

VOSA

A VO Spectral Energy Distribution Analyzer

Big data, massive jobs.
New architecture.

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IVOA interoperability meeting
Sesto, June 2015



VOSA (VO Sed Analyzer)

- A web tool: <http://svo2.cab.inta-csic.es/theory/vosa/>
- Designed to automatically determine physical parameters from comparison of observed photometry with collections of theoretical models.
- For several objects at the same time.
($\sim 1000 \Rightarrow > 10000$ *objects*)
- Using VO services.
 - Coordinates, distances, extinction,
 - Photometry,
 - Theoretical spectra, isochrones, evolutionary tracks (*ConeSearch*, *SSA*, *TAP*).

- 1 **Build object SEDs.**
- 2 **Analyze object SEDs.**
 - Model fit (Chi-square + Bayes analysis)
 - Hertzsprung-Russel diagram.
- 3 **Save results** as VOTable, ASCII, png, eps...
Or send them to other VO tools with **SAMP**.

Build SED's: User Data



Files	Objects	VO Phot.	SED	Chi-2 Fit	Bayes Analysis	HR Diag.	Save Results	Log	Help	Logout
Stars and brown dwarfs (Change)					No file selected (Select/upload a file)					

Upload your own data file (max size=500Kb)

It must comply with the [required data format](#)
(A small utility is available to help you to convert an original file in [ascii \(csv\)](#) or [votable](#) to VOSA input format)

File to upload:
Description:
 Fluxes (erg/cm²/s/A)
 Fluxes (Jy)
 Magnitudes

Create a single object data file

Just write the coordinates (in decimal degrees) of one object that you want to study and we will create a single object data file with the adequate format. RA and DEC are compulsory.

RA: (deg)
DEC: (deg)
Obj.Name:
Description:

Your files

Folder

Photometry tests

Required input file format

The uploaded file must be an ascii document with a line for each photometric point.

Each line should contain 10 columns:

object	RA	DEC	dis	Av	filter	flux	error	pntopts	objopts
...
...

Other tests

Galaxies

Default folder

- 1: a one word text label, without spaces
- 2: the RA, in deg, corresponding to the object
- 3: the DEC, in deg, corresponding to the object
- 4: the distance to the object in parsecs
- 5: the A_v parameter defining the extinction
- 6: a label corresponding to the narrow band filter
- 7: the flux in erg/cm²/s/A, Jy or magnitude. See (7).
- 8: the observed error in the flux (in erg/cm²/s/A) or magnitude. See (8).
- 9: options specific for this photometric point. See (9).
- 10: options specific for this object (they must be repeated in each line corresponding to the same object). See (10).

2957_vosa.dat	largo	2013-09-13 12:18:06	star2	1	Select
obj8.dat	obj8	2013-06-13 17:43:07	star	1	Select

Select
Select
Select
Select

Select
Select
Select
Select

Build SED's: Objects: Properties



Files **Objects** VO Phot. SED Chi-2 Fit Bayes Analysis HR Diag. Save Results Log Help Logout

Stars and brown dwarfs (Change)

File: est prueba (Info) (Change)

Coordinates Distances **Extinction**

Extinction properties

This option allows you to query VO services to search for the

Take a look to the corresponding [Help Section](#) and [Credits](#) for

[See a brief inline help about how using the form](#)

Search in VO catalogues

Search for Extinction properties

Search radius: arcsec
(default: 5')

Add default user values

Rv: , E(B-V): , Av:

Av range: -

Add

Se
Mark

Unmark all: [User](#) [Dias](#) [Rodrigo](#) [Jones](#) [Larson](#) [Savage](#) [Rowan-Robinson](#) [Leflore](#) [Glushkova](#) [Morales](#) [Layden](#)

