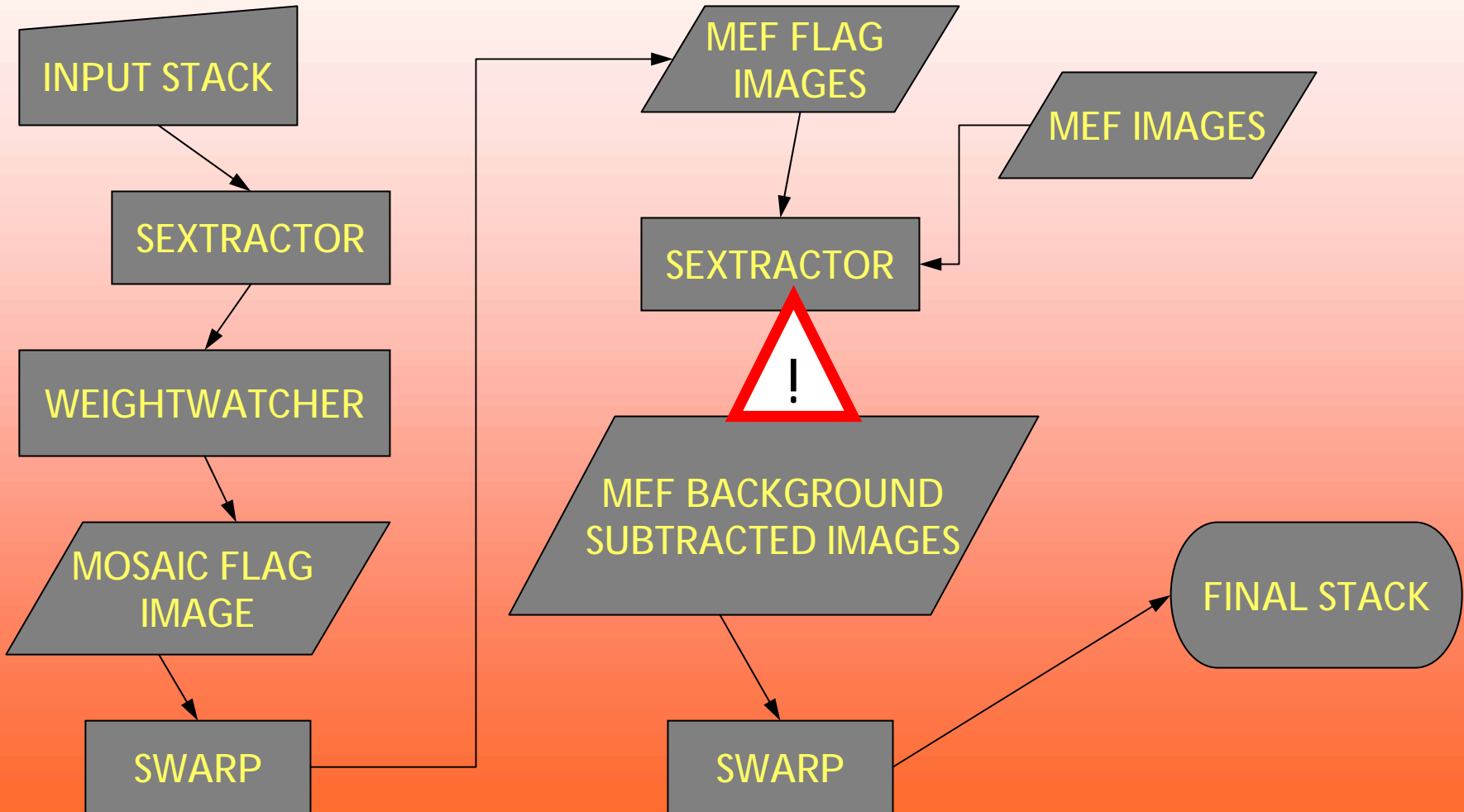
LANCZOS3

LANCZOS4



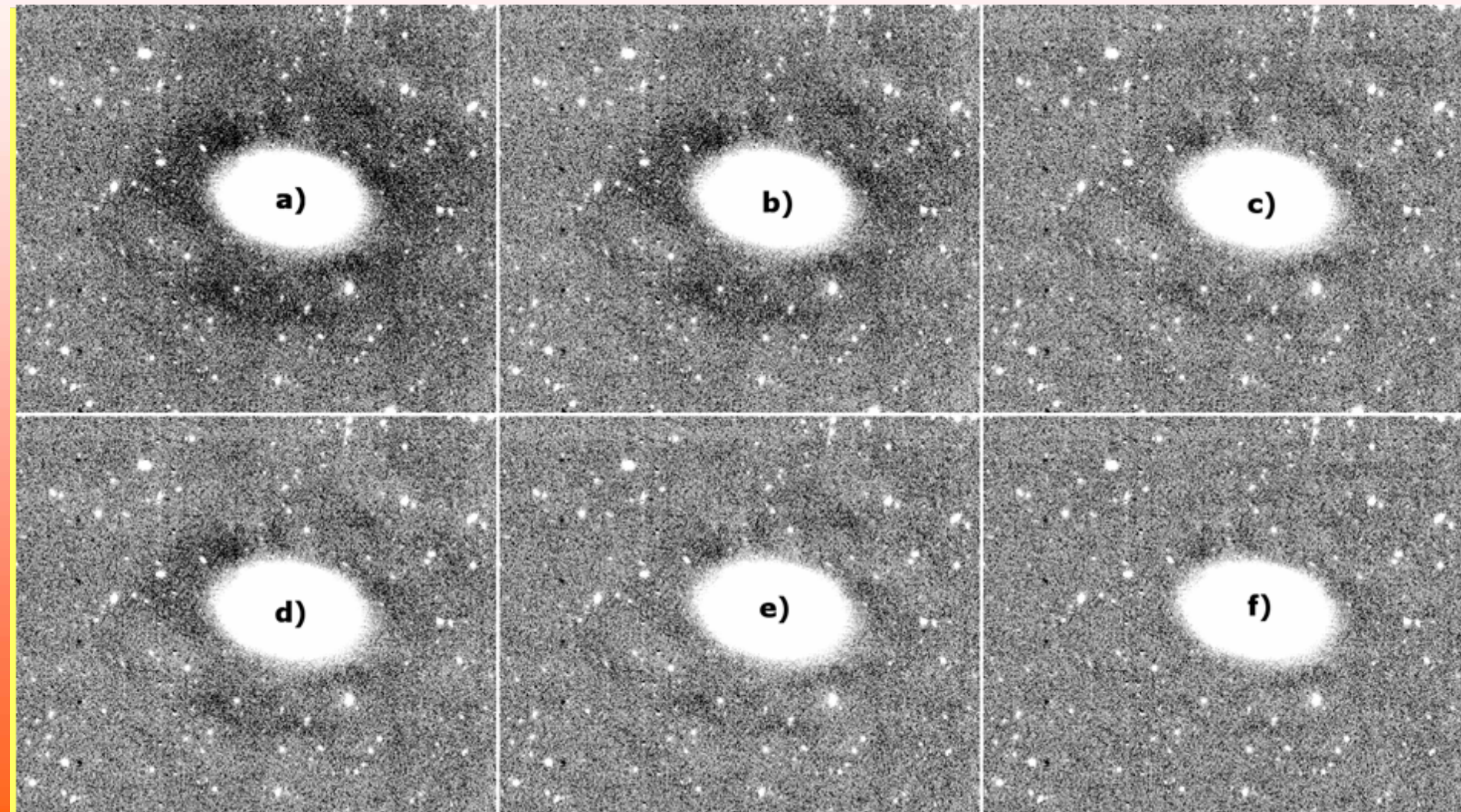


Double pass background subtraction





