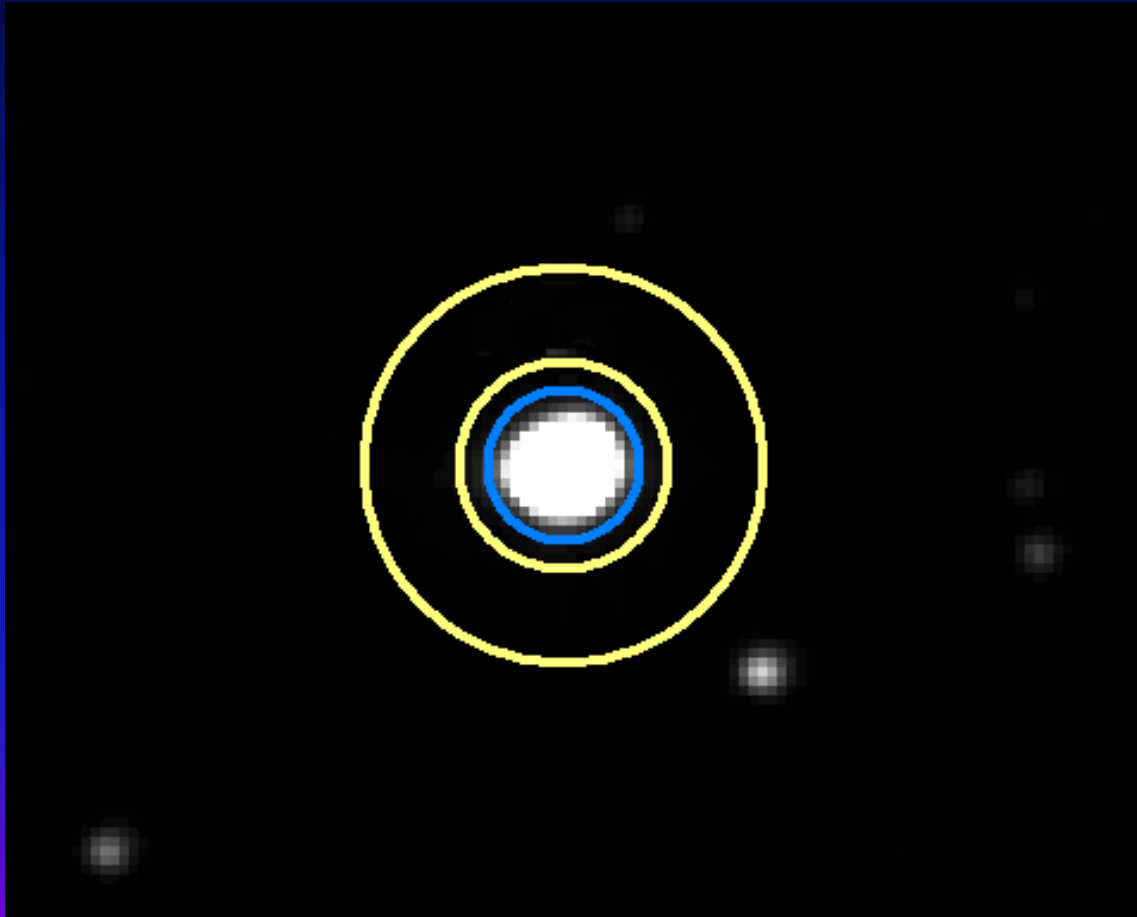# Photometry

Aperture Photometry

Aperture Photometry

Image of open cluster NGC 957
