Genius at CAB (INTA-CSIC)

WP400: Data exploitation

Task 4.4: VO tools and services

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VO SED Analyzer

http://svo2.cab.inta-csic.es/theory/vosa/

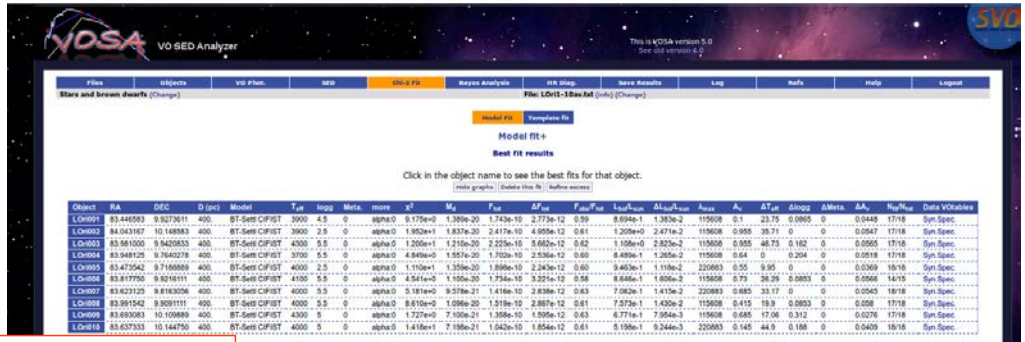
Goal: Determination of physical parameters (Teff, logg, [M/H], radius, mass, age,…) from the SED fitting to theoretical models.

Available since 2008.

More than 800 users.

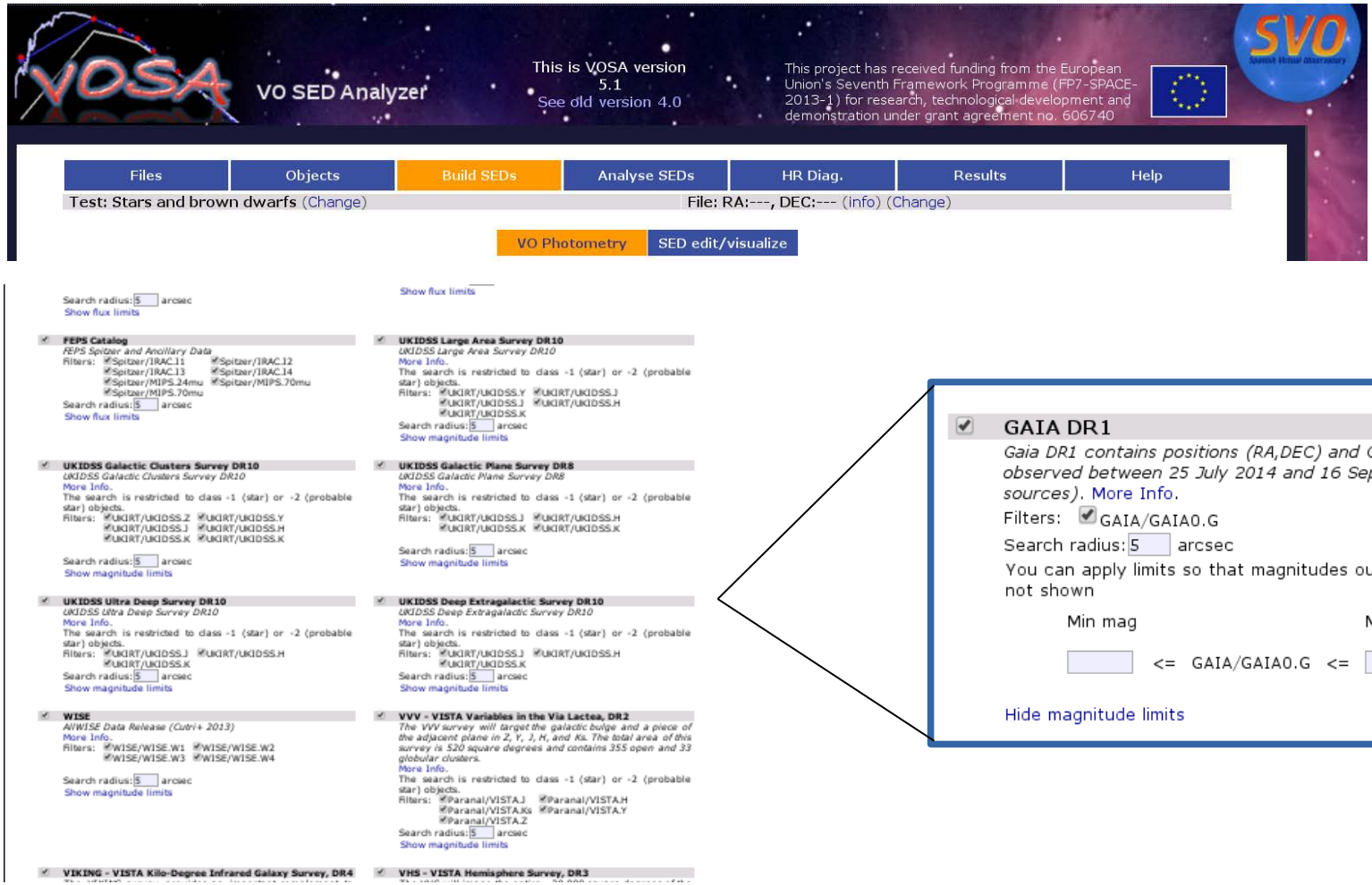
More than 1.000.000 objects.