Double pass background subtraction





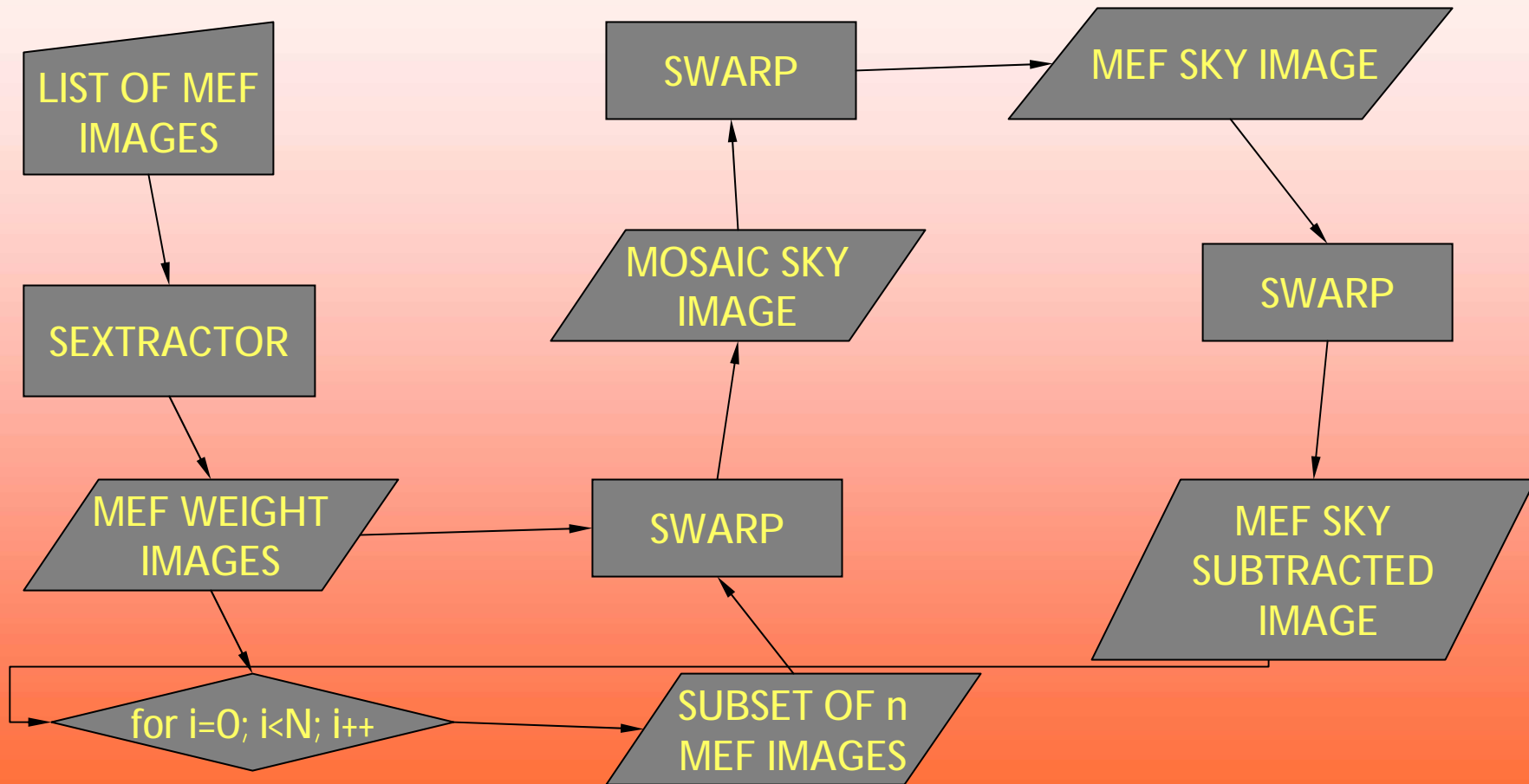
Final products

Using QualityFITS:

- seeing and background estimation
- preliminar star galaxy separation
- catalogue containing basic object parameters
- flag image used to flag objects in the catalogue
- χ^2 image and merged catalogue
- ...

