

# res.fit

GRB250313A G

Task 166 created by [pyl](#) on 2025-03-16 09:11:37 UTC - 8 minutes ago

State: **transients\_simple\_done** on 2025-03-16 09:20:10 UTC - a second ago

Original FITS header



## Initial inspection and masking



Target name or coordinates

Name or coordinates, one per line

Time

2025-03-15 03:05:43.880

Gain, e/ADU

65535,0

Saturation level,  
ADU

0,952622138

Mask cosmics

Run initial inspection

Make custom mask

Cleanup



```
Inspecting tasks/166/image.fits
Image size is 3008 x 3008
Image Min / Median / Max : 0.00 0.05 1.00
Image RMS: 0.01
Gain is 65535.00
Filter is G
Estimating saturation level from the image max value
Saturation level is 1.0
Background mesh size set to 256 x 256 pixels
Done masking cosmics, 0 (0.0%) pixels masked
609 (0.0%) pixels masked
Mask written to mask.fits
Using original WCS from FITS header
Field center is at 276.409 51.771, radius 0.61 deg
Pixel scale is 1.04 arcsec/pix
Suggested catalogue is Gaia eDR3
Suggested template is Pan-STARRS DR2
Found DATE-OBS: 2025-03-15T03:05:43.880000
Time parsed as: 2025-03-15 03:05:43.880
Time is 2025-03-15 03:05:43.880
MJD is 60749.128980092595
```

[image.fits](#)[mask.fits](#)



[image\\_bg.fits](#)



[image\\_rms.fits](#)

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## Photometry and astrometry



S/N Ratio

Initial aperture, pixels

Smoothing kernel, pixels

Background mesh size

Minimal object area

<input type="text" value="5"/>	<input type="text" value="3"/>	<input type="text" value="0"/>	<input type="text" value="256"/>	<input type="text" value="5"/>
Relative aperture, FWHM	Sky inner annulus, FWHM	Outer annulus, FWHM	FWHM override, pixels	Matching radius, arcsec
<input type="text" value="1"/>	<input type="text" value="5"/>	<input type="text" value="7"/>	<input type="text"/>	<input type="text"/>

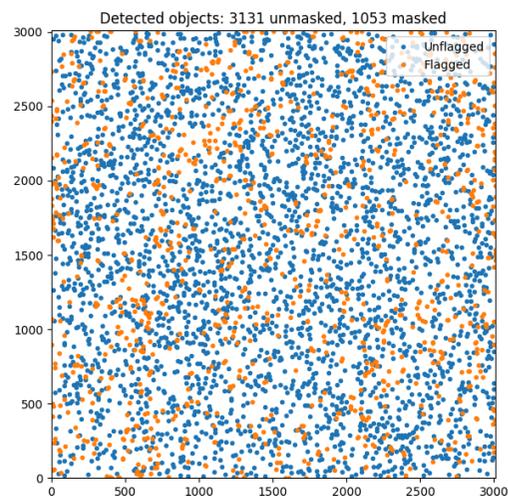
Filter	Reference catalog	Catalog limiting mag	Zeropoint spatial order	<input type="checkbox"/> Use color term
<input type="text" value="Gaia G"/>	<input type="text" value="Gaia eDR3"/>	<input type="text" value="20,0"/>	<input type="text" value="2"/>	
<input type="checkbox"/> Refine astrometry	<input type="checkbox"/> Blind match	<input checked="" type="checkbox"/> Filter catalogue blends	<input checked="" type="checkbox"/> Pre-filter detections	<input checked="" type="checkbox"/> Centroid targets
<input type="checkbox"/> Color term diagnostics	<input checked="" type="checkbox"/> Inspect background			

[Run photometry](#)