More than 80 refereed papers.



VOSA and Genius

SED building: Gaia DR1 included in the list of photometric catalogues VOSA uses to build the SED.



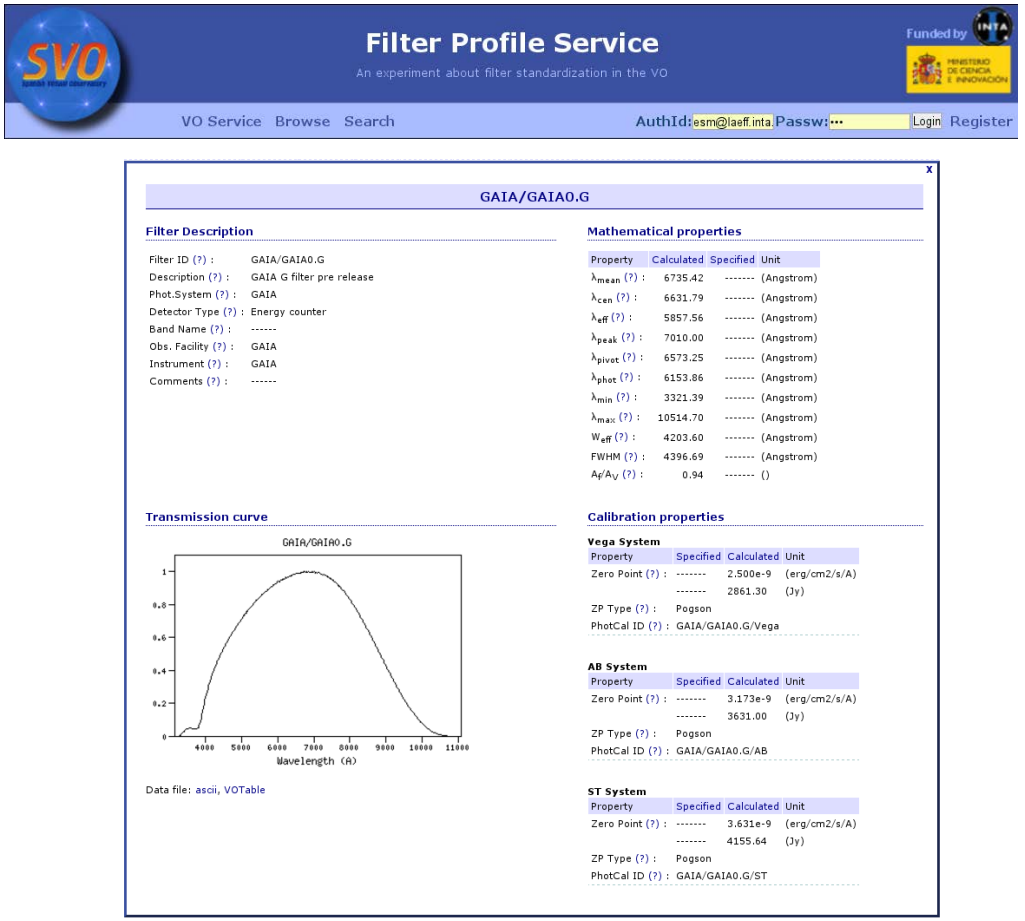
VOSA and Genius

From magnitudes to fluxes: The SVO Filter Profile Service