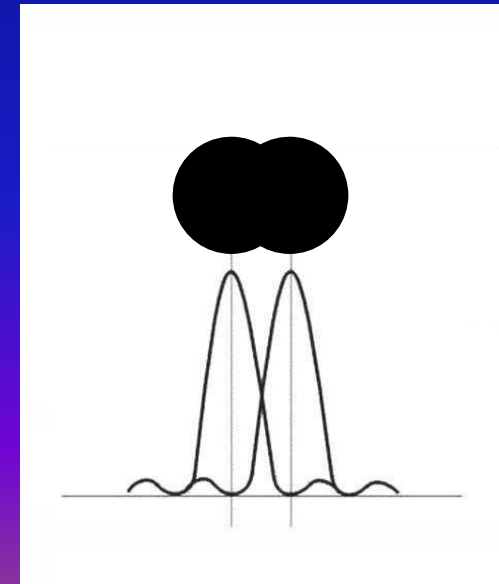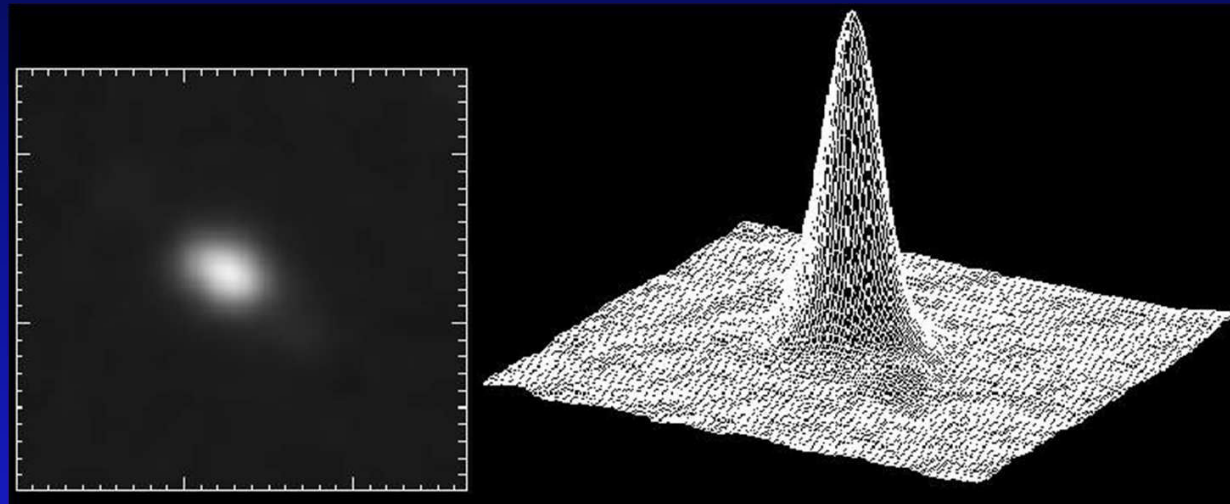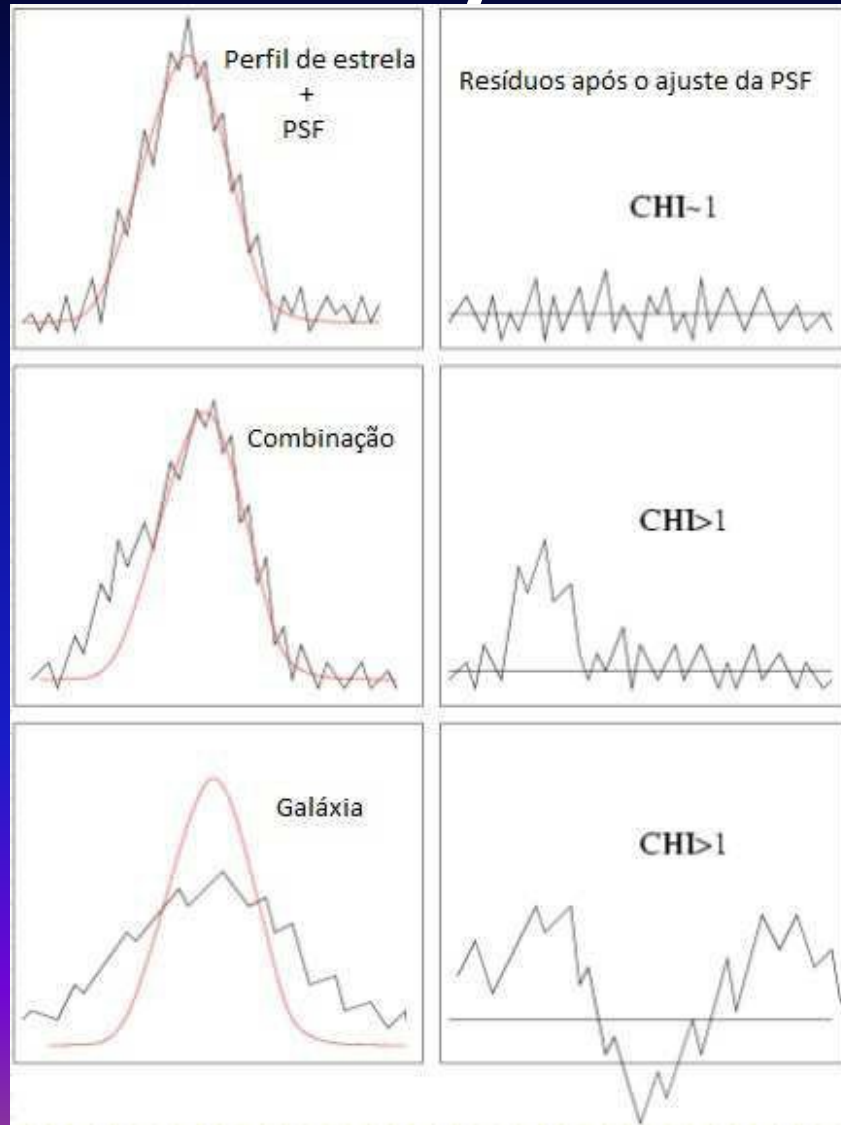
Aperture Photometry