Save Extinction properties

Object			Final				User				VO Data				
Name	RA (deg)	DEC (deg)	Av	Rv	E(B-V)	Av	Av range	λ (arcsec)	RA (deg)	DEC (deg)	Rv	E(B-V)	Av	Source	
prueba1	53.79	9.64	---	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>								
prueba10	267.025	1.309	1.147	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0	267.025	+1.309	---	0.370	---	Dias+, 2002-2010 (?)	
prueba11	263.102	7.062	0.31	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1.44	263.102	+7.062	---	0.31	---	Kodajeri+, 1992 (?)	
prueba12	264.875	-0.327	0.77	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.9	264.87525	-0.32700	---	0.77	---	Jones+, 2009 (?)	
prueba13	260.488	-3.731	2.356	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	2.1204	260.68823	-03.73154	---	0.76	---	Larson+, 2005 (?)	
prueba14	332.600	18.60	---	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>								
prueba15	340.357	23.847	0.341	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1.44	340.357	+23.847	---	0.11	---	Savage+, 1995 (?)	
prueba16	154.200	-59.52	---	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>								
prueba17	33.439	-3.703	0.50	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	2.1096	033.439579	-03.702900	---	0.50	---	Rowan-Robinson+, 2006 (?)	
prueba18	300.275	27.7535	0.00	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0.2412	300.27504	+27.75356	---	0.00	---	Le Borgne+, 2000 (?)	
prueba2	264.82	3.56	---	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>								
prueba20	312.4692	41.255	2.759	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0	312.4692	+41.2550	---	0.89	---	Glushkova+, 2009 (?)	
			0.5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	4.428	312.471	+41.255	---	0.890	---	Dias+, 2002-2010 (?)	
prueba21	317.508	15.517	0.5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1.696	317.508	+15.517	---	0.100	---	Dias+, 2002-2010 (?)	

- Coordinates, distances, extinction.
- New catalogues and extinction maps.
- New treatment of information.

Build SED's: VO Photometry



VO SED Analyzer

Files Objects **VO Phot.** SED Chi-2 Fit Bayes
Stars Test (Change) File: OTS44 but part of th

VO ph

This option allows you to increase the wavelength cover
catalogues.

Take a look to the corresponding [Help Section](#) and [Credits](#).

- ~ 30 VO catalogues.
- Infrared, optical and ultraviolet.
- AllWISE, Alhambra, VISTA...
- Magnitude/flux ranges.

First select the VO services that you want to use

Mark All Unmark All
Query selected services

Infrared

2MASS All-Sky Point Source Catalog

2MASS has uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with signal-to-noise ratio (SNR) greater than 1. [More Info.](#)

Filters: 2MASS/2MASS.J 2MASS/2MASS.H
2MASS/2MASS.Ks

Search radius: 5 arcsec

You can apply limits so that magnitudes out of the specified range are not shown

Min mag		Max mag
<input type="text"/>	< 2MASS/2MASS.J <	<input type="text"/>
<input type="text"/>	< 2MASS/2MASS.H <	<input type="text"/>
<input type="text"/>	< 2MASS/2MASS.Ks <	<input type="text"/>

[Hide magnitude limits](#)

DENIS Catalogue

This catalogue is the latest incremental release of the DENIS project. It consists of a set of 355,220,325 point sources detected by the DENIS survey in 3662 strips (covering each 30 degrees in declination and 12 arcmin in right ascension). [More Info.](#)

Filters: DENIS/DENIS.I DENIS/DENIS.J
DENIS/DENIS.Ks

Search radius: 5 arcsec

[Show magnitude limits](#)

IRAS Catalog of Point Sources, Version 2.0

This is a catalog of some 250,000 well-confirmed infrared point sources observed by the Infrared Astronomical Satellite. i.e.,

MSX6C Infrared Point Source Catalog

Version 2.3 of the Midcourse Space Experiment (MSX) Point Source Catalog (PSC), which supersedes the version (1.2) that

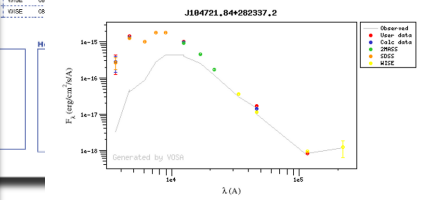
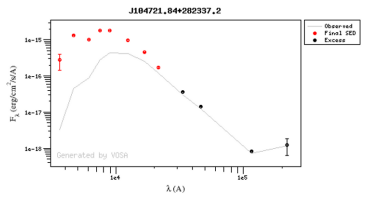
Build SED's: visualize, edit, improve

