Caveat on the FIS data Advanced Tools

2007/09/13
AKARI/FIS Data Reduction Workshop

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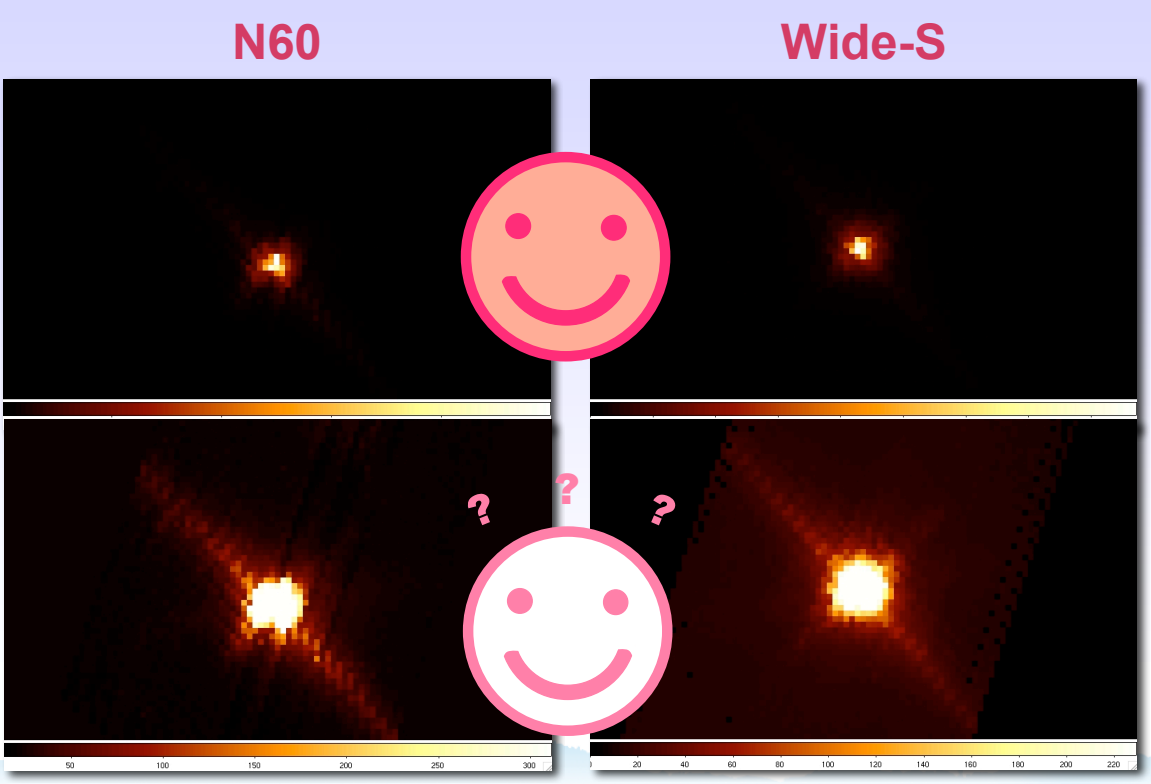
Output Image : N60 / Wide-S