Crowded Field

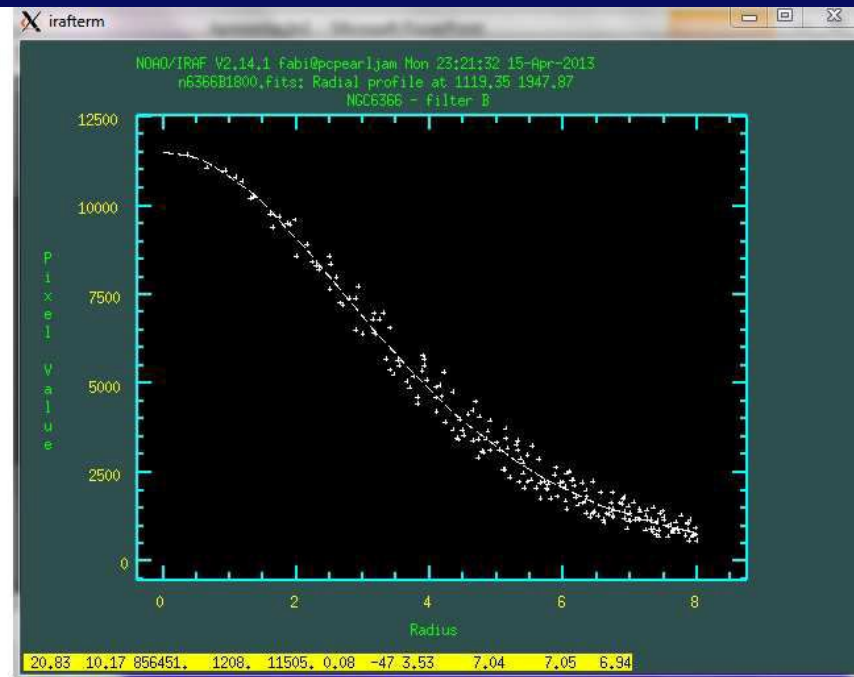**Source Confusion**

PSF Photometry :
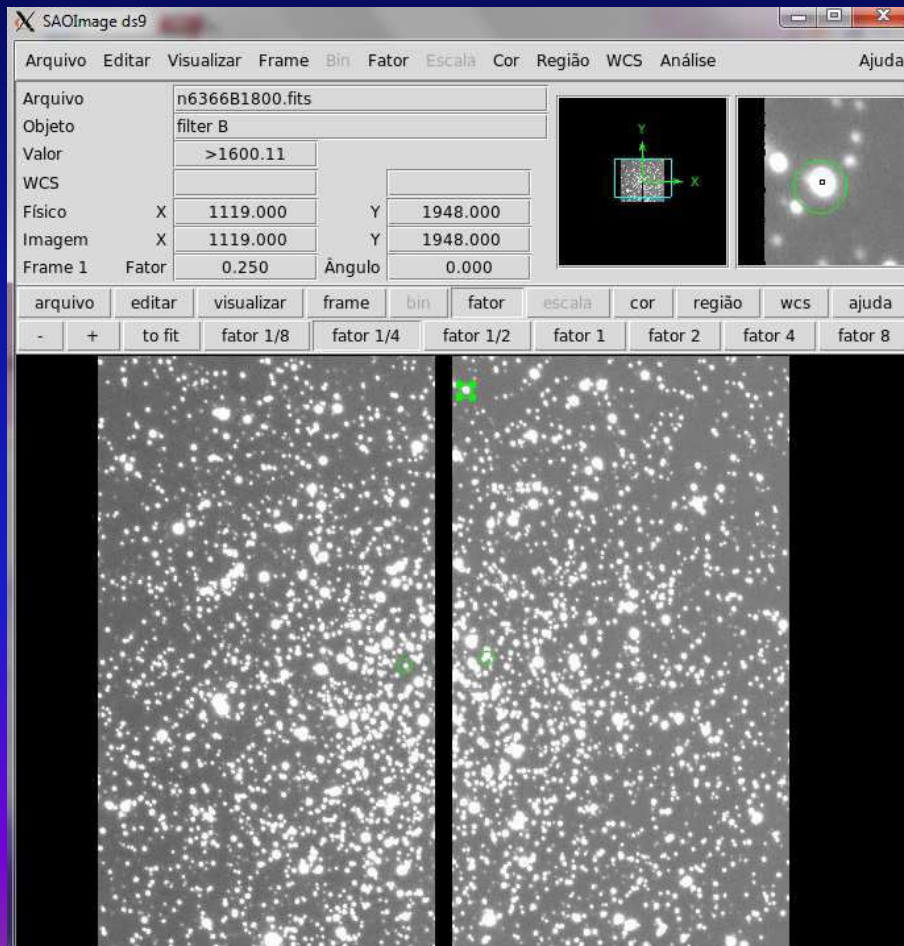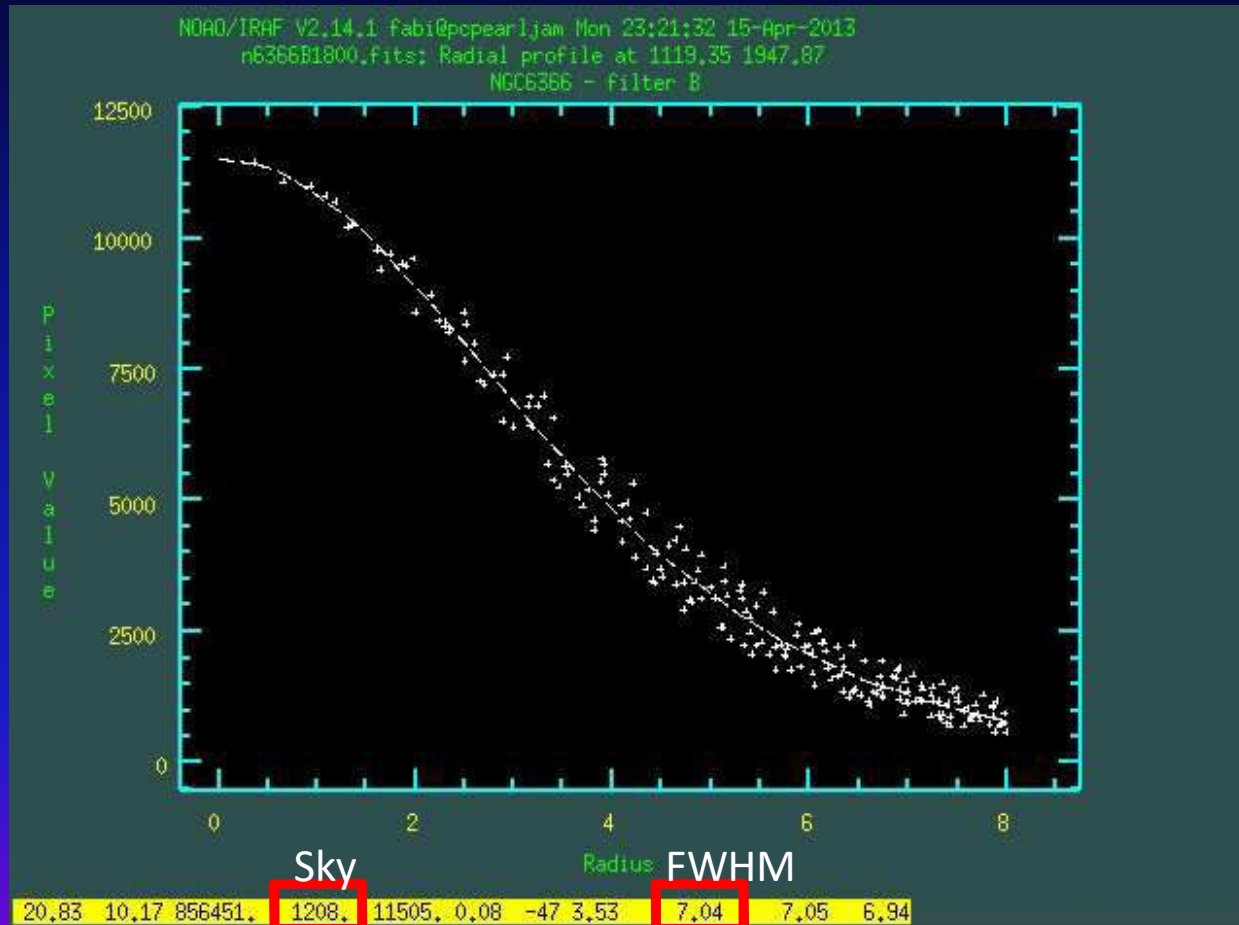
Point Spread Function(PSF)