### ----- Object detection -----

Will run SExtractor like that:

```
/usr/bin/source-extractor /tmp/sexxdwvbl10/image.fits
-c /tmp/sexxdwvbl10/empty.conf -VERBOSE_TYPE QUIET -
DETECT_MINAREA 5 -GAIN 65535.0 -DETECT_THRESH 2.0 -
WEIGHT_TYPE BACKGROUND -MASK_TYPE NONE -SATUR_LEVEL
0.9526221383363008 -FLAG_IMAGE
/tmp/sexxdwvbl10/flags.fits -PHOT_APERTURES 6 -
CHECKIMAGE_TYPE
SEGMENTATION, FILTERED, BACKGROUND, BACKGROUND_RMS -
CHECKIMAGE_NAME
/tmp/sexxdwvbl10/SEGMENTATION.fits, /tmp/sexxdwvbl10/FI
LTERED.fits, /tmp/sexxdwvbl10/BACKGROUND.fits, /tmp/sexx
dwvbl10/BACKGROUND_RMS.fits -PARAMETERS_NAME
/tmp/sexxdwvbl10/cfg.param -CATALOG_NAME
/tmp/sexxdwvbl10/out.cat -CATALOG_TYPE FITS_LDAC -
FILTER N -BACK_SIZE 256
SExtractor run succeeded
```



[objects.png](#)

4502 objects found  
 Segmentation map written to [segmentation.fits](#)  
 Filtered image written to [filtered.fits](#)  
 Background map written to [image\\_bg.fits](#)  
 Background RMS map written to [image\\_rms.fits](#)

---- Object measurement ----

Pre-filtering SExtractor detections with simple shape classifier

Using isolation forest outline detection over columns (FLUX\_RADIUS, FWHM, MAG\_APER - MAG\_AUTO)

3505 good, 997 outliers

FWHM is 3.89 pixels

FWHM diagnostic plot stored to [fwhm\\_mag.png](#)

Pre-filtering diagnostic plot stored to [prefilter.png](#)

Estimating global background with 256x256 mesh

Subtracting global background: median 0.1 rms 0.00

Using global background noise map: median 0.0 rms 0.00  
 + gain 65535.0

Scaling aperture radii with FWHM 3.9 pix

Using aperture radius 3.9 pixels

Using local background annulus between 19.5 and 27.2 pixels

Filtering out measurements with S/N < 5.0

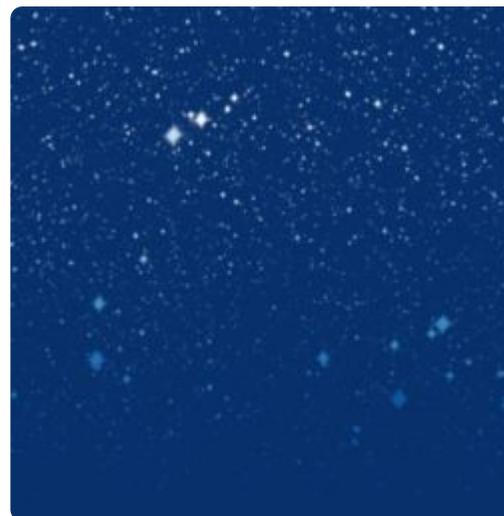
4184 objects properly measured, 3131 unflagged

Measured objects stored to [objects.vot](#)

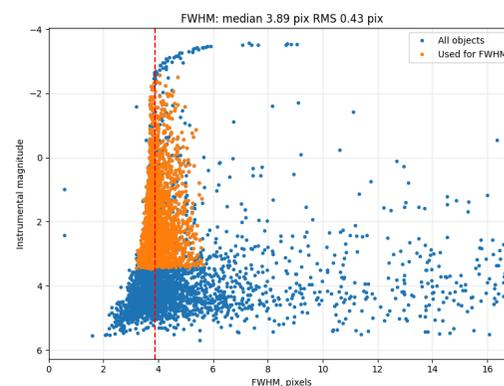
---- Initial astrometry ----

WCS loaded from [image.wcs](#)

---- Reference catalogue ----



[segmentation.fits](#)

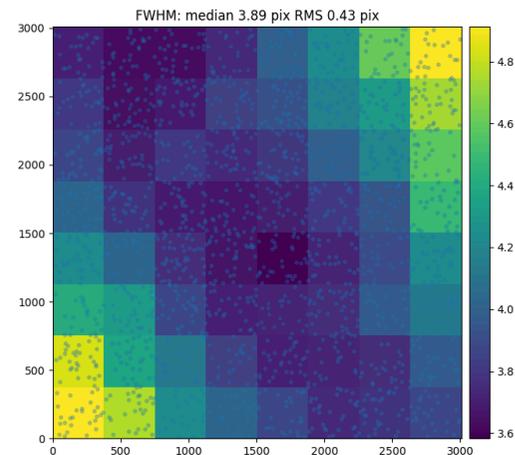


[fwhm\\_mag.png](#)

