

# EXTENDED SOURCES IN THE VVV

FRIENDS of FRIENDS MEETING  
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# INTRODUCTION

- Deep optical searches.
- Near infrared all-sky surveys (2MASS and DENIS).
- HI all-sky surveys.
- X-ray surveys.

Allow us the detection of voids, clusters and superclusters at low Galactic latitude (*Woudt et al. 2004*).

## *Kraan-Korteweg & Lahav (2000)*

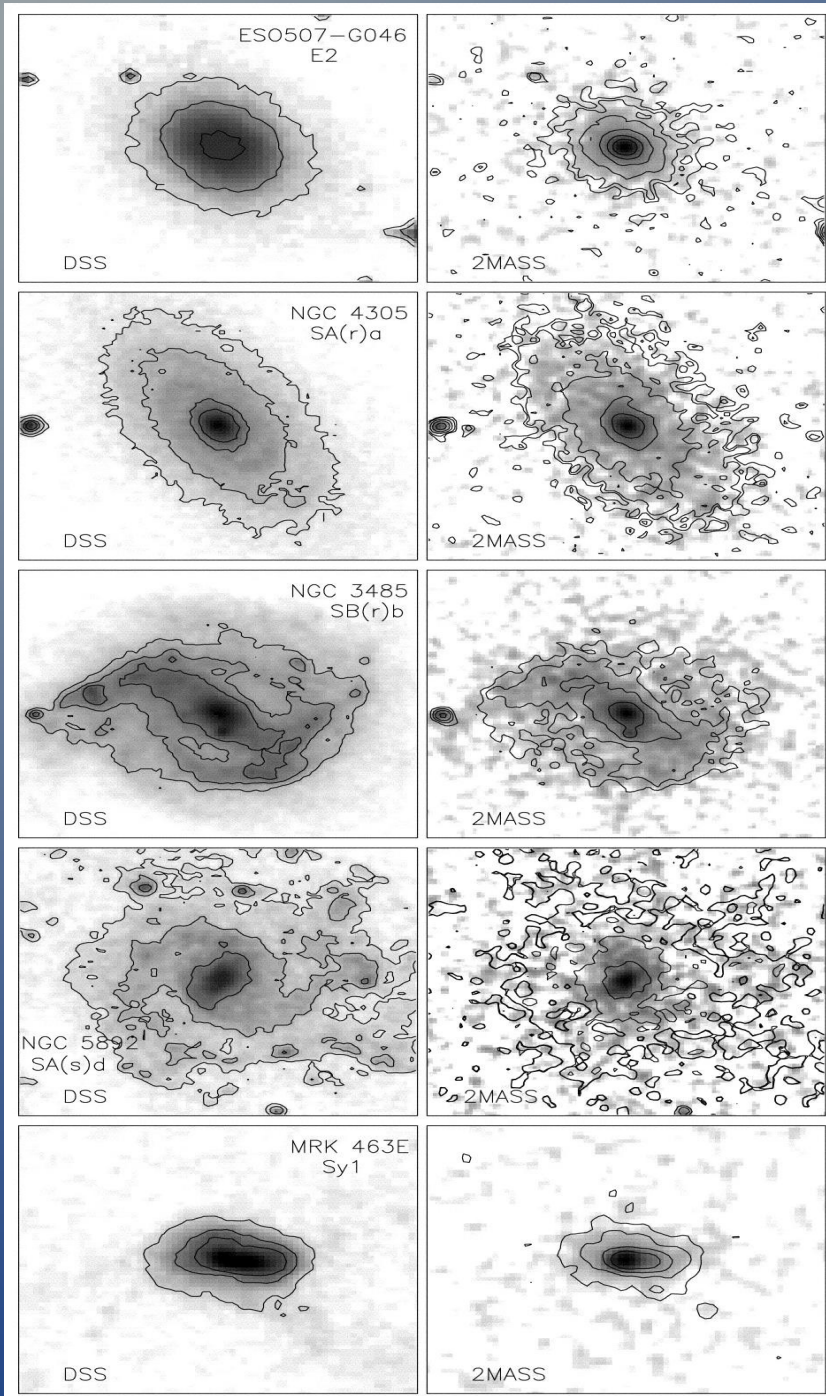
- Optical study of galaxies behind the MW.
- Searching for the GA, big concentration of galaxies from peculiar velocity field.

# The Milky Way

- Highly crowded fields
- Effect of interstellar extinction up to 10-25 magnitudes in  $A_V$
- IR helps us to study the zone of avoidance

## ***2MASS allows us to study the MW in the IR***

- First galaxy detections (*Hurt et al. 2000*).
- The 2MASS Extended Source Catalog with 1647599 extended sources (*Skrutskie et al. 2006*).
- Basic algorithms to detect and characterize the extended objects (*Jarrett et al. 2000*).
- 2MASS completeness and reliability down to  $J=15.0$  mag and  $K_s=13.5$  mag.