VO theoretical services Documents Tools Services

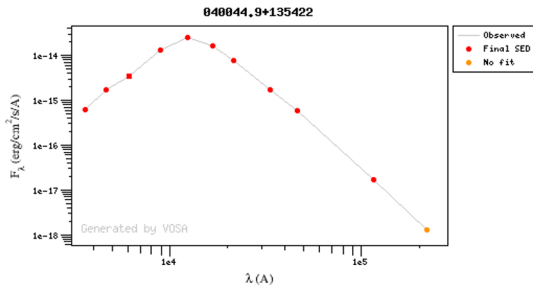
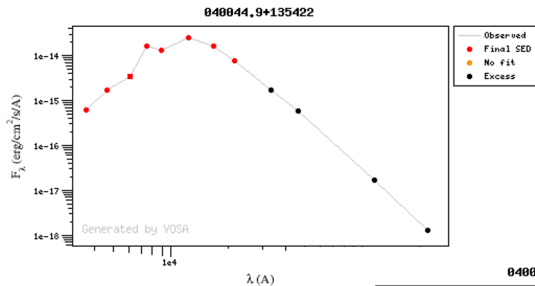


File	Objects	VO Phil.	SED	Chi-2 Fit	Basic Analysis	Fit				
Stars Test [Change]						File: J104721.info [Change]				
Object data										
LO#001 Position: (93.446583,9.9273611) Distance: 409. pc A_V : 0.36209599 Data for this object:										
Filter	beam	Flux _{int} JF	Flux _{int} JF	In SED	Infl	Unmod	Ref	Delta	Source	SA (ID)
SLDAN/SDSS-I	0122.33	1.390e-14	2.50e-15	1.390e-14	2.445e-15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CNO-14	053.448721
CRHT/CRHT-B	0101.87	1.390e-14	0.000e+00	1.430e-14	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
CRHT/CRHT-B	0101.87	1.390e-14	0.000e+00	1.430e-14	0.000e+00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
JMAGS/JMAGS-J	1229.00	0.470e-15	1.920e-15	1.030e-14	2.120e-15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
JMAGS/JMAGS-J	1229.00	0.470e-15	1.920e-15	1.030e-14	2.120e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	JMAGS	053.448721
JMAGS/JMAGS-M	1603.00	0.470e-15	1.920e-15	1.030e-14	1.410e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
JMAGS/JMAGS-H	1603.00	0.470e-15	1.920e-15	1.030e-14	1.410e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
JMAGS/JMAGS-H	1603.00	0.470e-15	1.920e-15	1.030e-14	1.410e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	JMAGS	053.448721
JMAGS/JMAGS-Ks	2190.00	2.890e-15	5.50e-17	3.010e-15	5.830e-17	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
JMAGS/JMAGS-Ks	2190.00	2.890e-15	5.50e-17	3.010e-15	5.830e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
JMAGS/JMAGS-Ks	2190.00	2.890e-15	5.50e-17	3.010e-15	5.830e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	JMAGS	053.448721
WISE/WISE-W1	2000.00	0.150e-14	1.241e-15	0.150e-14	1.241e-15	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
WISE/WISE-W1	2000.00	0.150e-14	1.241e-15	0.150e-14	1.241e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
WISE/WISE-W1	2000.00	0.150e-14	1.241e-15	0.150e-14	1.241e-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	WISE	053.448721
WISE/WISE-W2	4403.78	2.100e-16	7.940e-19	2.100e-16	8.080e-19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
WISE/WISE-W2	4403.78	2.100e-16	7.940e-19	2.100e-16	8.080e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
WISE/WISE-W2	4403.78	2.100e-16	7.940e-19	2.100e-16	8.080e-19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	WISE	053.448721
WISE/WISE-W3	9693.02	0.800e-17	7.430e-17	0.800e-17	7.430e-17	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	User	
WISE/WISE-W3	9693.02	0.800e-17	7.430e-17	0.800e-17	7.430e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gal (I)	
WISE/WISE-W3	9693.02	0.800e-17	7.430e-17	0.800e-17	7.430e-17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	WISE	053.448721

- Handle multiple data corresponding to the same filter (from different catalogs or/and user input).
- Information available in the VO catalog about observation date, object name, quality, etc.
- See the origin of each SED point.
- Exclude points with infrared or ultraviolet excess.
- Decide what data goes to the final SED.
- Excess detection/modification.