PSF Photometry:

Photometry using IRAF

Imexamine

Photometry using IRAF

$$= \sqrt{\quad}$$

Annulus=2.5 FWHM (At least)

Photometry using IRAF

Photometry using IRAF

Photometry using IRAF

Photometry using IRAF

Photometry using IRAF

Threshold between 4 and 6
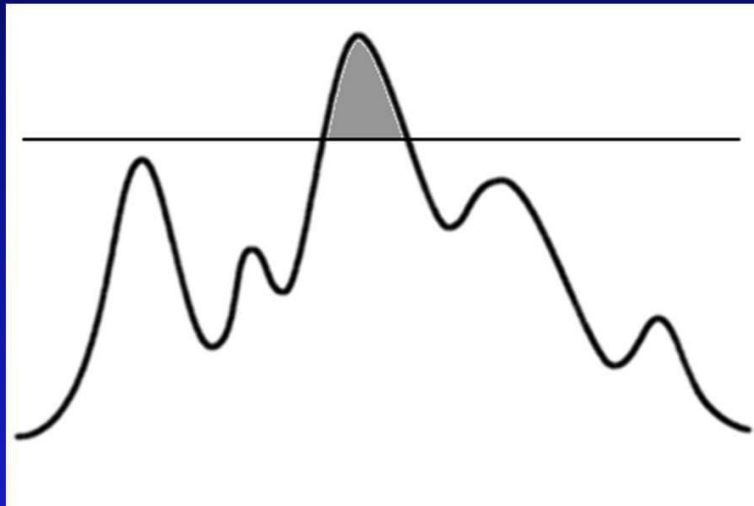
Threshold too high

Threshold too low

Photometry using IRAF

Photometry using IRAF

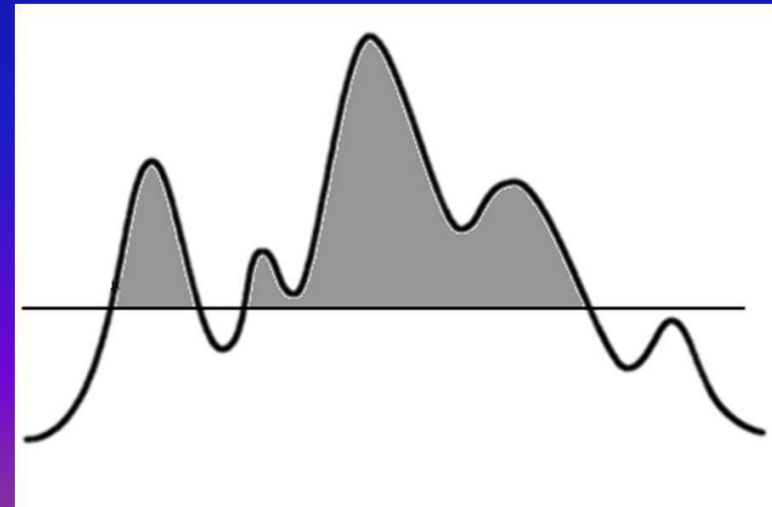annulus

dannulus

Photometry using IRAF

Aperture

PSF photometry with IRAF

Select the PSF candidates

* Relative isolated stars

* Unsaturated stars

* Stars spread through the CCD

* 25 to 30 candidates!