Output Image : N60 / Wide-S

N60 | Wide-S

Cross-talk

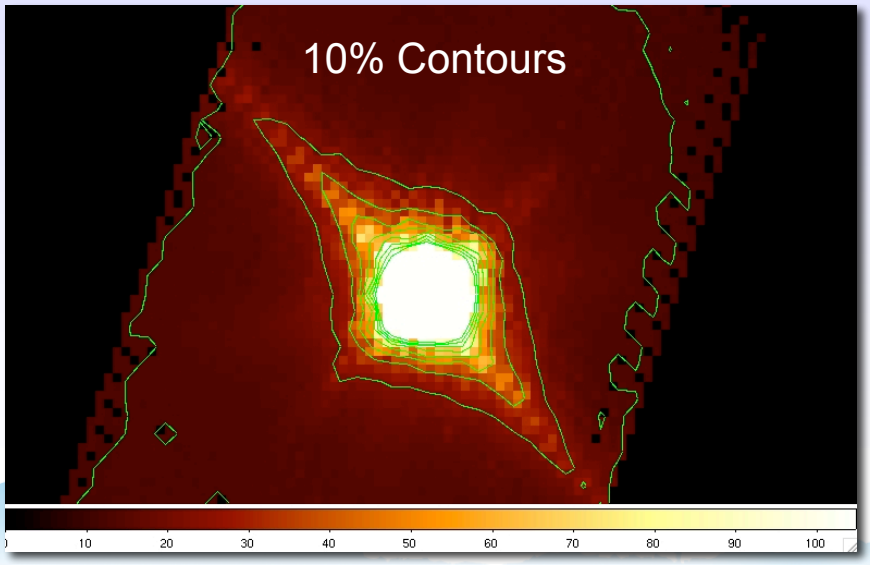
Output Image : Wide-L / N160

Wide-L | N160

Ghost

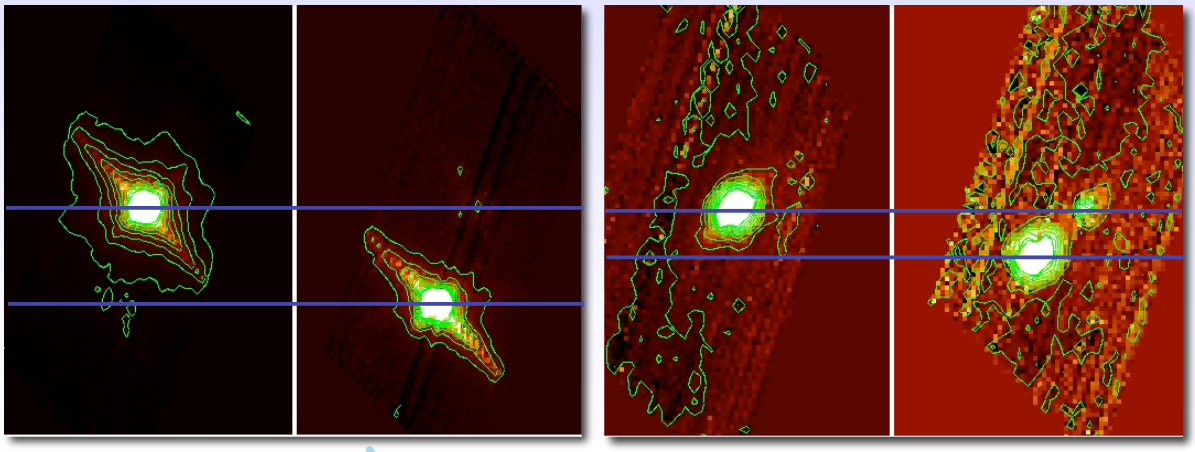
Cross-talk

- Cross-talk between the array pixels appears only in the SW detector.
  - Photons diffuse into the monolithic structure Ge:Ga substrate

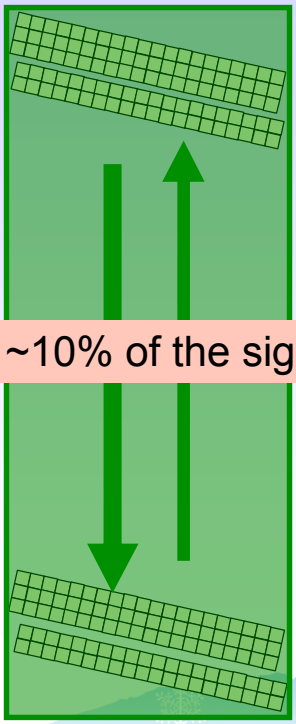


Ghost

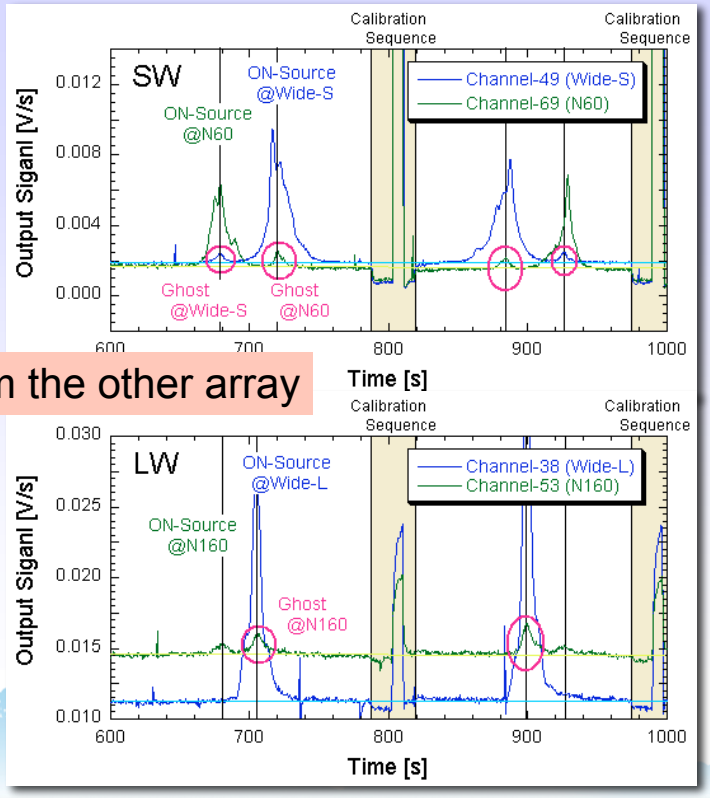
- The Ghost image appears in all bands.
  - Electrical cross-talk in the MPX of the CRE
  - Wide-S ↔ N60 Wide-L ↔ N160