**T. H. Jarrett. 2000 April 18. Near-Infrared Galaxy Morphology Atlas**  
**Comparison between optical and infrared imaging. Five galaxies are illustrated: spheroidal E2 galaxy (ESO 507-G046), early-type Sa spiral (NGC 4305), barred SBb spiral (NGC 3485), late-type Sd spiral (NGC 5892), and Seyfert-type active galaxy (Mrk 463E). The -band integrated flux for each galaxy is  $\sim 10.0$  mag ( $\sim 75$  mJy). The left column show gray-scale Digitized Sky Survey images with contours overlaid. The right column shows 2MASS -band images (gray-scale halftone), overlaid with J-band contours. The gray-scale stretch and contour levels were chosen to highlight similar features between the DSS and 2MASS data. The average surface brightness of the lowest contour for the optical images is  $\sim 24.6$ ,  $24.0$ ,  $23.4$ ,  $23.0$ , and  $24.0$  mag arcsec $^{-2}$ , reading from top to bottom (early to late types).**

# VVV

## The VISTA Variables in The Via Lactea

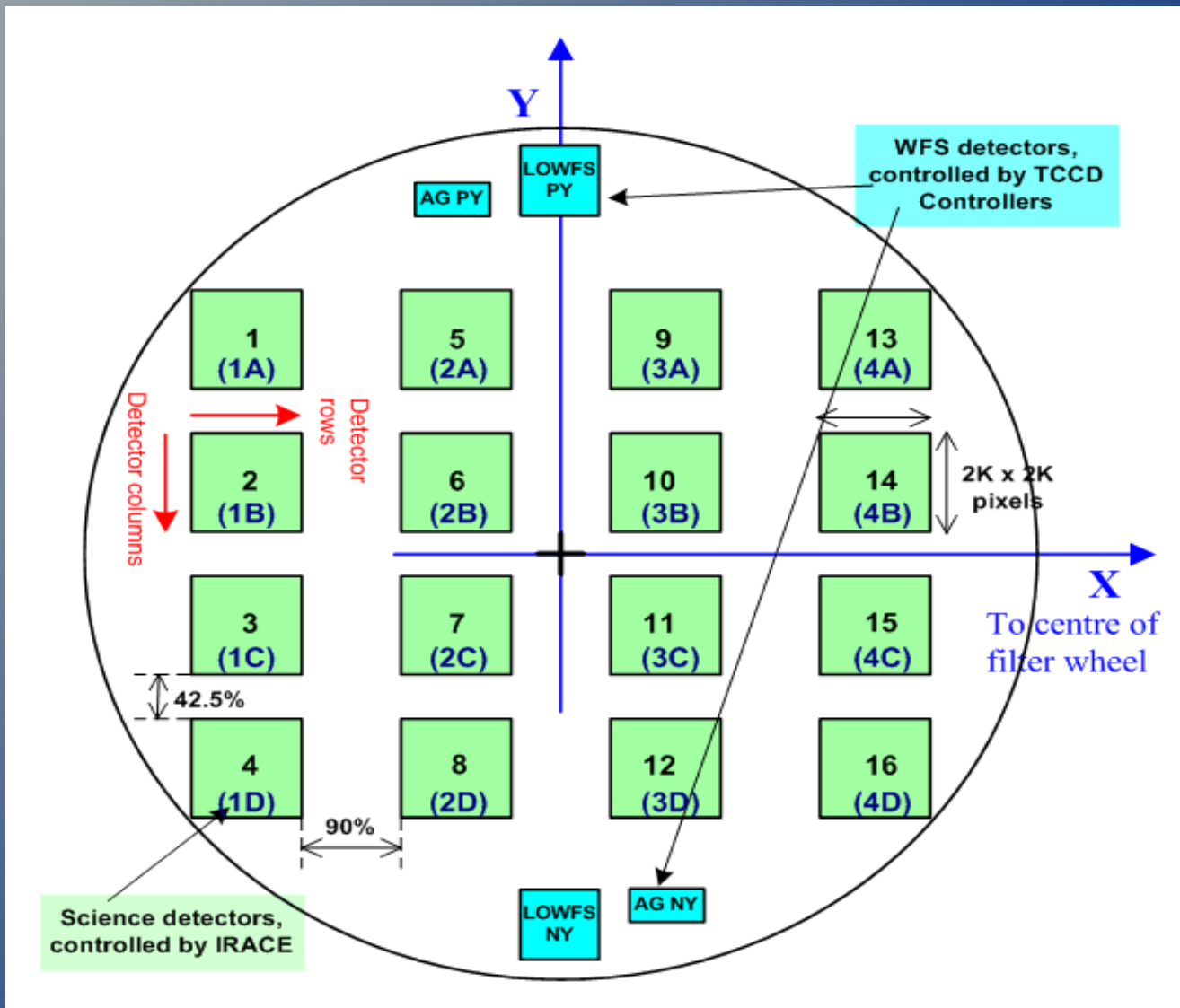
- VVV is a public IR variability survey of the Milky Way bulge and an adjacent section of the mid-plane where star formation activity is high.
- Bands: Z, Y, H, J and Ks.
- Area to be observed: ~ 520 square degrees.
- Allocated time: 1920 hours, ~190 days.

# VISTA

## Visible and Infrared Survey Telescope for Astronomy

- VISTA is a 4-m class wide-field survey telescope equipped with an IR camera and located at ESO's Cerro Paranal Observatory in Chile.
- The IR camera for VISTA is composed of 16 Raytheon VIRGO 2048x2048 20 micron pixel array detectors, with a pixel scale of 0.34" (f/3.25) and a field of view per exposure of 0.59 square degrees.