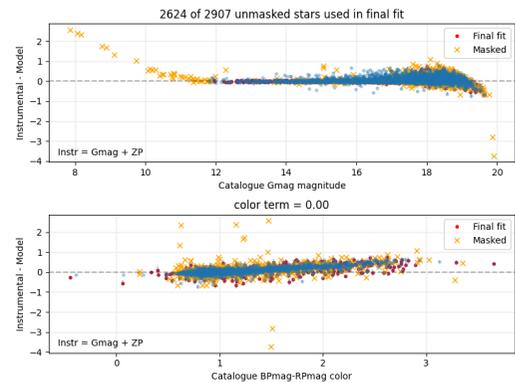
Field center is at 276.409 51.771, radius 0.61 deg,  
 scale 1.04 arcsec/pix  
 Requesting from VizieR: I/350/gaiaedr3 columns: ['\*',  
 'RAJ2000', 'DEJ2000', 'e\_RAJ2000', 'e\_DEJ2000']  
 Center: 276.386 51.788 radius: 0.630  
 Filters: {'Gmag': '<20.0'}  
 Got 10458 entries with 41 columns  
 Got 10458 catalogue stars from gaiaedr3  
 Catalogue written to [cat.vot](#)  
 9056 catalogue stars after blend filtering with 4.0  
 arcsec radius  
 Will use catalogue column Gmag as primary magnitude  
 Will use catalogue columns BPmag and RPmag for color

#### ---- Photometric calibration ----

Performing photometric calibration of 4184 objects vs  
 9056 catalogue stars  
 Using 2.1 arcsec matching radius, Gmag magnitude and  
 spatial order 2  
 Using (BPmag - RPmag) color for color term  
 3502 initial matches between 4184 objects and 9056  
 catalogue stars, sr = 2.10 arcsec  
 Median separation is 0.28 arcsec  
 Fitting the model with spatial\_order = 2  
 Using robust fitting  
 2907 objects pass initial quality cuts  
 Iteration 0 : 2907 / 3502 - rms 0.16 0.16 - normed  
 6.41 2.93 - scale 1.63 1.63 - rms 0.01  
 Iteration 1 : 2712 / 3502 - rms 0.16 0.15 - normed  
 3.26 2.02 - scale 1.19 1.19 - rms 0.01  
 Iteration 2 : 2624 / 3502 - rms 0.16 0.14 - normed  
 2.99 1.66 - scale 1.34 1.34 - rms 0.01  
 Fitting converged



[fwhm.png](#)



[photometry.png](#)

2624 good matches

Intrinsic scatter is 0.01

Photometric calibration finished successfully.

Instr / Cat correlation is 0.99 which corresponds to p-value 0

Photometric solution stored to photometry.pickle

Mean zero point is 14.545, estimated error 0.0022

Measured objects stored to [objects.vot](#)

---- Global detection limit ----

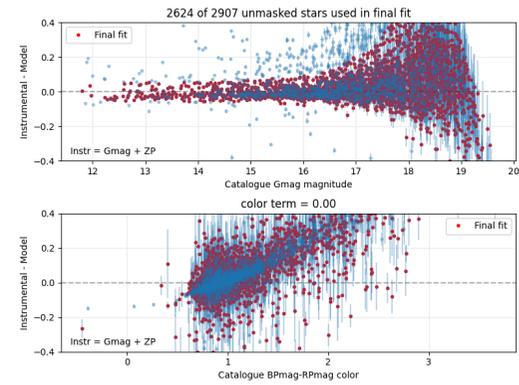
Detection limit at S/N=10 level is 18.50