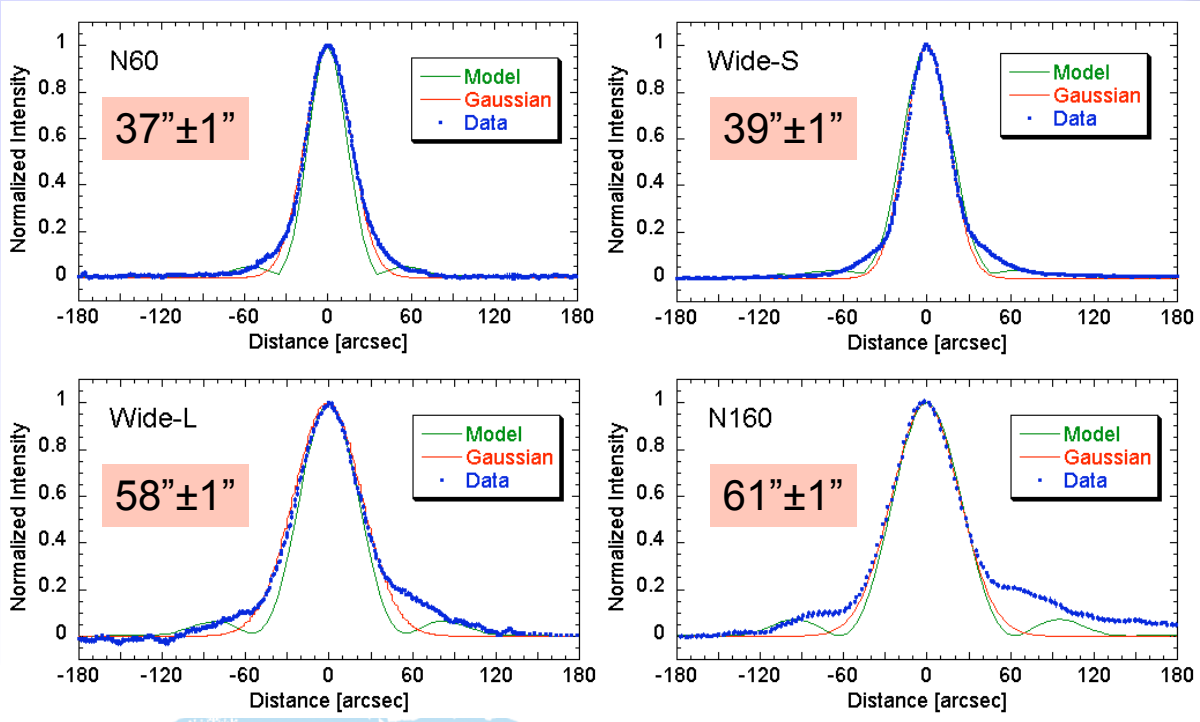
Ghost (2)