# Unveiling galaxies behind the galactic plane

*(Amores et al. in preparation)*

- Region: Tile d003
- Only 342 objects classified as galaxy by 2MASS in the complete VVV region.
- d003 no galaxies in common with 2MASS.

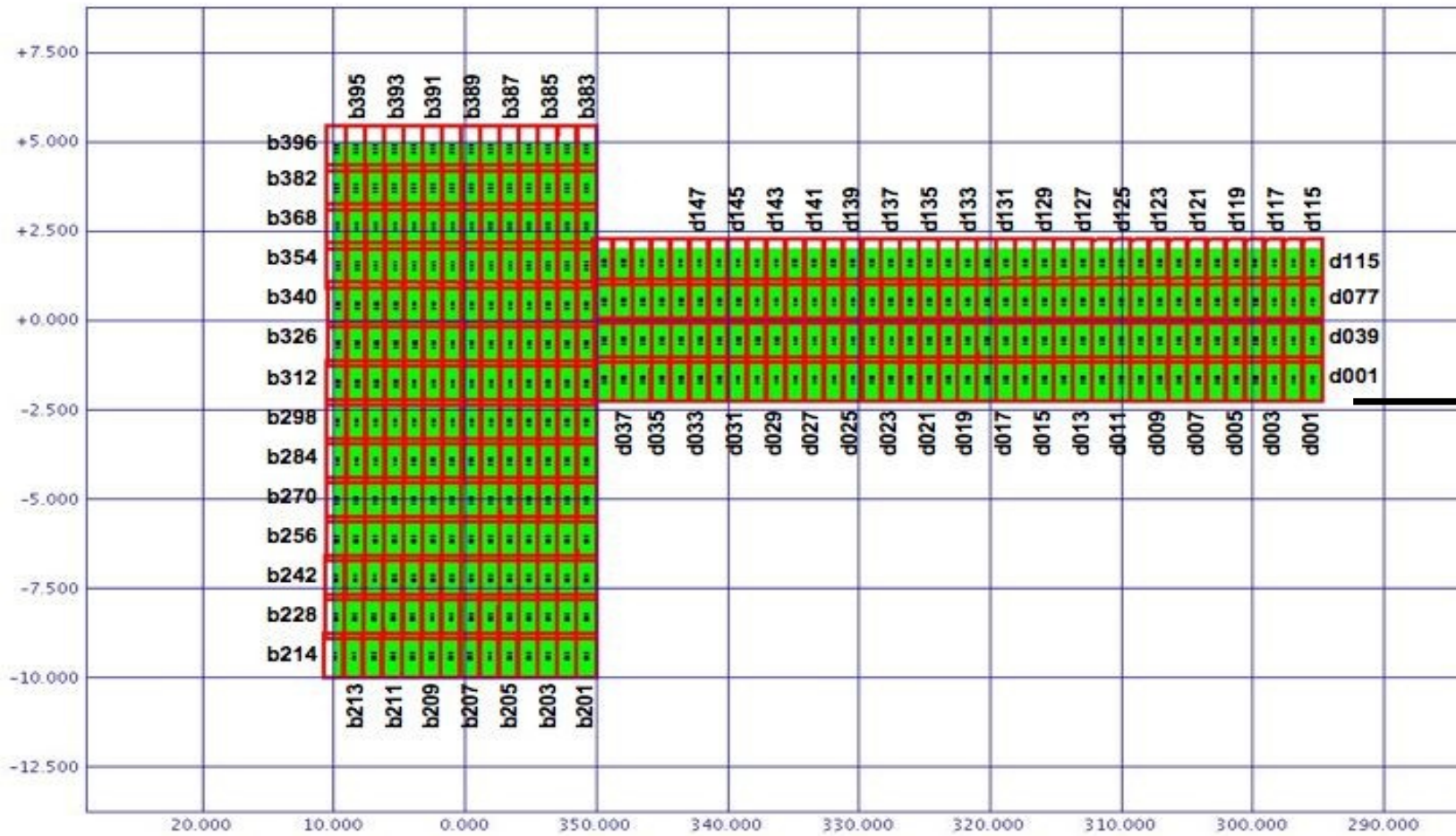
# CASU

## Cambridge Astronomy Survey Unit

CASU will be responsible for the processing of all data obtained with VISTA.

VIRCAM Catalogues: 80 Columns.