Detection limit at S/N=5 level is 19.27

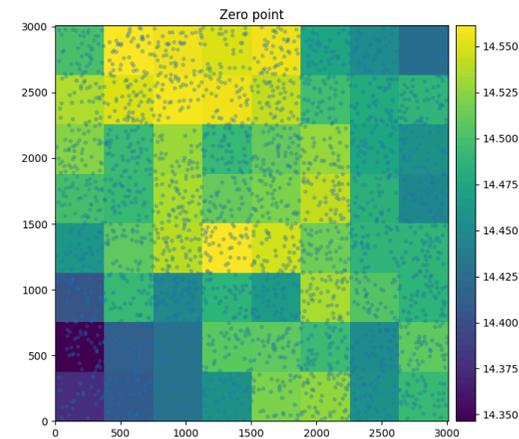
Detection limit at S/N=3 level is 19.83

Local background RMS detection limit (S/N=5) is 19.41  
+/- 0.05

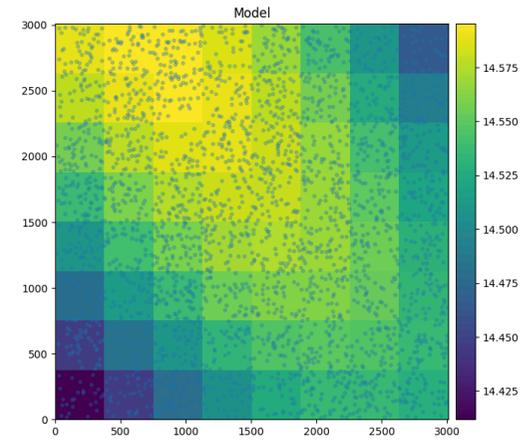
## Task 166 : STDWeb



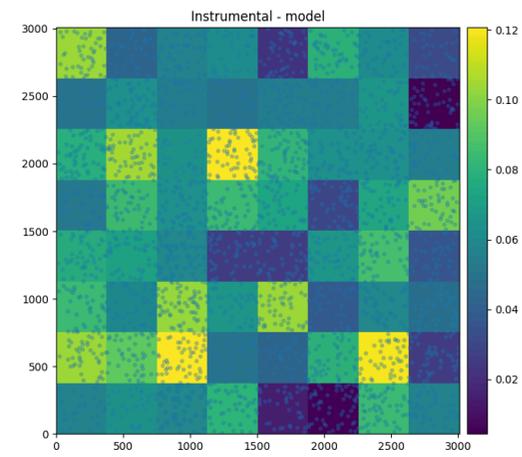
[photometry\\_unmasked.png](#)



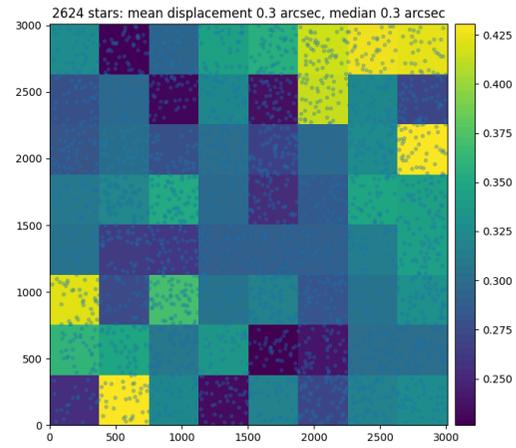
[photometry\\_zero\\_point.png](#)



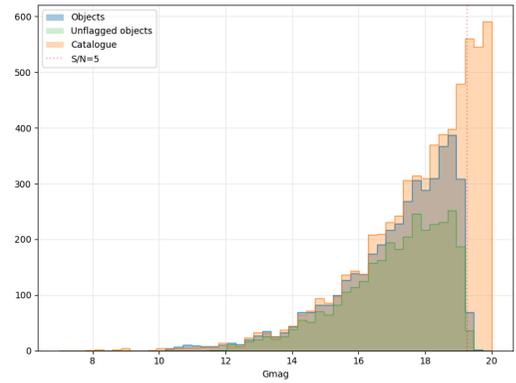
[photometry\\_model.png](#)