PSF photometry with IRAF

PSF photometry with IRAF

PSF photometry with IRAF

Estrela saturada

PSF photometry with IRAF
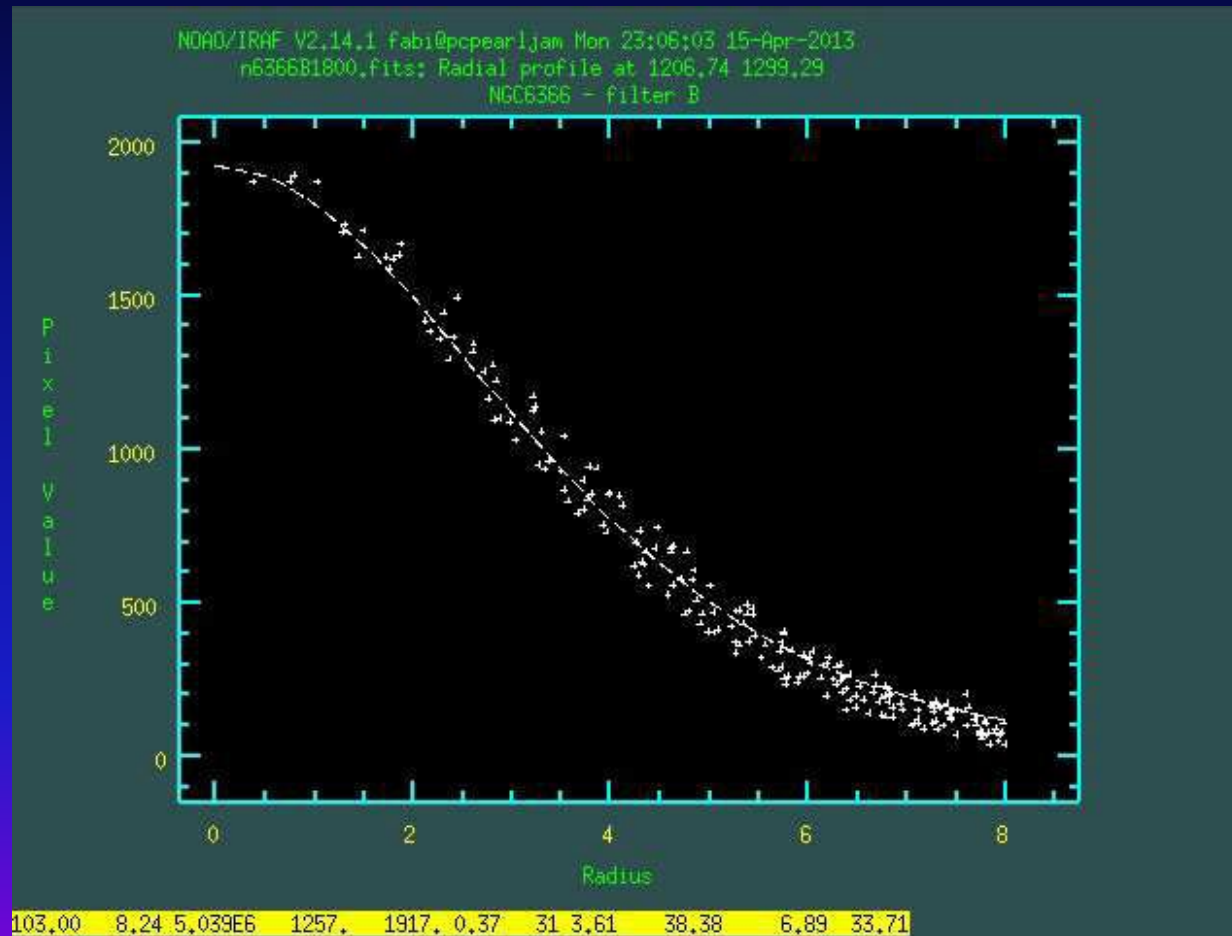
Unsaturated star

PSF photometry with IRAF

PSF photometry with IRAF

PSF photometry with IRAF

fitrad= circular area in which the pixels will be used to calculate the PSF fitting. Usually the FWHM can be used, unless there are too much crowding.

Psfrad= radio in which the PSF is defined. Must be larger than the radius of the brightest star you want to measure.

PSF photometry with IRAF

Function

gaussian (black)
lorentzia(red) Moffat
b=1.5 (blue) Moffat
b=3.5 (green)