~10% of the signal from the other array

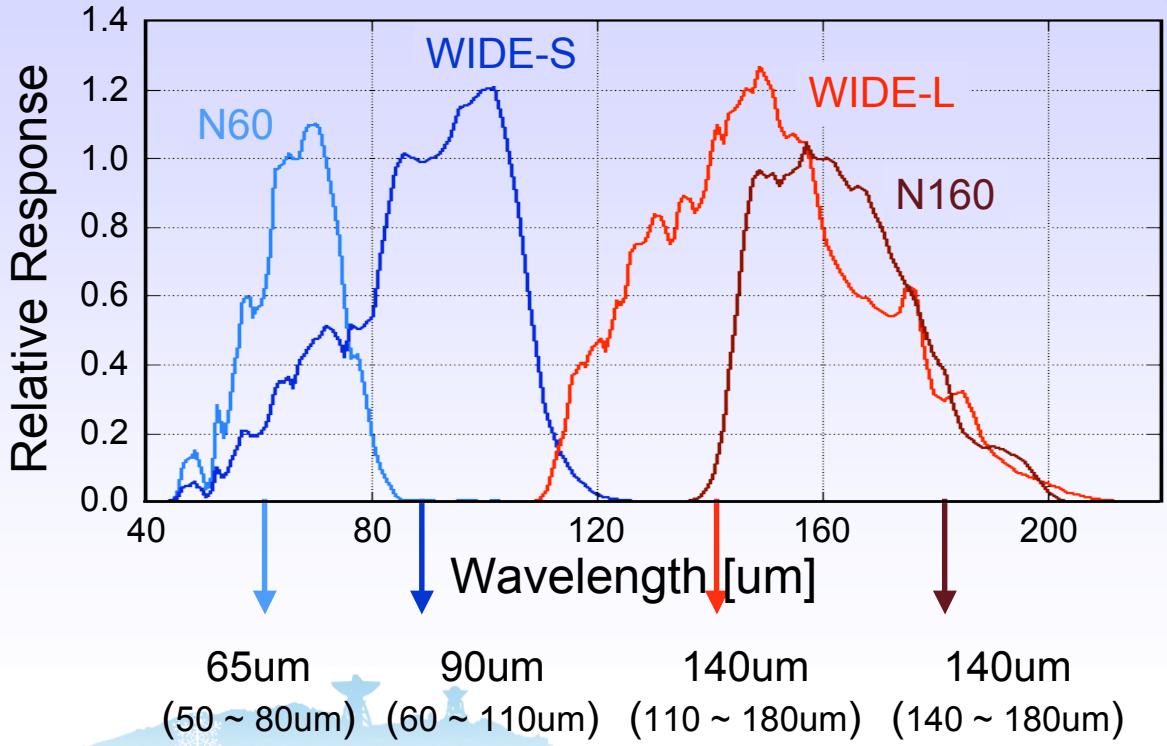


Point Spread Function (PSF)



- Tails of the PSF = 30% of the total power

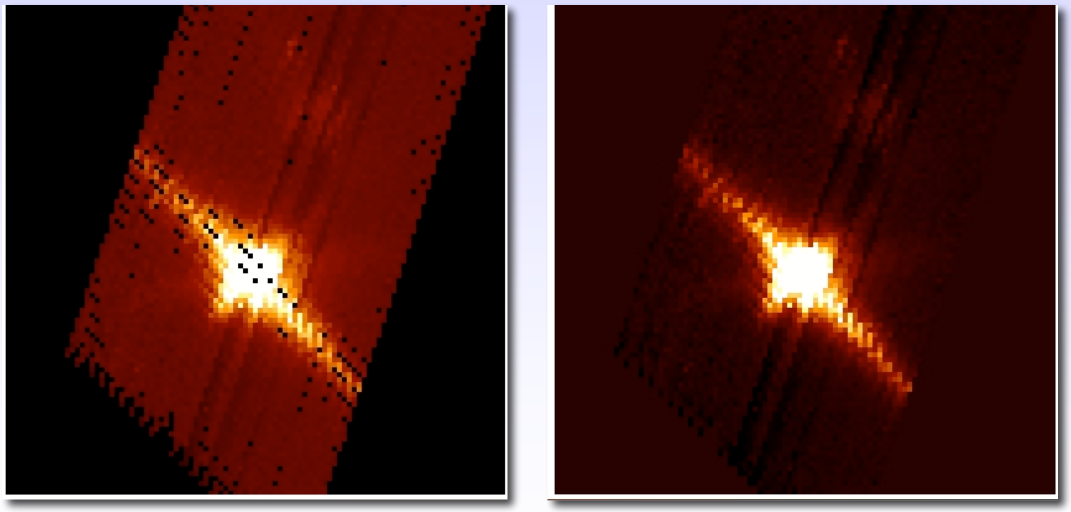
System Spectral Response



65um	90um	140um	140um
(50 ~ 80um)	(60 ~ 110um)	(110 ~ 180um)	(140 ~ 180um)

Bad Pixel Correction Tool

- badpix_corr, in_file='FIS_SW_**_img.sav', func='', /cube_fits



- Please check the fraction of the corrected pixels !!