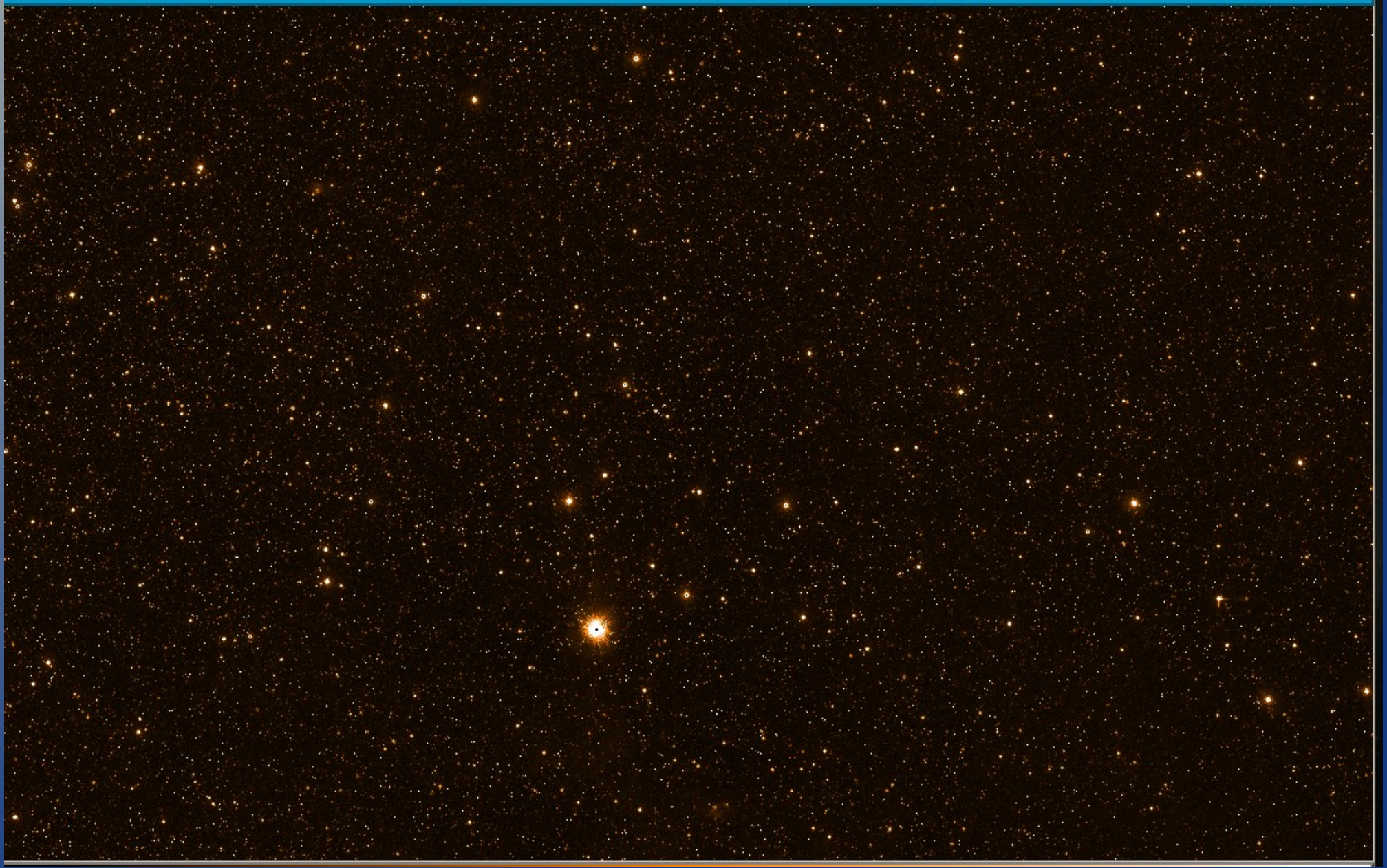
SADT  
348 tiles: 196 bulge, 152 disk



d001



# Tile d001





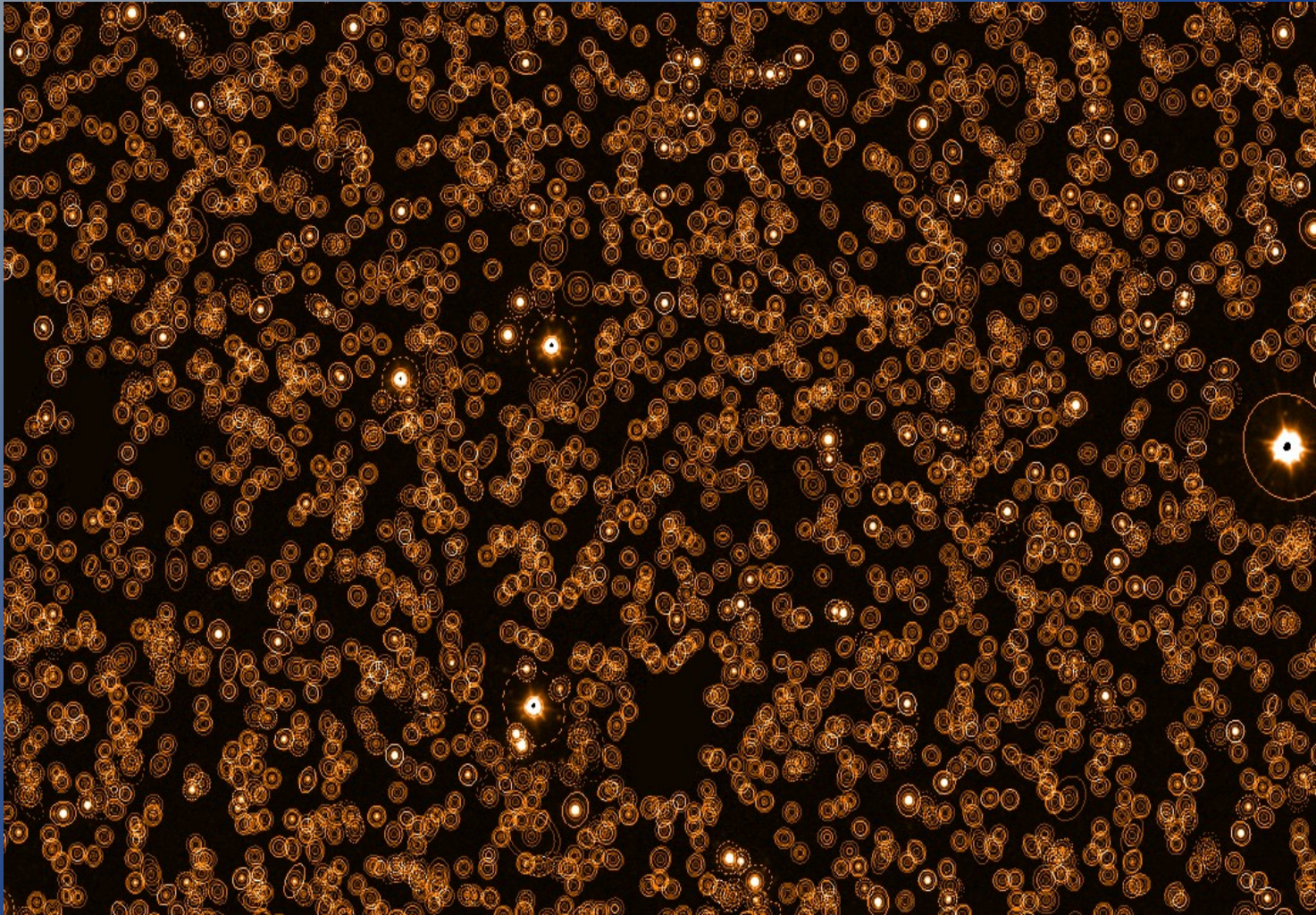
# Chip 01





# SExtractor

Source Extractor. Bertin & Arnouts (1996)



8625 Sources detected!

# Matched Catalog

## IRAF (stsdas)

- CASU Catalog

RA, DEC

X, Y

Petr\_flux