http://svo2.cab.inta-csic.es/svo/theory/fps/

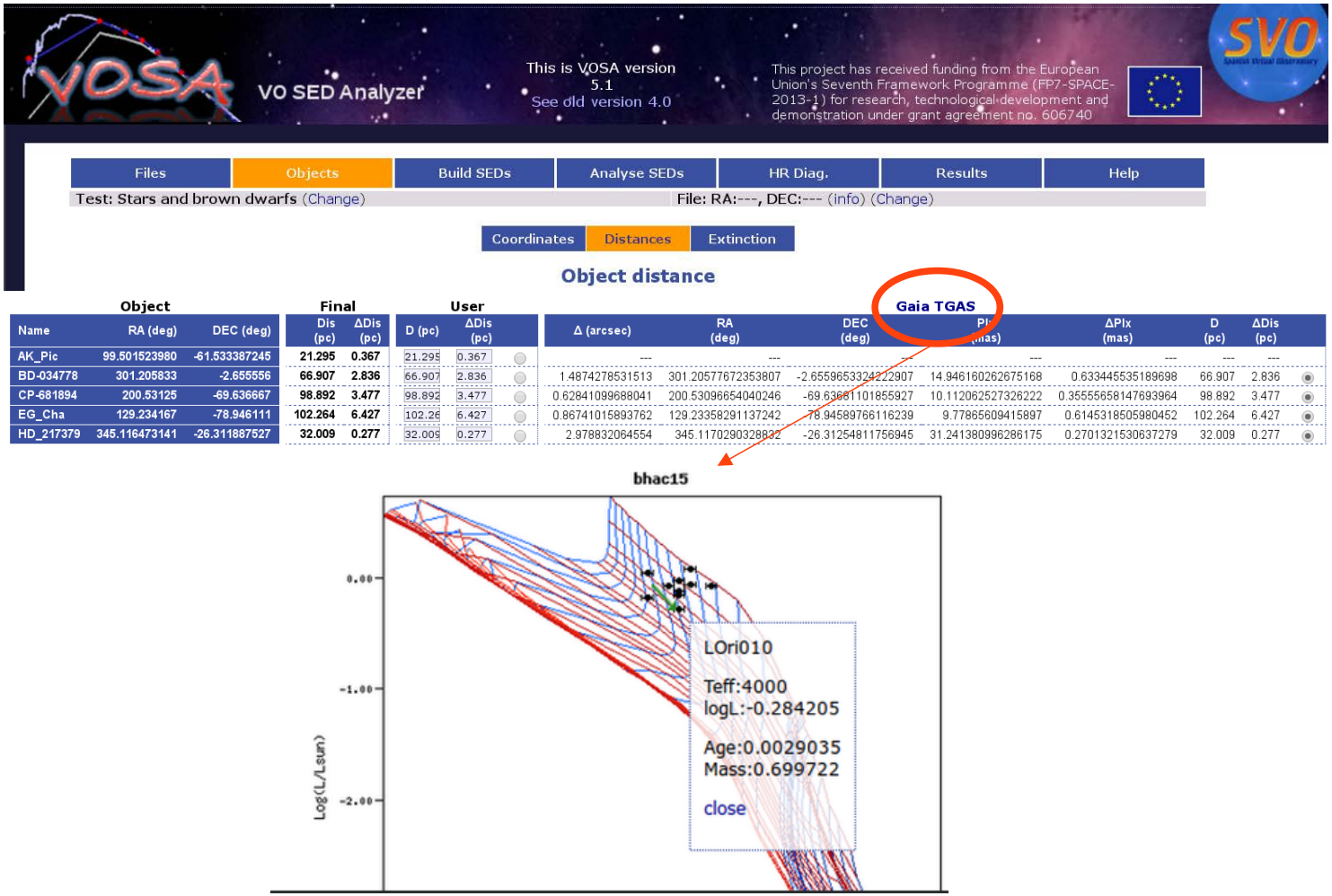
VOSA takes advantage of the Filter Profile Service to get the needed information (i.e. zeropoints and other filter properties to, for instance, estimate flux overlapping).