Bad Pixel Correction Tool

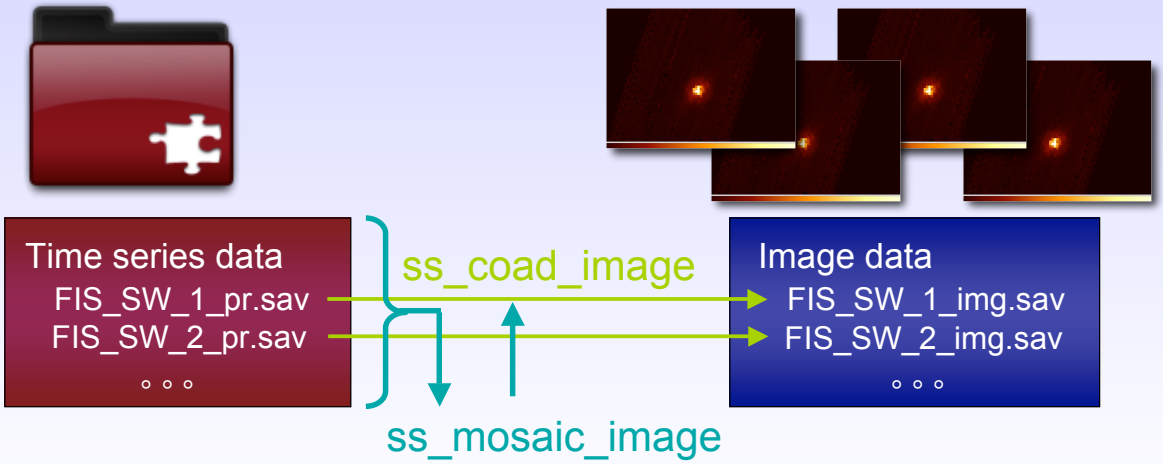
- badpix_corr, in_file='FIS_SW_**_img.sav', func='', /cube_fits

```
uxterm
FISDR> badpix_corr, in_file='FIS_SW_Ceres_img.sav', /cube_fits
You can choose the interpolating functions
   plsfit : plane surface fit (z = ax +by +c)
   gausfit : gaussain surface fit (z = (1/(2*pi*thx*thy))*exp(-.5*(((x-mx)/thx)^2+((y-my)/thy)^2 ))-c)
   chebyshfit : Chebyshev polynomial interpolation (z = sum(Ti*Ci)  + .5*C0)
   csplinterp : bicubic spline interpolation
   splinterp : bicubic spline interpolation
   twoordfit : second-order polynomial surface interpolation (z = ax^2 + bxy + cy^2 + dx + ey + f)
Now, try to use Gausian fit ...
Restored coadd image data:FIS_SW_Ceres_img.sav
COAD_DET        DOUBLE    = Array[2, 101, 199]
COAD_STDERR     DOUBLE    = Array[2, 101, 199]
COAD_NUM        DOUBLE    = Array[2, 101, 199]
IM_LON_COORD    DOUBLE    = Array[101, 199]
IM_LAT_COORD    DOUBLE    = Array[101, 199]
DATA_TYPE       STRING    = 'FIS_SW'
MAP_MEAN        DOUBLE    = Array[2, 4]
GRID_SIZE       DOUBLE    =     0.0027777778
HDR             STRING    = Array[27]
Wide Band Corrected Image was completed.
Corrected pixel number was: 179 / 7887.0000 = 2.2695575
Wide Band Corrected Error was completed.
Narrow Band Corrected Image was completed.
Corrected pixel number was: 284 / 23047.000 = 1.2322645
Narrow Band Corrected Error was completed.
Output corrected coadd image data in IDL format:FIS_SW_Ceres_img_corr.sav
Output map data in 3D cube FITS:FIS_SW_Ceres_img_corr_cube_[wln].fits
FISDR> []
```

- Please check the fraction of the corrected pixels !!