$$G(r) \propto \exp\left(-\frac{r^2}{2a^2}\right)$$

$$L(r) \propto \frac{1}{1+(r^2/a^2)^b}$$

$$M(r) \propto \frac{1}{(1+r^2/a^2)^b}$$
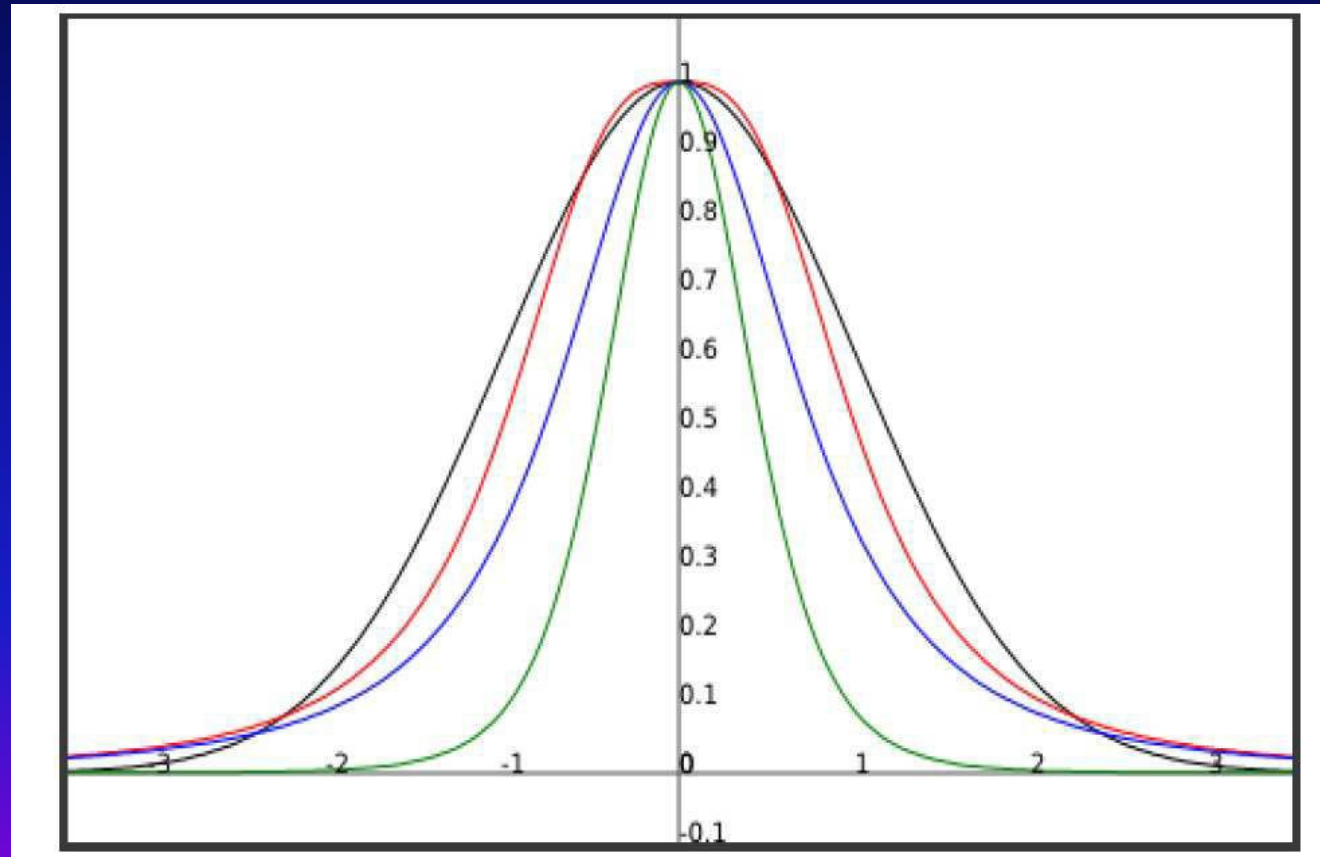
r is the distance to the center of the object. **a** and **b** are the fitting parameters

PSF photometry with IRAF

Some commands of PSF task

a= add star to the psf candidates list

f= fits PSF

d= delete star from the PSF list

l = list the PSF candidates

w= write the PSF to file

PSF photometry with IRAF

task = seepsf

PSF photometry with IRAF

PSF photometry with IRAF

Output from ALLSTAR

- Photometry list
- Rejected list
- Subtracted image

PSF photometry with IRAF

1. Find stars in the subtracted image
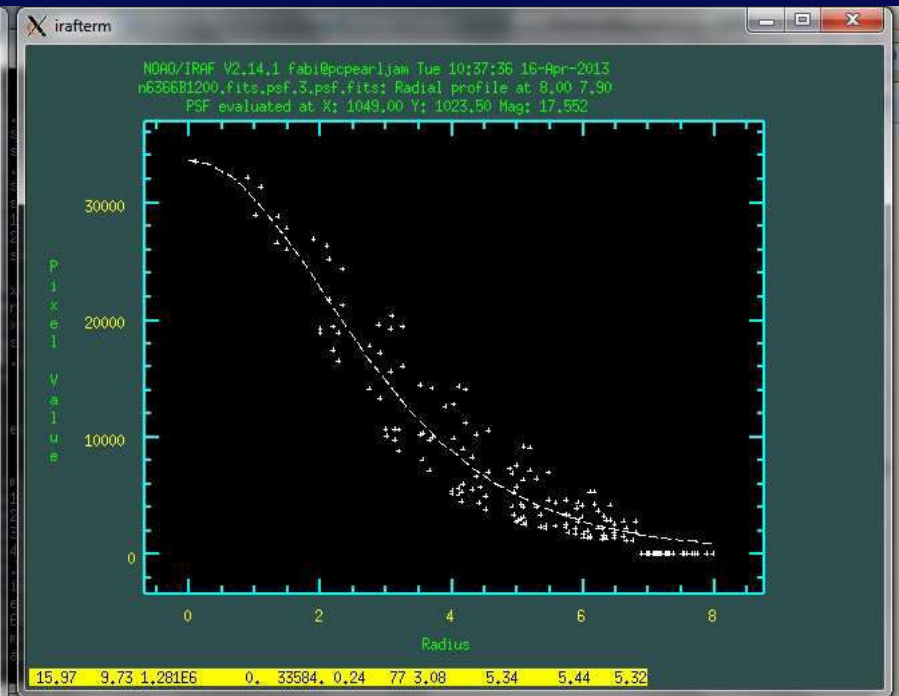2. Concatenate files from FIND from original and subtracted (PCONCAT)
3. Rename the resulting file (PRENUMBER)
4. Re-do the aperture photometry with this new list
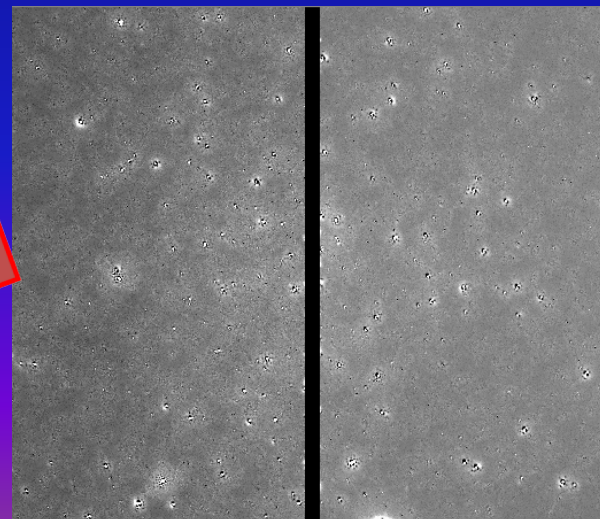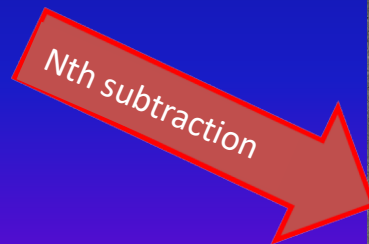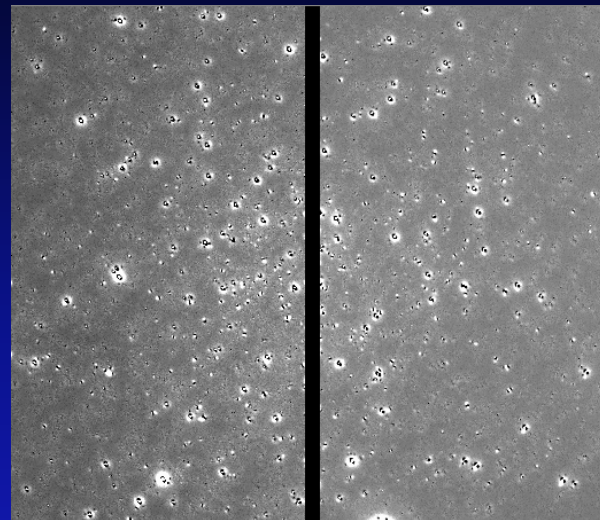5. Re-do the PSF photometry with the new list