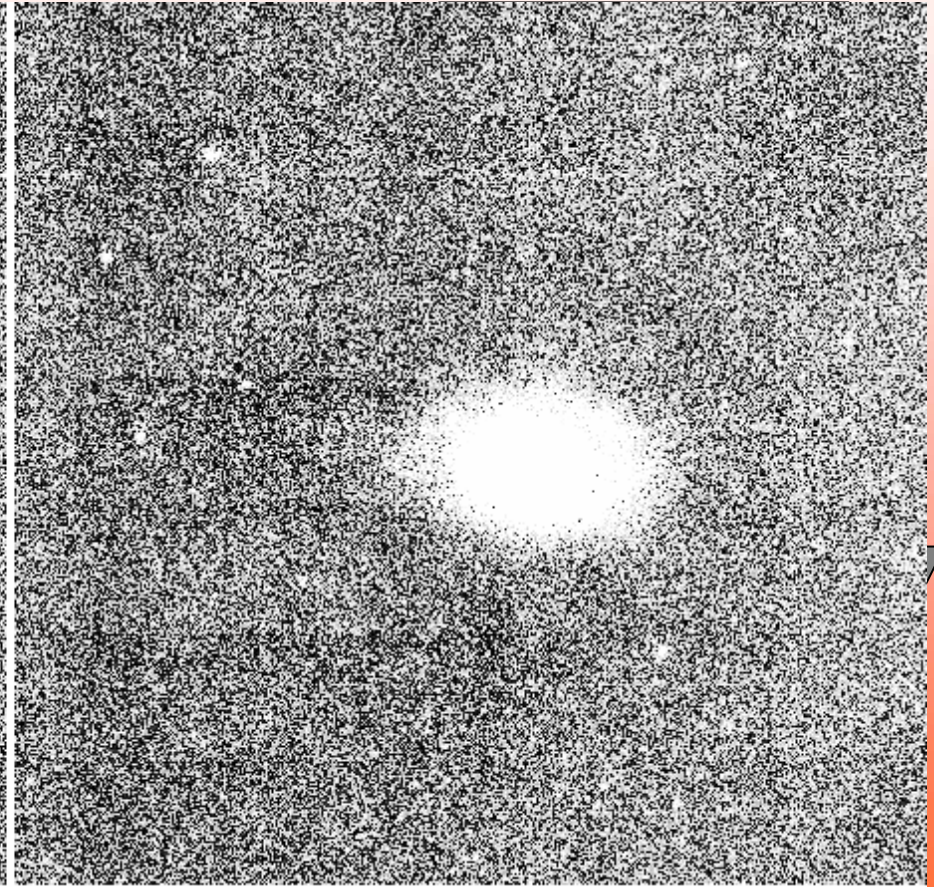
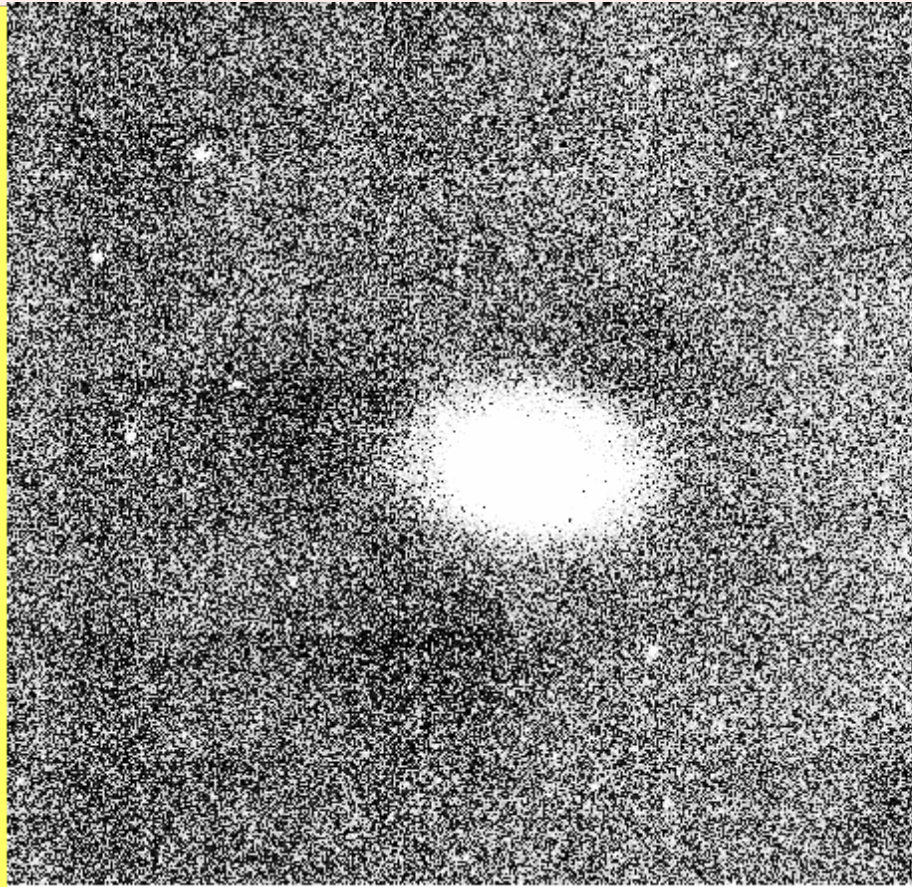