kron\_flux

rPetrosian

rkron

ellipticity

classification

- Our SExtractor catalog

RA, DEC

X, Y

mag\_iso

mag\_aper

mag\_auto

r1/2

rKron

ellipticity

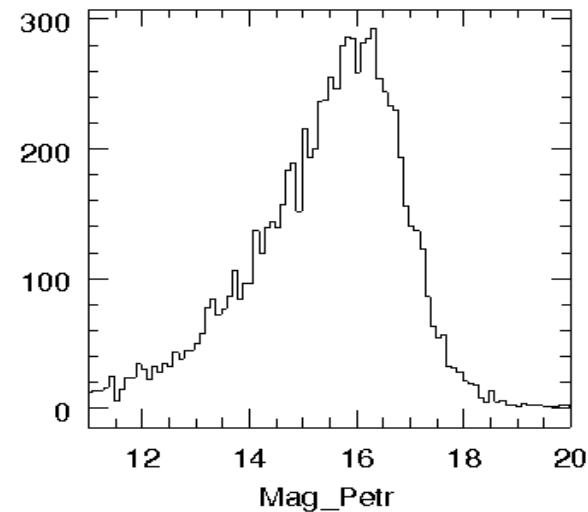
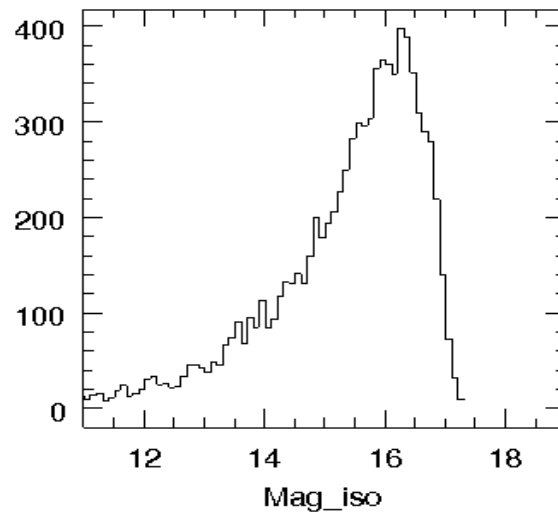
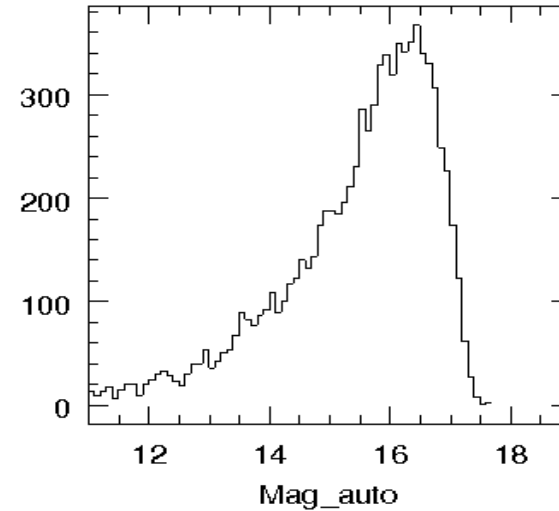
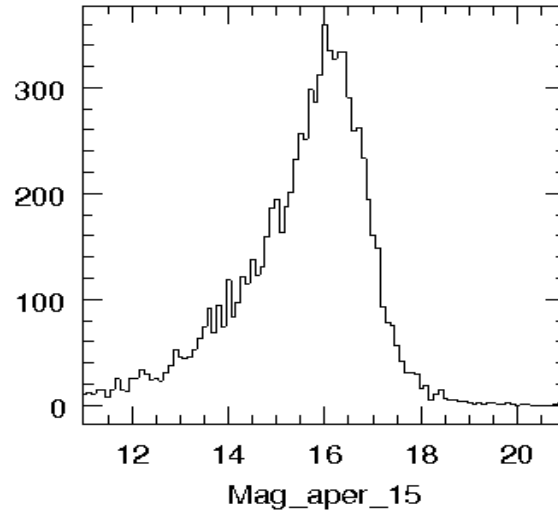
class\_star