Photometric systems described following the VO Photometric Data Model.



VOSA and Genius

Phys. parameter determination: TGAS distances available from VOSA to estimate bolometric luminosities.

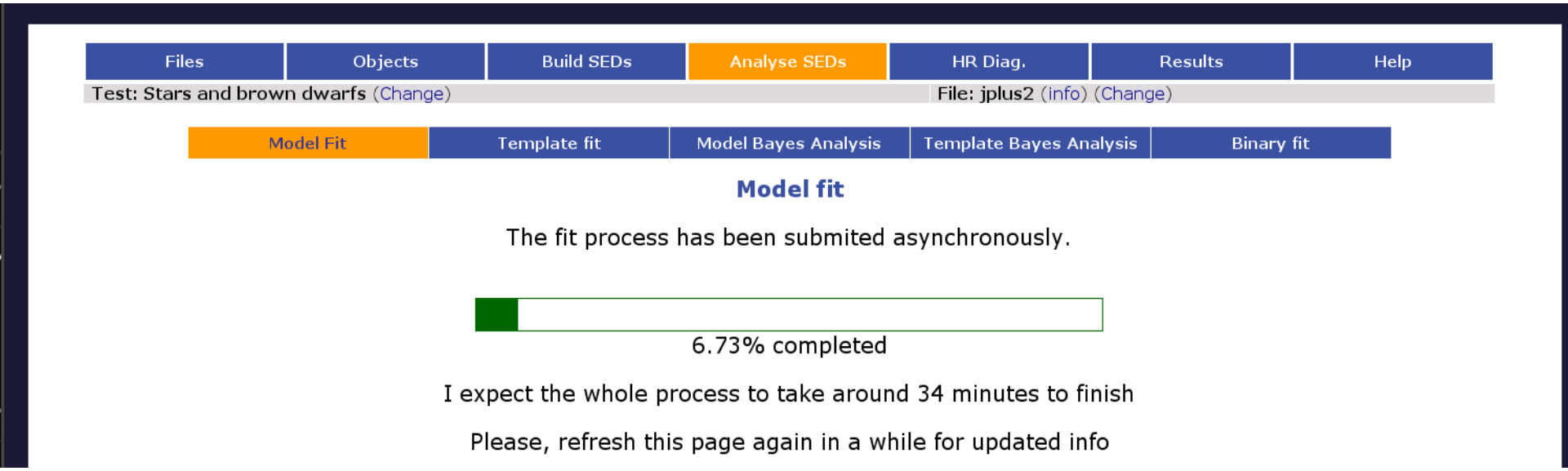


VOSA and Genius

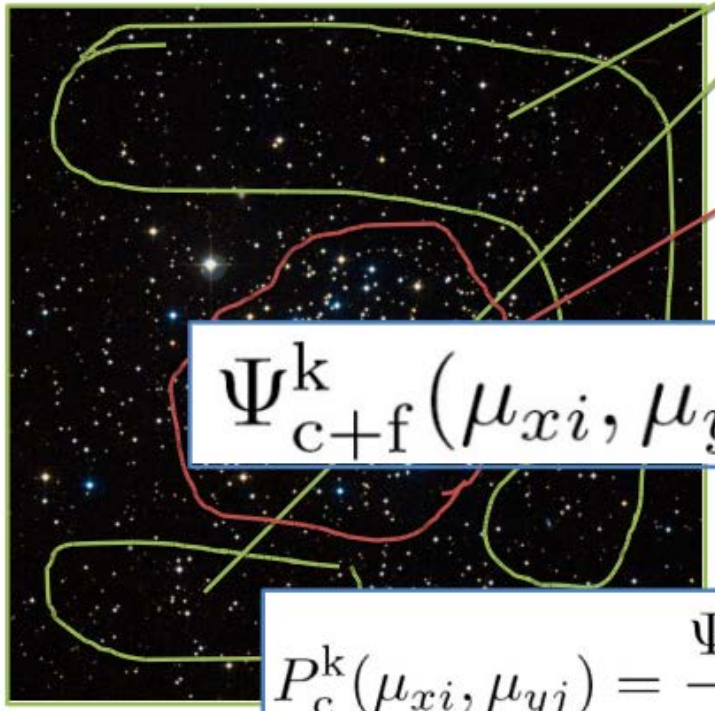
New architecture to scale VOSA to Big Data:

- Distributed environment.
- Parallelized computing.
- Asynchronous jobs.
- Front-end redesigned

VOSA is now able to handle files with thousands of objects.



Non parametric method



$$\Psi^{\mathrm{k}}_{\mathrm{f}}(\mu_{xi},\mu_{yj})$$

$$\Psi^{\mathrm{k}}_{\mathrm{c+f}}(\mu_{xi},\mu_{yj})$$

$$\Psi^{\mathrm{k}}_{\mathrm{c+f}}(\mu_{xi},\mu_{yj}) - \Psi^{\mathrm{k}}_{\mathrm{f}}(\mu_{xi},\mu_{yj})$$

$$P^{\mathrm{k}}_{\mathrm{c}}(\mu_{xi},\mu_{yj}) = \frac{\Psi^{\mathrm{k}}_{\mathrm{c+f}}(\mu_{xi},\mu_{yj}) - \Psi^{\mathrm{k}}_{\mathrm{f}}(\mu_{xi},\mu_{yj})}{\Psi^{\mathrm{k}}_{\mathrm{c+f}}(\mu_{xi},\mu_{yj})}$$

Galadí-Enríquez D., Jordi C., Tullols E, A&A 337, 125-140 (1998)

Clusterix 2.0

***Clusterix** 2.0 is an interactive web-based application to calculate the grouping probability of a list of objects using proper motions and the non parametric method described in Galadí-Enríquez et al. 1998. It also allows the possibility of gathering physical parameters (parallaxes, radial velocities, proper motions,...) from Vizier and estimating effective temperatures, surface gravities and metallicities using VOSA.*

Step 1/3: Information gathering (coordinates and physical parameters)

Search by Id

Usage: ID

Radius arcmin

Catalogue GAIA/DR1

Search by Coordinates

Usage: RAJ2000(deg),DEJ2000(deg)