Image Combining Tool

- **ss_mosaic_image** (previously known as ss_multi_scan_map2)
  —> **make wide/deep image map with combining the multi-scan data**



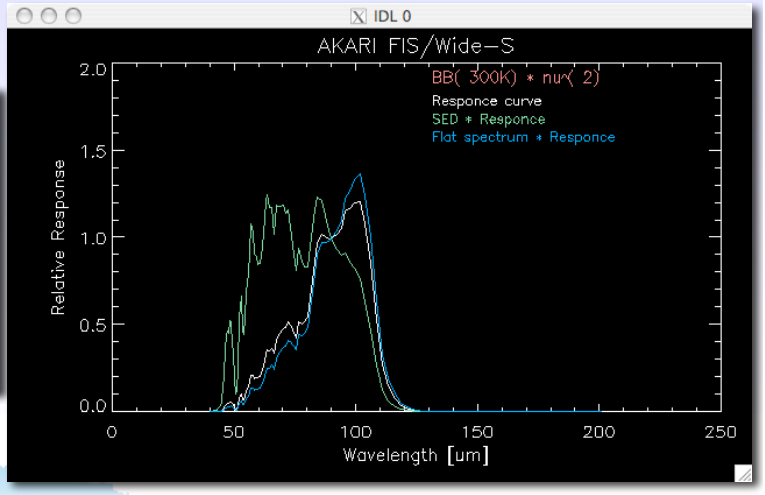
- ss_mosaic_image, targetdir, SIGMA=sigma, T_START=t_start, T_END=t_end,
  GRID_SW(LW) = grid_sw(LW), /cube_fits, tag_name=' * ', **/aot_mix**
  LON_CENTER = lon_center, LAT_CENTER = lat_center,
  LON_SIZE = lon_size, LAT_SIZE = lat_size,
  ECLIPTIC = ecliptic, GALACTIC = galactic,

Color correction factor

- The FIS photometric flux is defined for a flat spectrum.
- Color_corr, band, [,/check], factor,
  bb=[temp,beta] or power=[alpha], [,/check]
  (N60=0, Wide-S=1, Wide-L=2, N160=3)

uxterm

```
FISDR> color_corr
# USAGE #
color_corr, band, bb=[temp,beta] or power=[alpha] [, /check]
band      : 1=N60, 2=Wide-S, 3=Wide-L, 4=N160
spectrum  : Blackbody or Power Law
            Blackbody  : bb=[temp,beta]
            Power Law  : power=[alpha]
factor    : color correction factor (output)
/check    : display the responce graph
FISDR> color_corr, 1, bb=[300,2], /check
Read FIS_RSRF_070122.txt file
--- Wide-S band ---
Blackbody Spectrum : temperature = 300(K), beta = 2
d_nu_flat : 1.5327850 (THz)
d_nu_SED  : 3.0759437 (THz)
Color correction factor : 2.0067678
FISDR>
```