# CASU vs SExtractor

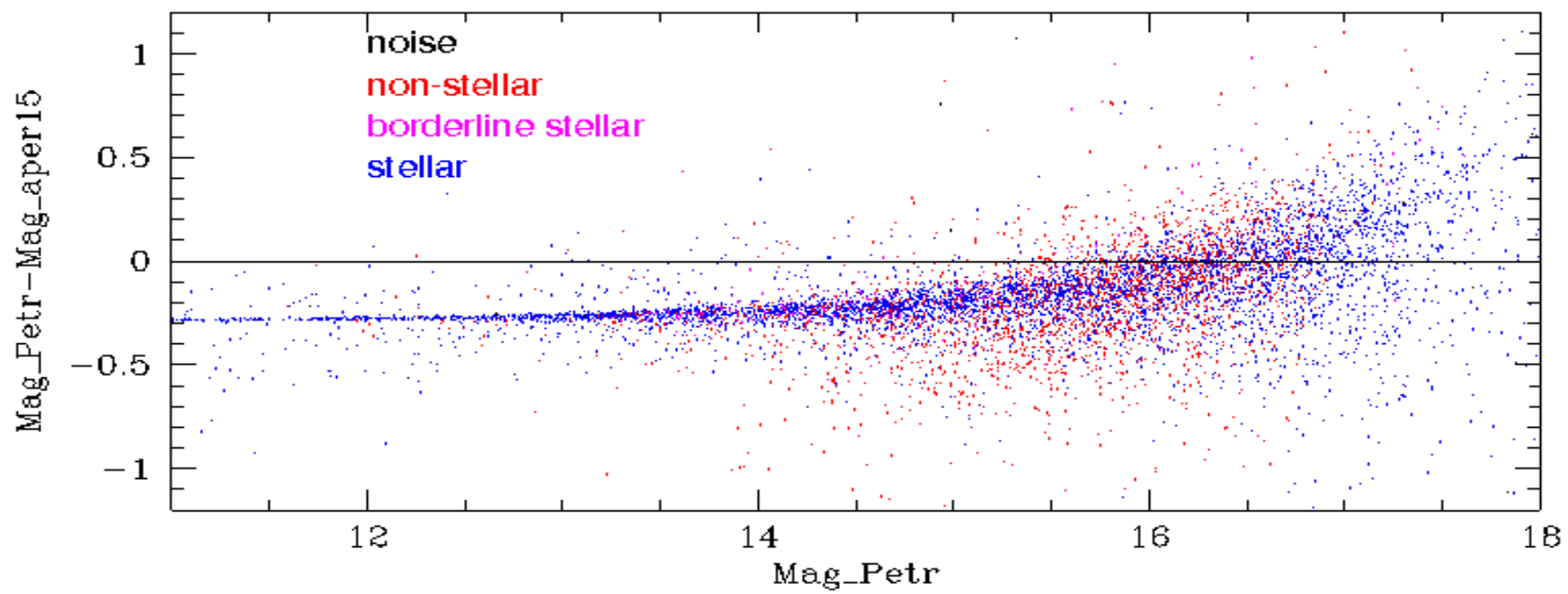
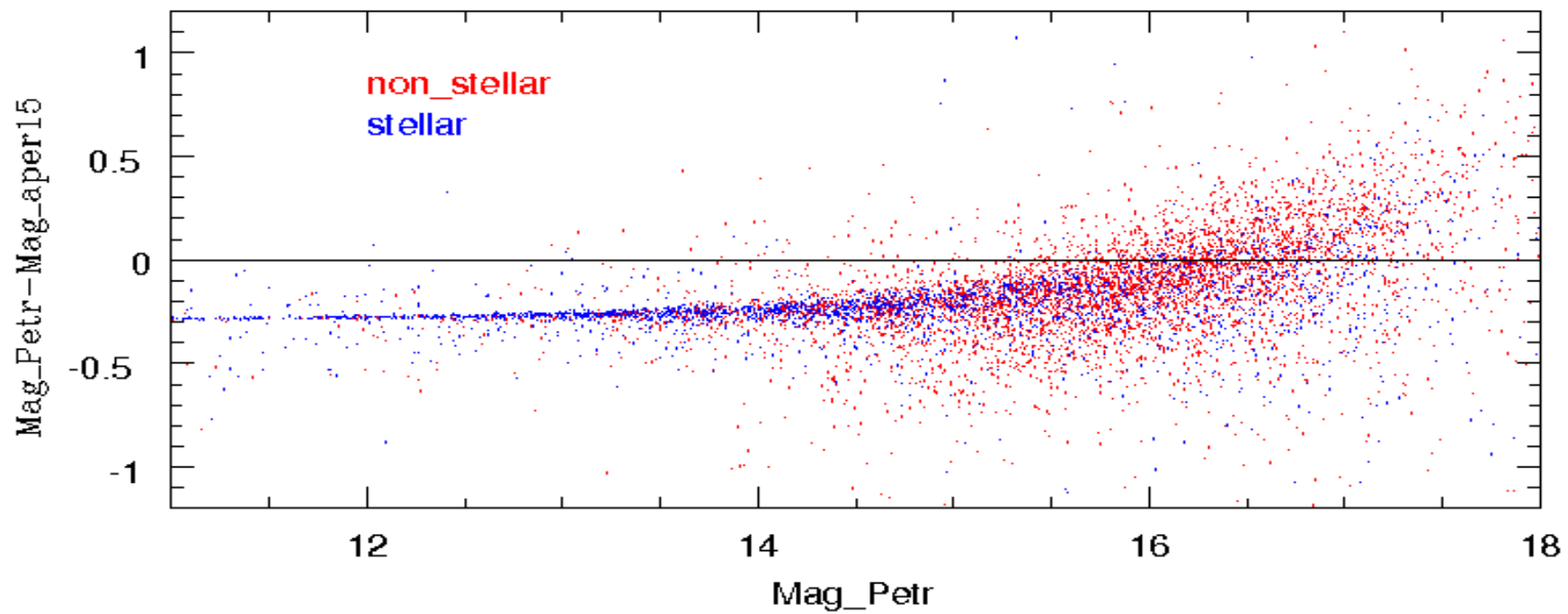
## Magnitudes