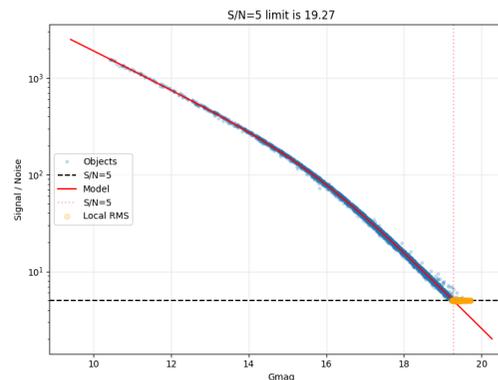
[photometry\\_residuals.png](#)



[astrometry\\_dist.png](#)



[limit\\_hist.png](#)



[limit\\_sn.png](#)

## Simple transient detection



Task IDs to cross-check

Center position to limit the search

Radius,  
deg

Minimal mag  
difference

Check SkyBoT  Reject blends  Reject prefiltered

Run simple transient detection

4184 objects loaded from [objects.vot](#)

WCS loaded from [image.wcs](#)

Field center is at 276.409 51.771, radius 0.61 deg,  
scale 1.04 arcsec/pix

FWHM is 3.9 pixels, or 4.03 arcsec

Time is 2025-03-15 03:05:43.880

MJD is 60749.128980092595

---- Simple catalogue-based transient detection ----

Will check Vizier catalogues: gaiaedr3 ps1  
Will reject pre-filtered detections  
Will only keep matches brighter than catalogue by 2.00  
mags  
Candidate filtering routine started with 4184 initial  
candidates and 2.0 arcsec matching radius  
3273 of them are unflagged  
66 remains after matching with Gaia EDR3  
3 remains after matching with PanSTARRS DR1  
3 remains after matching with SkyBot  
3 candidates remaining after filtering  
Blend filtering routine started with 3 initial  
candidates, 8.1 arcsec blending radius and 2.0 arcsec  
matching radius  
Cannot guess catalogue coordinate columns, skipping  
['angDist', 'stdpipe\_id', 'ra', 'dec', 'ra\_epoch2000',  
'dec\_epoch2000', 'errHalfMaj', 'errHalfMin',  
'errPosAng', 'source\_id', 'ra2', 'ra\_error', 'dec2',  
'dec\_error', 'parallax', 'parallax\_error',  
'parallax\_over\_error', 'pm', 'pmra', 'pmra\_error',  
'pmdec', 'pmdec\_error', 'astrometric\_n\_good\_obs\_al',  
'astrometric\_gof\_al', 'astrometric\_chi2\_al',  
'astrometric\_excess\_noise',  
'astrometric\_excess\_noise\_sig',  
'astrometric\_params\_solved', 'pseudocolour',  
'pseudocolour\_error', 'visibility\_periods\_used',  
'ruwe', 'duplicated\_source', 'phot\_g\_mean\_flux',  
'phot\_g\_mean\_flux\_error', 'phot\_g\_mean\_mag',  
'phot\_bp\_mean\_flux', 'phot\_bp\_mean\_flux\_error',  
'phot\_bp\_mean\_mag', 'phot\_rp\_mean\_flux',  
'phot\_rp\_mean\_mag', 'phot\_bp\_rp\_excess\_factor',  
'bp\_rp', 'dr2\_radial\_velocity',  
'dr2\_radial\_velocity\_error', 'dr2\_rv\_nb\_transits',  
'dr2\_rv\_template\_teff', 'dr2\_rv\_template\_logg',

```
'panstarrs1', 'sdssdr13', 'skymapper2', 'urat1',
'phot_g_mean_mag_error', 'phot_bp_mean_mag_error',
'phot_rp_mean_mag_error', 'phot_g_mean_mag_corrected',
'phot_g_mean_mag_error_corrected',
'phot_g_mean_flux_corrected',
'phot_bp_rp_excess_factor_corrected',
'ra_epoch2000_error', 'dec_epoch2000_error',
'ra_dec_epoch2000_corr']
```

3 remains after matching blends with PanSTARRS DR1

---- Final list of candidates ----

3 candidates in total

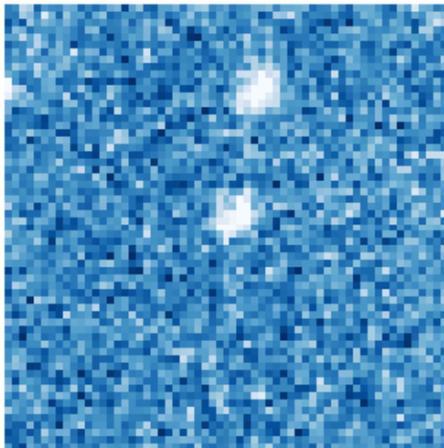
Candidates written to [candidates\\_simple.vot](#)