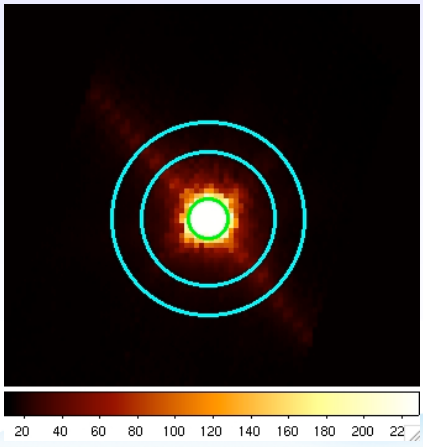
Aperture Photometry

1). Observed flux calibrater

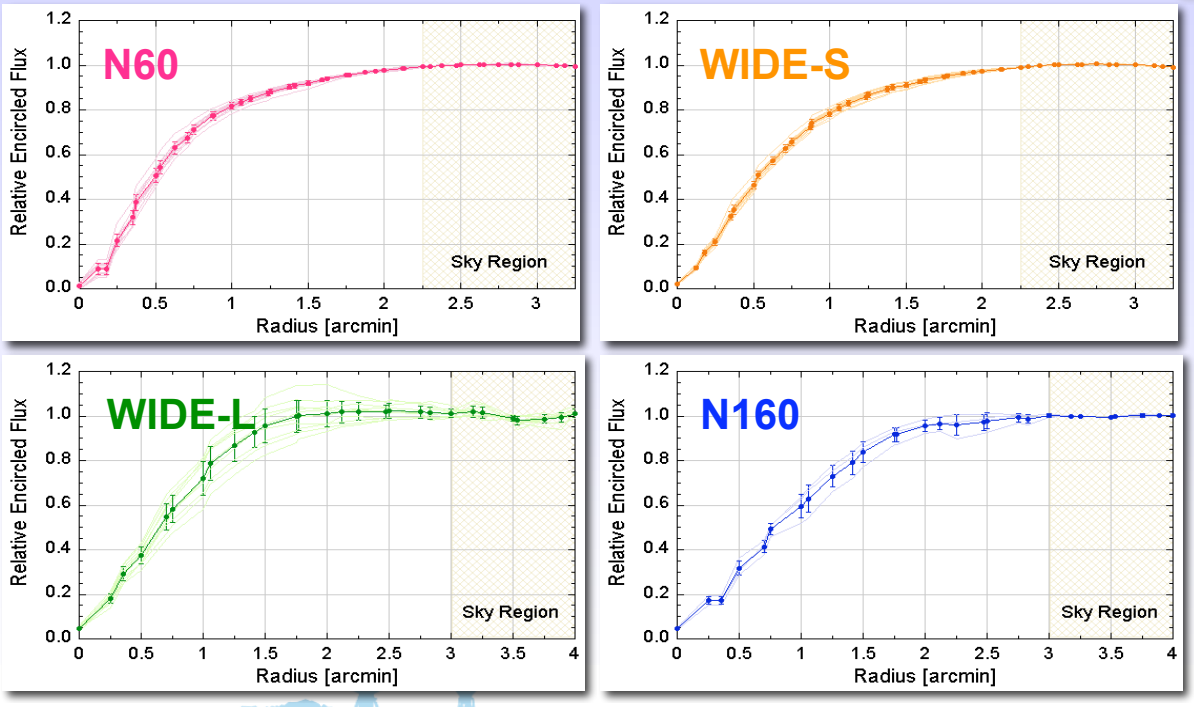
Asteroid : 19 sources
Star : 20 sources
Galaxies : 18 sources

2). Define the size of the aperture and the sky area

SW = 2.25-3.25 [arcmin]
LW = 3.00-4.00 [arcmin]



Aperture correction factor

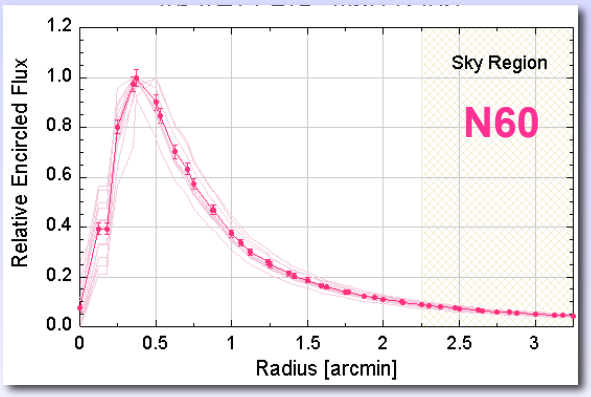


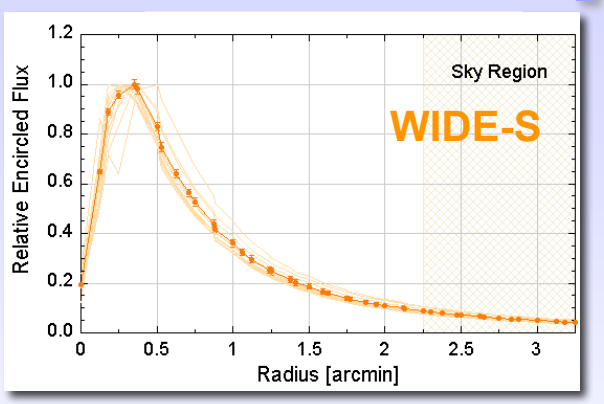
Aperture correction factor

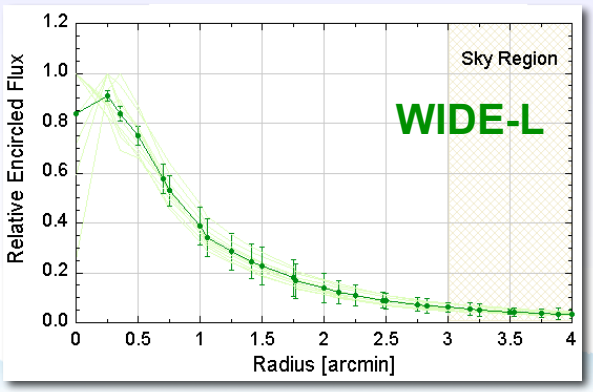
- apfactor, band, radius[arcmin], factor, factor_error