PSF photometry with IRAF

Original Image

1st subtraction

Nth subtraction
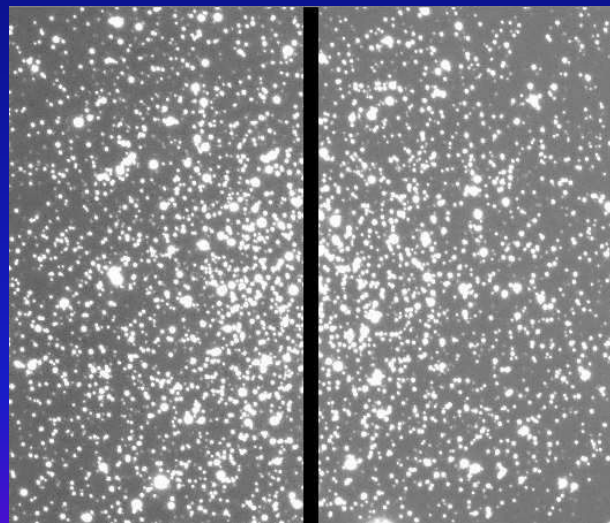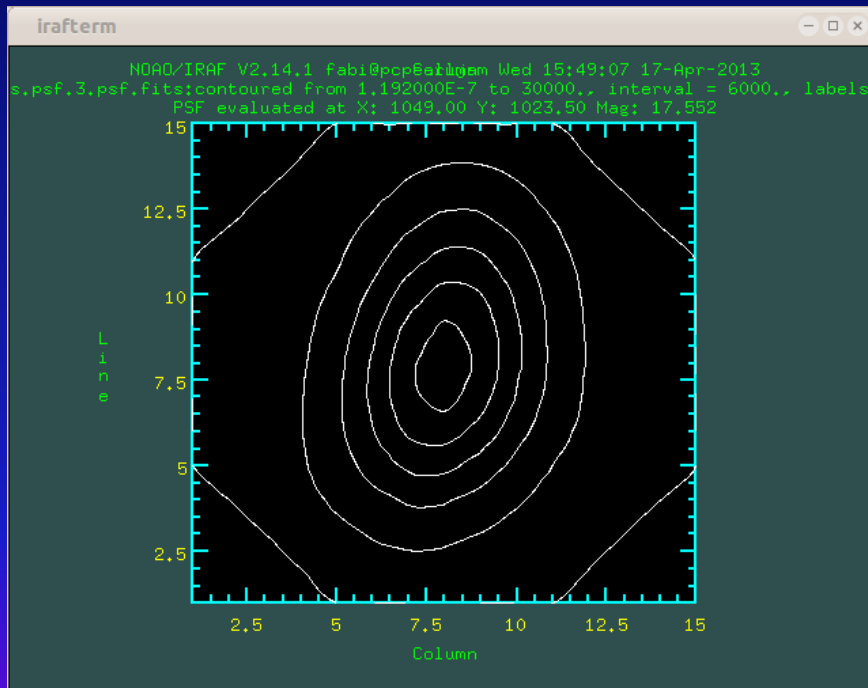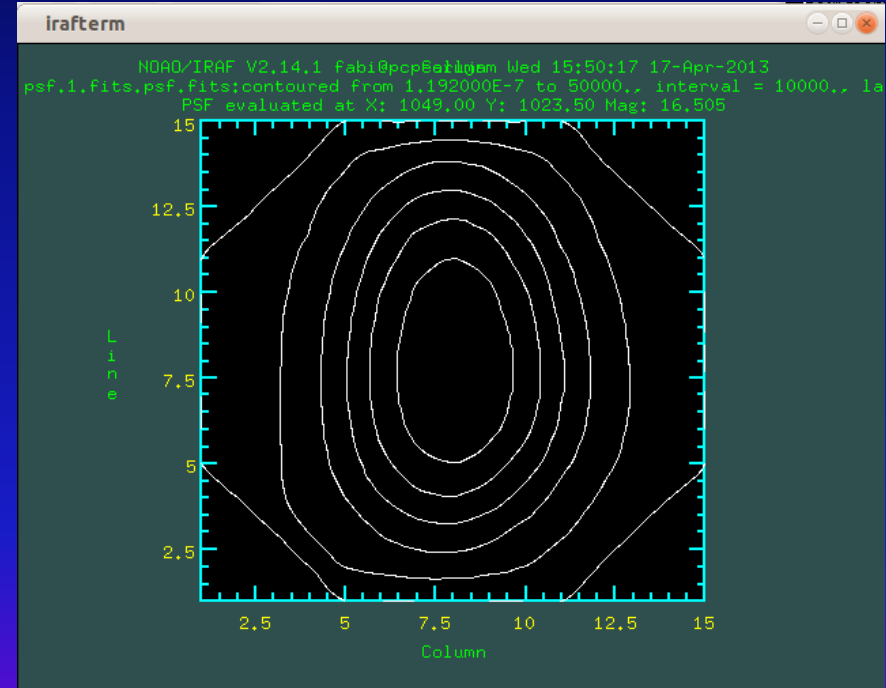
PSF photometry with IRAF