## Transient candidates from simple transient detection

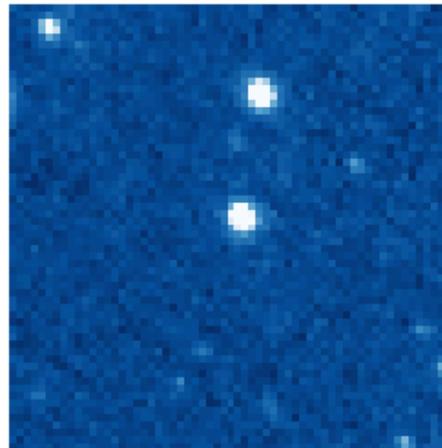


J182805.78+513333.0 : Gmag : mag =  $18.22 \pm 0.08$  : S/N = 11.95

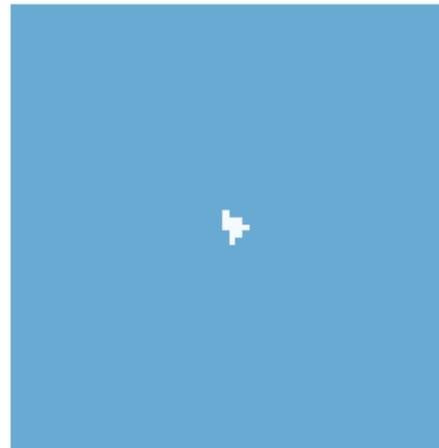
IMAGE



TEMPLATE



FOOTPRINT



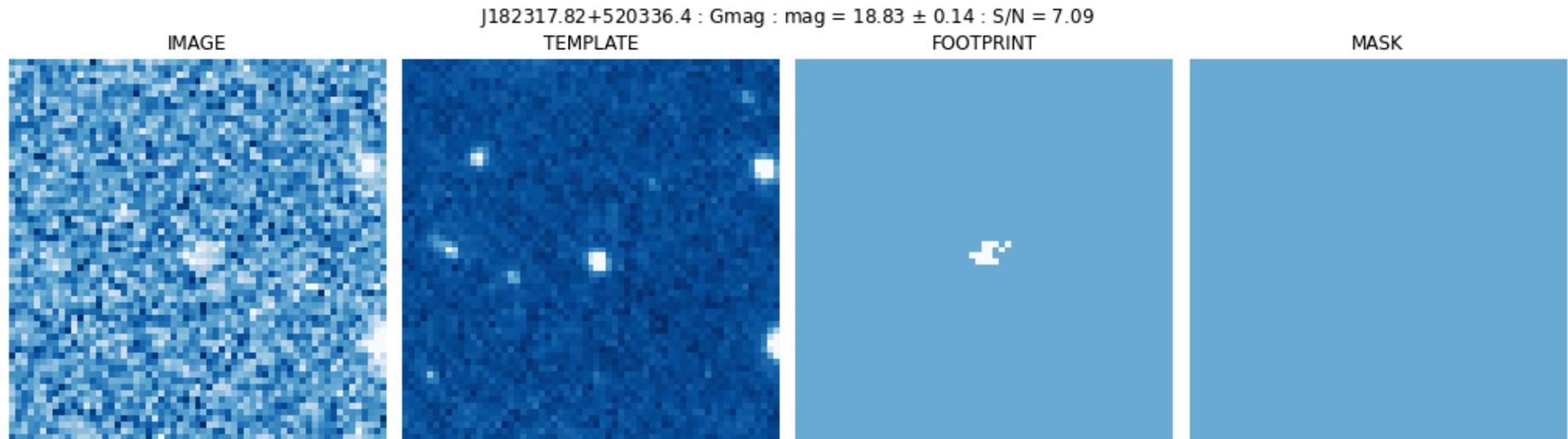
MASK



[candidates\\_simple/J182805.78+513333.0.cutout](#)