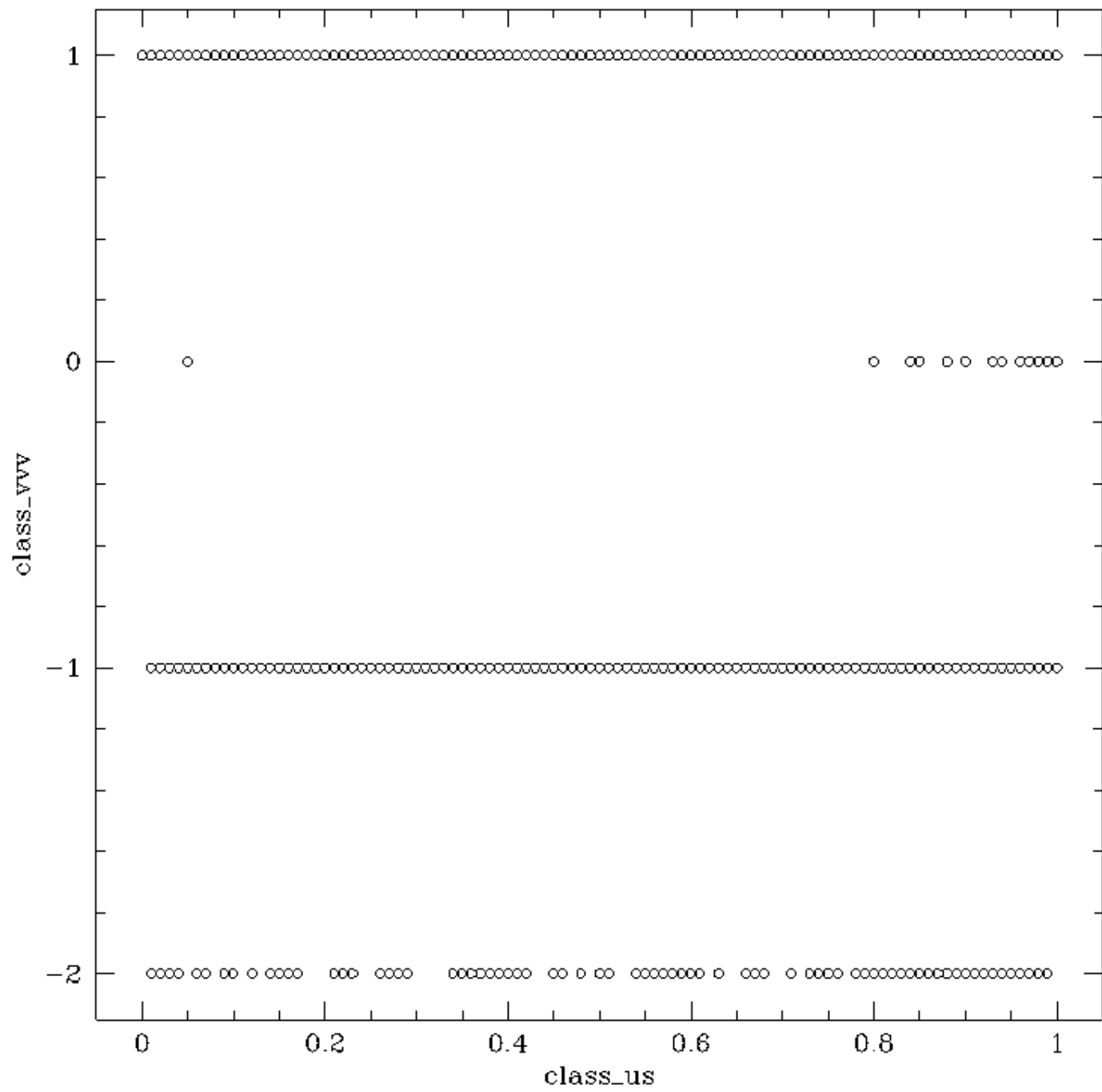
$$\text{mag} = ZP - 2.5 * \log_{10}(\text{flux}/\text{exptime}) - \text{apcor}$$