Radius arcmin

Catalogue GAIA/DR1

Search in Webda

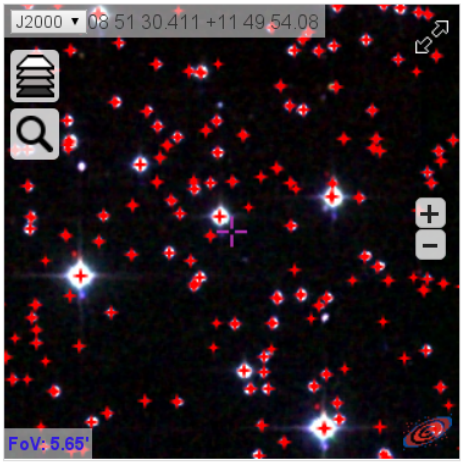
ngc2682

Search

Membership from proper motions

Search by file?

Choose file No file chosen



Clear

A list of 8783 objects has been created

Download

Clusterix 2.0

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Step 1/3: Information gathering (coordinates and physical parameters)

Gather information from VO services

☐ Proper Motion	Radius		arcsec ▾	TGAS ▾
☐ Radial Velocity	Radius		arcsec ▾	Gaia ESO ▾
☐ Parallax	Radius		arcsec ▾	TGAS ▾

☐ VOSA Photometry ?

Clusterix 2.0

Step 2/3: Region selection

Cluster info: ngc2682

Selection of the "cluster" and "field" regions

Area type: Polygon Circle

Cluster (shift):
132.86499075502223,11

Field (ctrl):
132.46894916352724,11

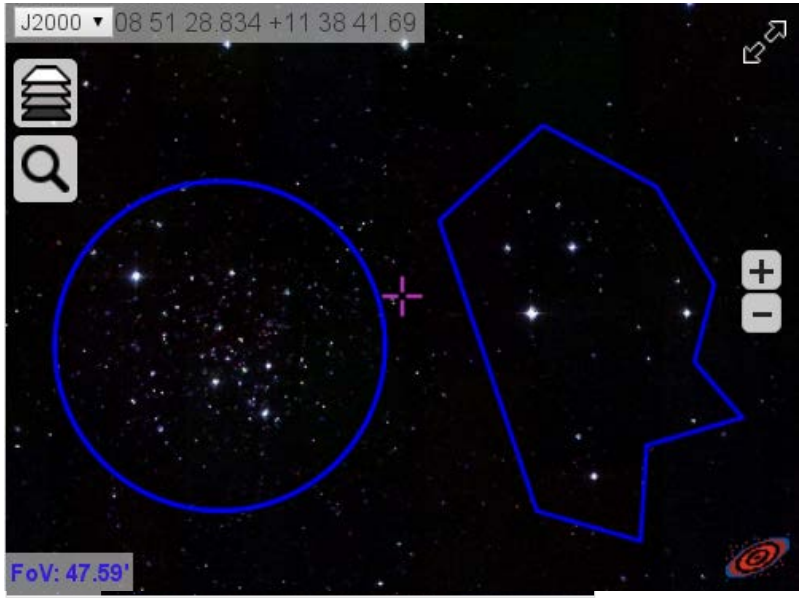
Membership determination parameters

Maximum μ (mas/yr): 15.0

Maximum μ err (mas/yr): 10.0

Smooth param (no unit): 2.273286441 Silverman rule: 2.273286441

γ threshold: 3.0



To draw areas select the area type (poligon or circle) in the radio button and press left-shift key for defining a cluster or left-ctrl key for defining a field.

- Polygons: Keep pressing shift or ctrl and start clicking on the image. After the second point you will see the edges of the polygon. When you are done release shift/ctrl and click on the image. That will close the polygon.
- Circle: Keep pressing shift/ctrl and click in the center of the polygon.
A small blue circle will appear to remember you the center.
Release the shift/ctrl key and click on the desired outer limit/radius of the circle you want to draw. The blue circle will disappear and the final circle will appear.