B

V
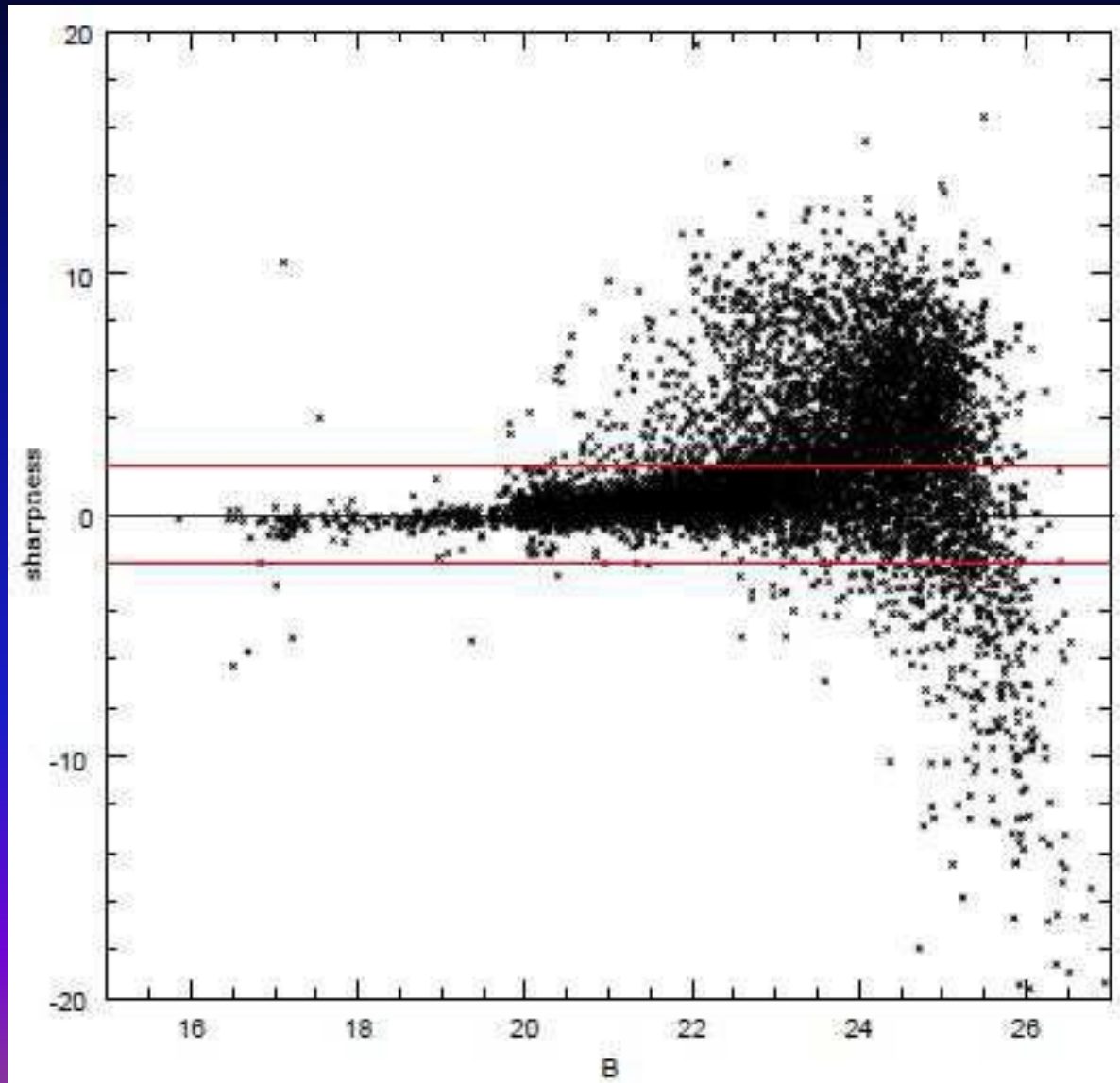
Sharpness

Isolated Star ⎤ Sharpness próximo à zero

Semi-resolved Galaxies
Double or mixed sources ⎤ Sharpness >> zero

Cosmic rays
and
Image defects ⎤ Sharpness << zero

Sharpness

Diagrama cor magnitude

IRAF

cl>pdump id,xcenter,ycenter,mag,merr,sharp

terminal

>sort 1,1b arquivo1

>sort 1,1b arquivo2

>join arquivo1 arquivo2

Color-magnitude Diagram