Extras: initial sky subtraction





Extras: initial sky subtraction



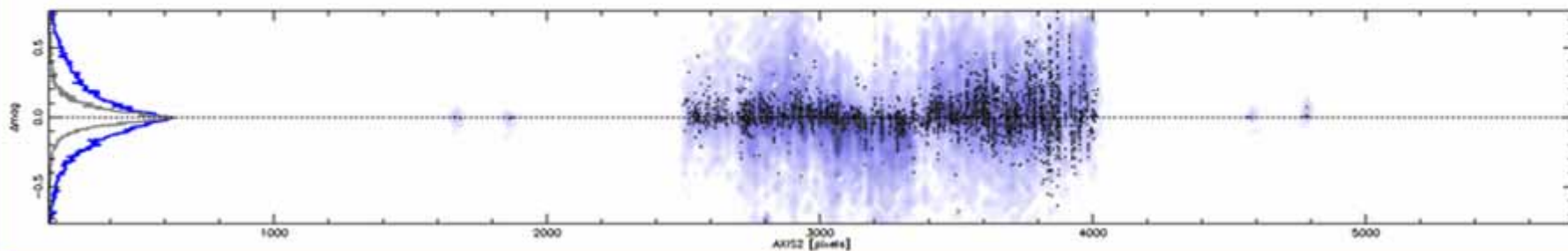
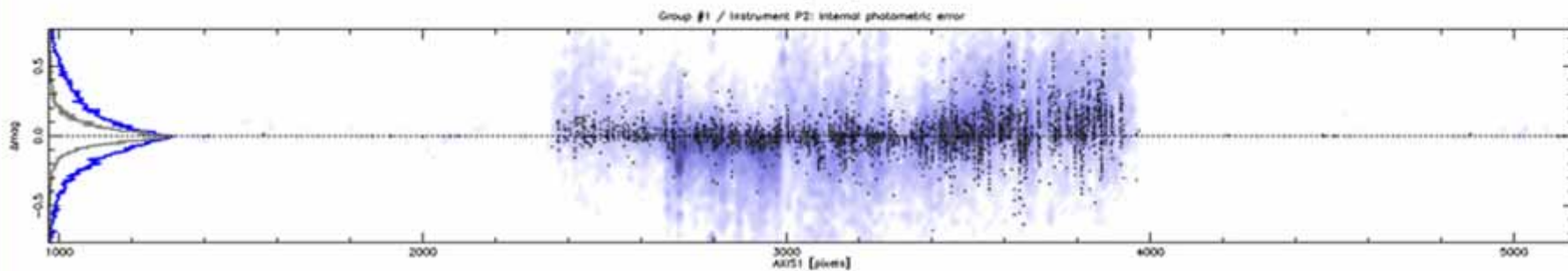
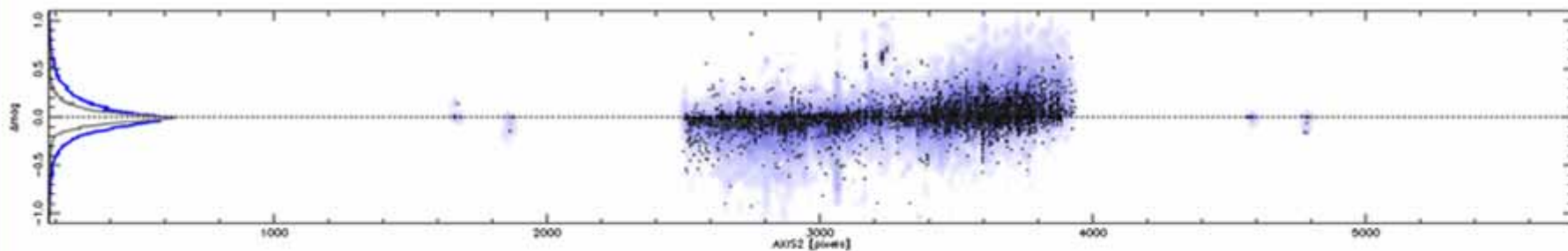
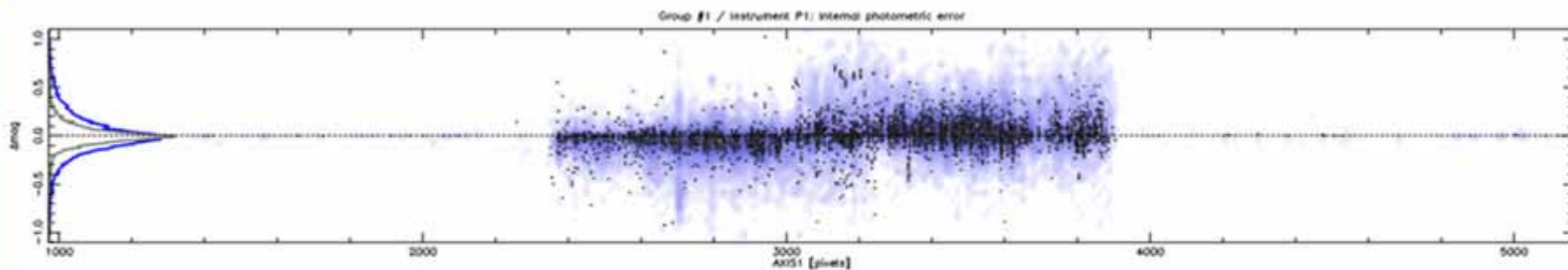