Improved automatic detection of infrared excess



Analyze SED's: Model fit.



VO SED Analyzer

Files Objects VO Phot. SED Chi-2 Fit Bayes
Stars Test (Change) File: no

Model Fit

Model

This option allows you to estimate some physical properties (such as temperature, luminosity, etc.) of an object comparing its SED with those derived from theoretical spectra.

Take a look to the corresponding [Help Section](#) and [Credits Page](#) for more information.

First select the models that you want to use:

Mark All

Next: Select r...

AMES-Dusty 2000
The AMES-Dusty Model grid of theoretical spectra

Kurucz ODFNEW /NOVER models
ATLAS9 Kurucz ODFNEW /NOVER models. Newly computed ODFs with better opacities and better abundances have been used.

BT-Settl
The BT-Settl Model grid of theoretical spectra; With a cloud model, valid across the entire parameter range.

BT-DUSTY
The BT-DUSTY Model grid of theoretical spectra.

BT-NextGen (GNS93)
The NextGen Model grid of theoretical spectra; Gas phase only, valid for $T_{\text{eff}} > 2700$ K. Updated opacities.

GRAMS G-rich grid

- 14 collections of theoretical models (+5 for galaxies)
- New: CIFIST, BlackBody...
- Choose ranges of parameters.
- Get best fit values: T_{eff} , $\log g$, metallicity, luminosity, etc.
- Extinction as an additional fit parameter.
- Two methods: chi-square and Bayes analysis.

AMES-Cond 2000
The AMES-Cond Model grid of theoretical spectra.

Husfeld et al models for non-LTE Helium-rich stars
Husfeld et al models for non-LTE Helium-rich stars

BT-COND
The BT-COND Model grid of theoretical spectra.

BT-NextGen (AGSS2009)
The NextGen Model grid of theoretical spectra; Gas phase only, valid for $T_{\text{eff}} > 2700$ K. Updated opacities.

Black Body flux
Black Body flux as calculated in the BT-NextGen model.

GRAMS G-rich original grid

Analyze SED's: Model fit.



VO SED Analyzer

Files	Objects	VO Phot.	SED	Obj. ID	Bayes Analysis	HR Diag.	Save Results	Log	Help	Logout
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Stars Test (change)

File: bbbbbb [obj] (change)

Model fit | Template fit

Model fit+

Best fit

LOr1001

LOr1002

LOr1003

LOr1004

LOr1005

LOr1006

LOr1007

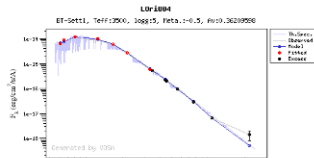
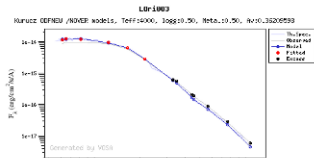
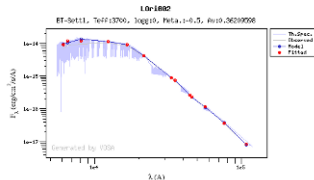
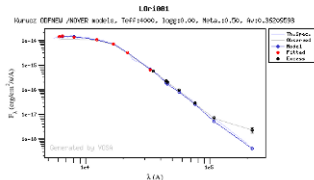
LOr1008