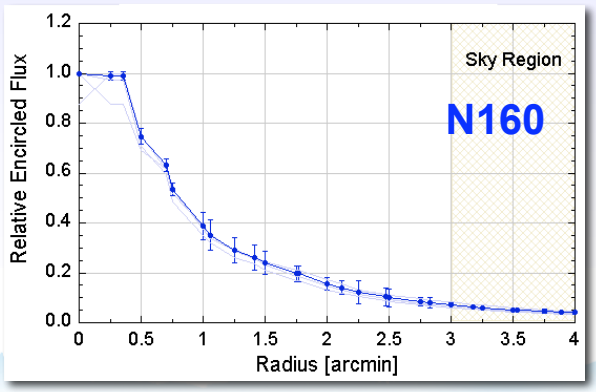
```
uxterm
FISDR> apfactor, 1, 1
--- Wide-S band ---
Read Aperture correction table
Aperture correction factor at r= 1 : 0.78509300 +- 0.014157500
FISDR> apfactor, 0, 1
--- N60 band ---
Read Aperture correction table
Aperture correction factor at r= 1 : 0.81867700 +- 0.014477000
FISDR> apfactor, 1, 1
--- Wide-S band ---
Read Aperture correction table
Aperture correction factor at r= 1 : 0.78509300 +- 0.014157500
FISDR> apfactor, 2, 1
--- Wide-L band ---
Read Aperture correction table
Aperture correction factor at r= 1 : 0.72001300 +- 0.074397400
FISDR> apfactor, 3, 1
--- N160 band ---
Read Aperture correction table
Aperture correction factor at r= 1 : 0.59546700 +- 0.053664800
FISDR>
```

Aperture Photometry

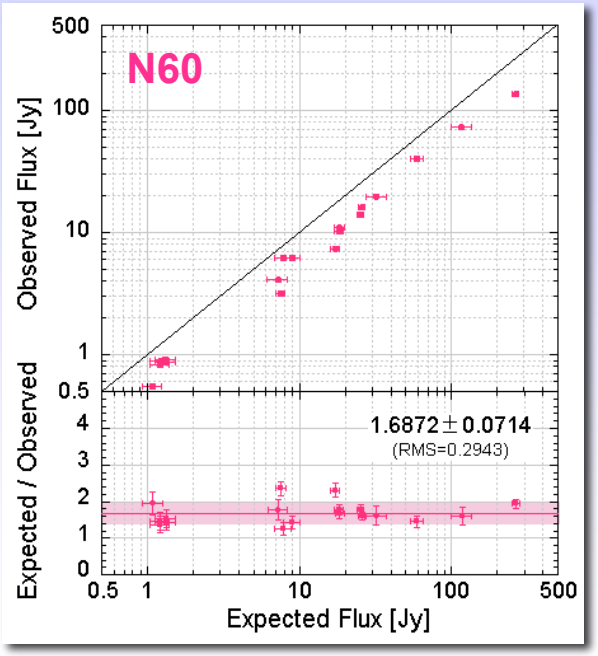


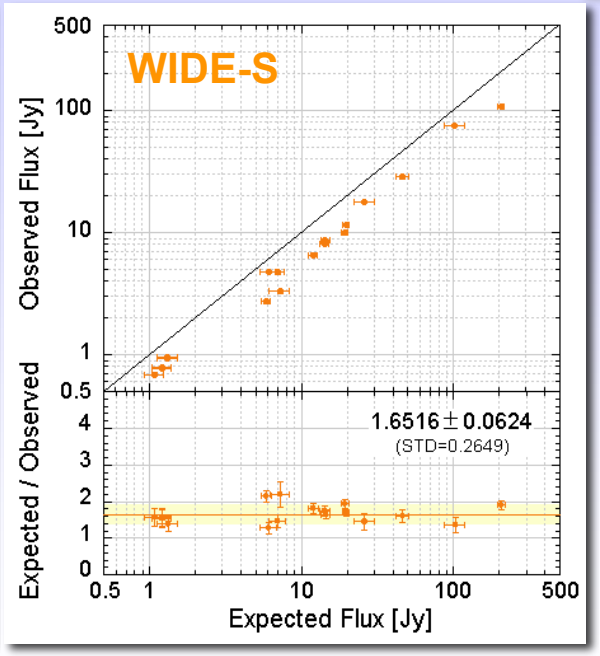






Point source - Diffuse Factor





Point source - Diffuse Factor