;	fwhm	flags	bg	NUMBER	MAG_AUTO	ISOAREA_IMAGE	ra	dec	bg_fluxerr	bg_local	mag_calib	mag_cal
---	------	-------	----	--------	----------	---------------	----	-----	------------	----------	-----------	---------

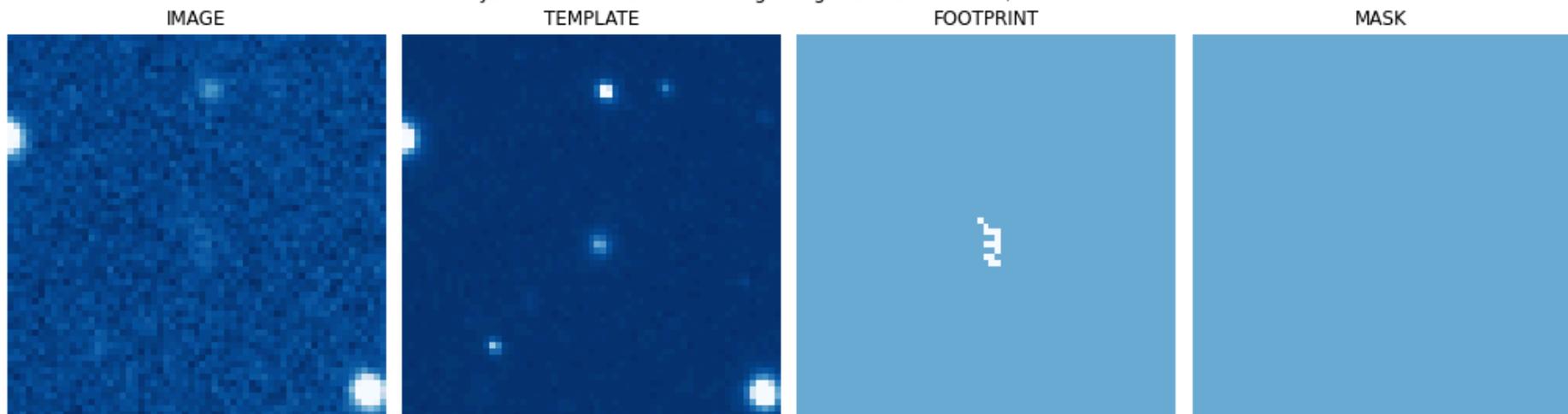
id	fwhm	flags	bg	NUMBER	MAG_AUTO	ISOAREA_IMAGE	ra	dec	bg_fluxerr	bg_local	mag_calib	mag_calib
5	5.463	0x2	0.05092	1108	3.606	11	277.02410	51.55916	0.002279	-0.0001062	18.22	0.083



[candidates\\_simple/J182317.82+520336.4.cutout](#)

mag	magerr	flux	fluxerr	x	y	xerr	yerr	a	b	theta	FLUX_RADIUS	fwhm	flags	bg
4.335	0.1409	0.01845	0.002396	2681.47	2597.57	0.2135	0.1083	1.624	0.7502	-5.671	2.28	6.589	0x2	0.0535

J182631.92+521003.2 : Gmag : mag = 19.02 ± 0.15 : S/N = 6.55


[candidates\\_simple/J182631.92+521003.2.cutout](https://candidates_simple/J182631.92+521003.2.cutout)

mag	magerr	flux	fluxerr	x	y	xerr	yerr	a	b	theta	FLUX_RADIUS	fwhm	flags	bg	NUM
4.421	0.1527	0.01704	0.002397	932.01	2846.30	0.215	0.17	1.511	0.4071	38.18	2.789	4.655	0x2	0.05261	35

## Template subtraction



Template

Pan-STARRS DR2

Sub-image size

1000

Sub-image overlap

50

Method

HOTPANTS

HOTPANTS extra params

{"ko": 0, "bgo": 0}

Center position to limit the search

Radius,  
deg

1

 Filter Vizier catalogues

 Filter SkyBoT

 Pre-filtering

 Sub-pixel adjustment

 Target photometry

 Transient detection

 Verbose

Run subtraction

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