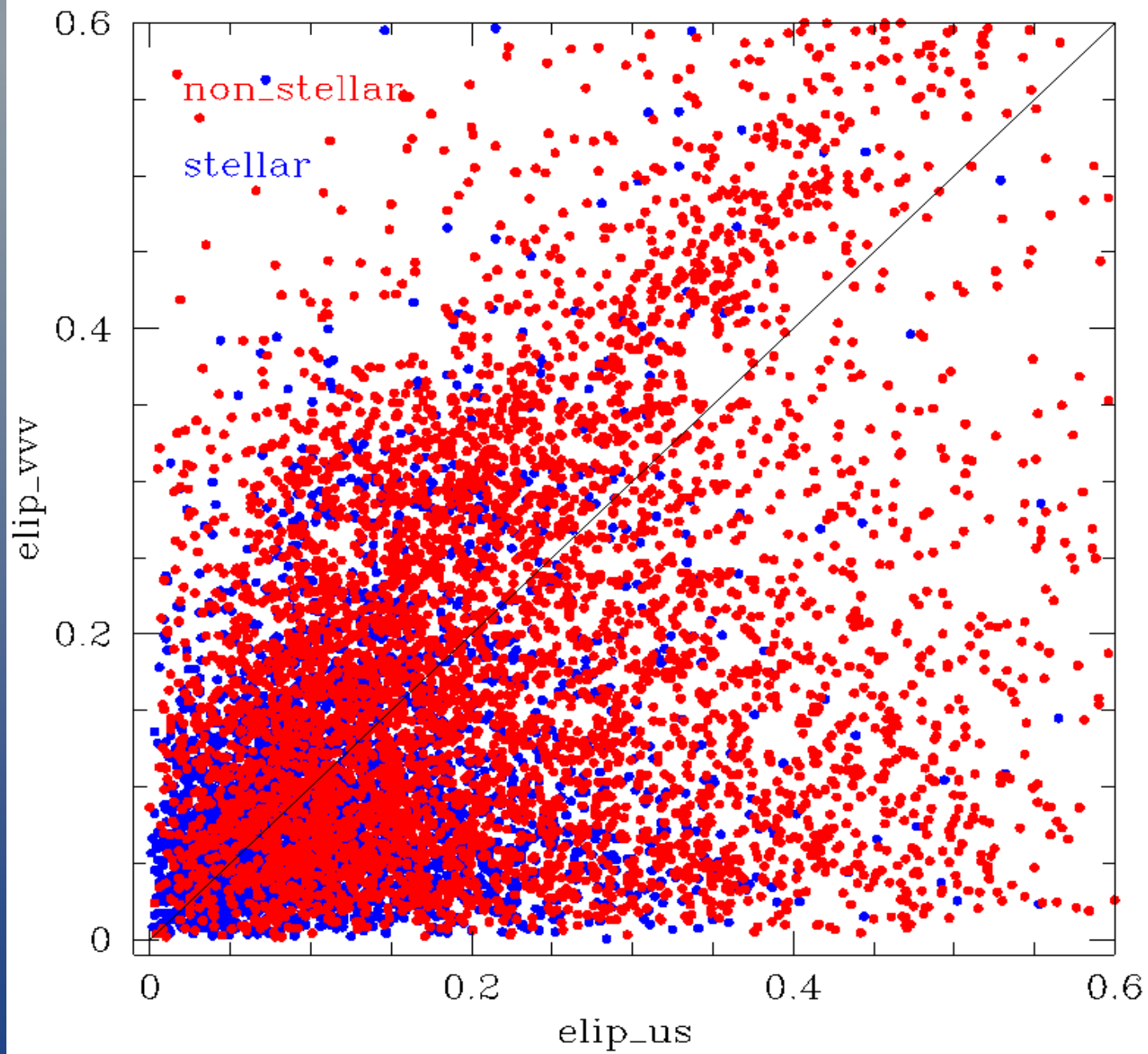
# CASU vs SExtractor

- CASU Classification
  - 1 stellar
  - +1 non-stellar
  - 0 noise
  - 2 borderline stellar
- SExtractor class\_star
  - < 0.90 non- stellar
  - > 0.90 stellar





- CASU
  - 1 stellar
  - +1 non-stellar
  - 0 noise
  - 2 borderline stellar
- SExtractor `Class_star`
  - < 0.90 non- stellar
  - > 0.90 stellar



**Muchas Gracias!!!**