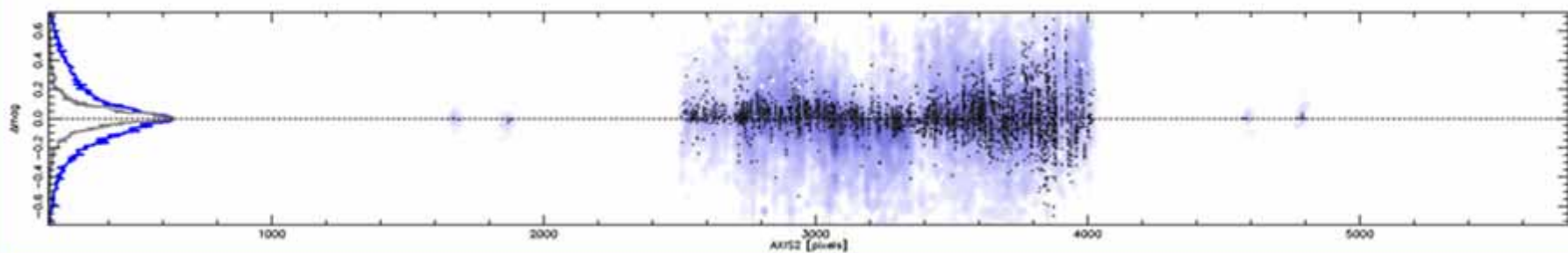
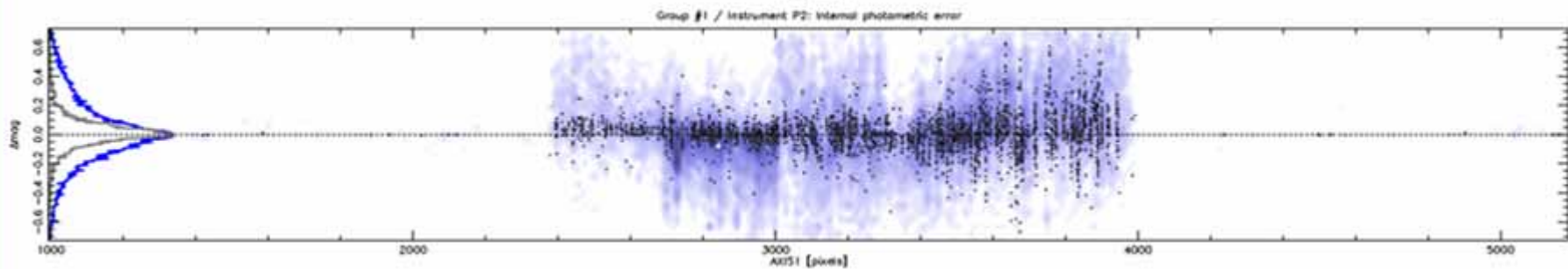
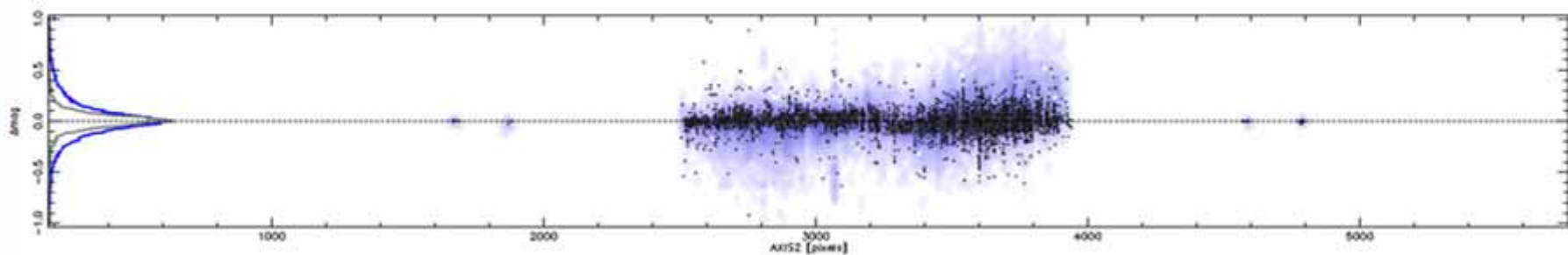
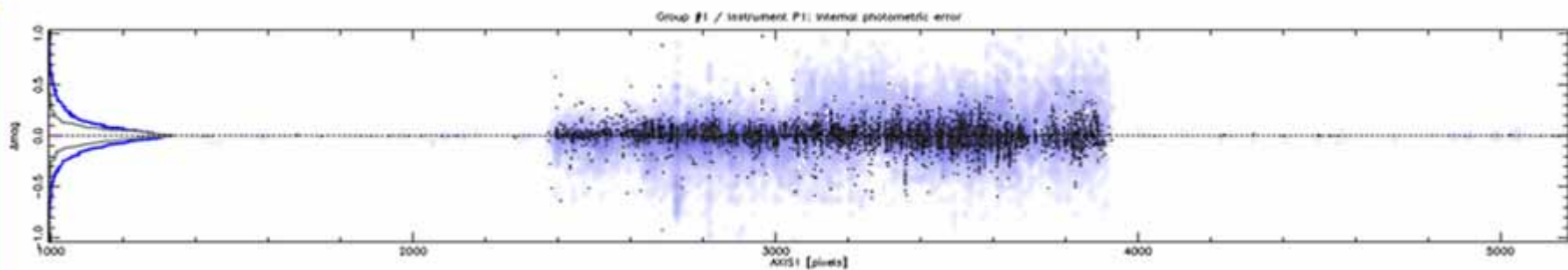
Extras: detector zero-point determination

SCAmP provides the same rigid shift of photometric zero-point for all extensions in a MEF file.

How to calibrate each detector separately?

- compute the astrometry as usual
- split the MEF files (and their headers)
- find one or more photometric reference image or (2MASS?) and label it as photometric
- SOLVE_PHOTOM with SCAmP fixing the astrometry
- join the headers







Summary

What does WIRCam data reduction need from SPICA?

- To verify NAXIS keywords and split cubes, if necessary.
- To implement new qualityFITS functions.
- To introduce WIRCam configuration files or specific options for qualityFITS, SExtractor, Scamp, SWarp.
- To introduce an option for double pass background subtraction.

Open questions

- Database structure.
- Final χ^2 images and flagged catalogs.