Step 3/3. Determination of membership probabilities

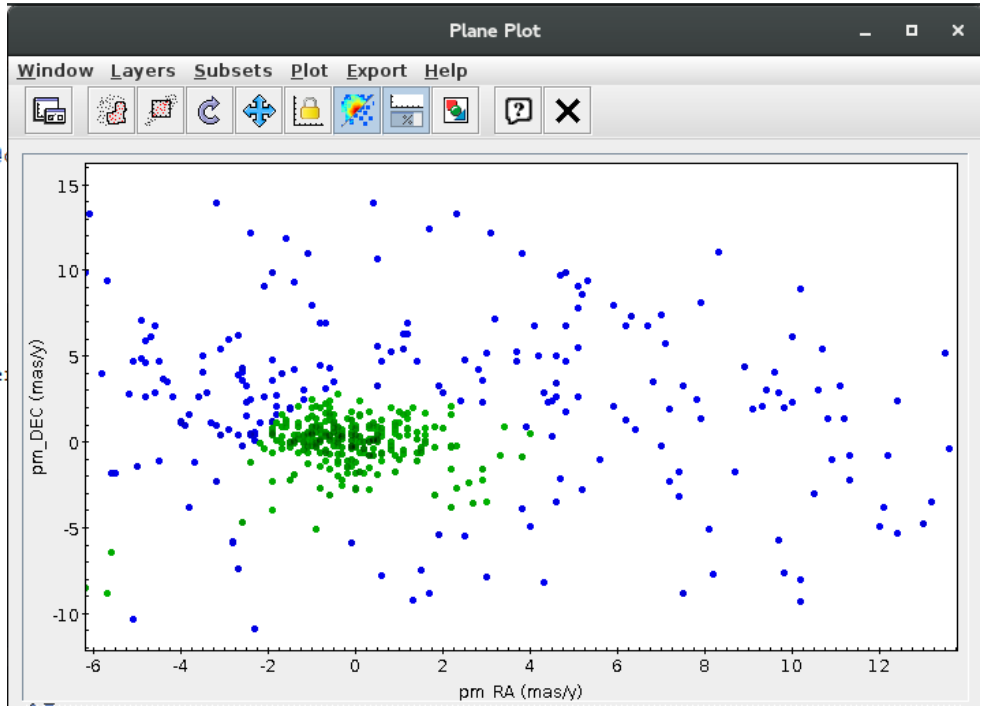
SAMP Save as

Clusterix Results

SAMP

```
#
#   Results were retrieved using Clusterix software
#   http://clusterix.cab.inta-csic.es/
#   In case of problems, please, report to: clusterix_archive_support@
#
#   Labels:
#
#       STAR_NO identificator of star retrieved from the input data
#       RA      right ascension of a star
#       DEC     declination of a star
#       RA_PM   proper motion in alpha
#       DEC_PM  proper motion in delta
#       PROB    probability that star belongs to evaluated open cluste
#
#   Parameters:
#
#       CLUSTER RA: 132.816497803
#       CLUSTER DEC: 11.752399921
#       CLUSTER INNER RADIUS: 20 arcmins
#       CLUSTER OUTER RADIUS: 40.00 arcmins
#       PROPER MOTION CUTOFF: 15.00 mas/yr
#       PROPER MOTION ERR CUTOFF: 10.00 mas/yr
#       SMOOTH PARAMETER: 1.50
#       GAMMA FACTOR: 3.00
#
#       EXPECTED NUMBER OF MEMBERS: 290
#
```

#STAR_NO	RA	DEC	RA_PM	DEC_PM	PROB	FLAG
23	132.714996	11.802800	-6.10	13.30	0.98	T
2152	133.046005	11.530400	-10.60	-3.70	0.98	T
218	132.925995	11.835400	-10.70	-4.20	0.98	T



Future enhancements:

Tangencial velocities instead of proper motions.

Access to Gaia DR2 data.

N-dimensional scenario.

Asynchronous jobs.