LOr1009

LOr1010

Best fit+ results

Object	RA	DEC	D (pc)	Model	T _{eff}	logg	M _{bol}	more	χ^2	M ₀	F ₀₁	ΔF_{01}	F _{001/F₀₁}	L _{star/L_{sun}}	$\Delta L_{star/Lsun$	R _{star/R_{sun}}	$\Delta R_{star/Rsun$	ΔT_{eff}	$\Delta \log g$	ΔM_{bol}	R _{star/R_{sun}}	Date	Volatile
LOr1001	83.446583	9.927301	400.000	Kurucz	4000	0.00	0.93	—	4.421e+0	1.238e-20	1.780e-10	1.885e-12	0.53	8.922e-1	0.309e-3	33205	0.3020998	125	0.25	0.15	7/14	Syn Spec.	
LOr1002	84.043167	10.148693	400.000	BT-Settl	3700	0	-0.5	alpha 0.2	1.921e-1	2.848e-20	1.600e-10	2.488e-12	0.54	9.621e-1	1.241e-2	119008	0.3020998	50	0.25	0.25	13/13	Syn Spec.	
LOr1003	83.961007	9.942833	400.000	Kurucz	4000	0.20	0.93	—	4.485e+0	1.056e-20	1.987e-10	1.485e-12	0.50	7.915e-1	7.423e-3	21500	0.3020998	125	0.25	0.15	6/13	Syn Spec.	
LOr1004	83.948125	9.766278	400.000	BT-Settl	3500	5	-0.5	alpha 0.2	3.047e+1	1.789e-20	1.520e-10	1.449e-12	0.50	7.591e-1	7.209e-3	33205	0.3020998	50	0.25	0.25	7/14	Syn Spec.	
LOr1005	83.473542	9.738889	400.000	BT-Settl	3500	1	0	alpha 0	6.641e+0	1.976e-20	1.721e-10	2.773e-12	0.54	8.544e-1	1.382e-2	119008	0.3020998	50	0.25	0.2	13/14	Syn Spec.	
LOr1006	83.817750	9.927311	400.000	Kurucz	4000	0.20	0.93	—	2.049e+0	9.705e-21	1.417e-10	1.453e-12	0.48	7.995e-1	7.348e-3	33205	0.3020998	125	0.25	0.15	6/13	Syn Spec.	
LOr1007	83.921125	9.816299	400.000	Kurucz	3600	0.00	-1.81	—	2.776e+0	1.338e-20	1.204e-10	1.180e-12	0.50	8.021e-1	9.280e-3	21500	0.3020998	125	0.25	0.25	6/14	Syn Spec.	
LOr1008	83.901542	9.909811	400.000	BT-Settl	3500	2.5	-2	alpha 0.4	4.238e+1	1.017e-20	1.416e-10	1.567e-12	0.48	7.025e-1	2.788e-2	21500	0.3020998	50	0.25	0.25	6/13	Syn Spec.	
LOr1009	83.909893	10.106691	400.000	BT-Settl	4100	-0.1	-2.5	alpha 0.4	5.970e+0	1.950e-20	1.915e-10	2.945e-12	0.55	8.745e-1	1.029e-2	119008	0.3020998	50	0.25	0.25	13/13	Syn Spec.	
LOr1010	83.637333	10.144750	400.000	BT-Settl	4100	-0.1	-2.5	alpha 0.4	2.152e+1	1.467e-20	1.900e-10	1.178e-12	0.50	8.436e-1	5.873e-3	75901	0.3020998	50	0.25	0.25	13/14	Syn Spec.	



Analyze SED's: HR diagram.



VO SED Analyzer

Files	Objects	VO Phot.	SED	Chi-2 Fit	Bayes Analysis	HR Diag.	Save Results	Log	Help	Logout
Stars Test (Change)		File: bbbbbb (Info) (Change)								

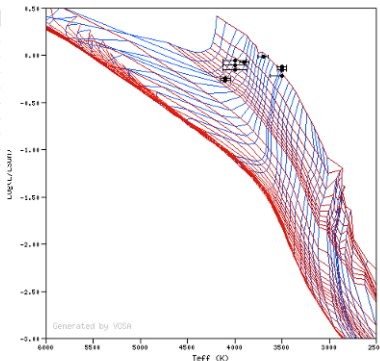
HR Diagram

Delete this HR Diagram

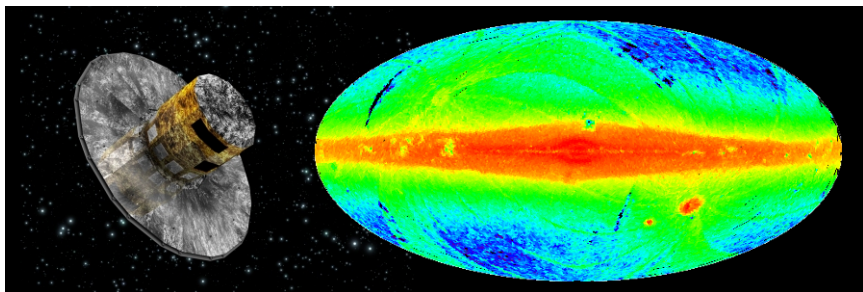
Objects

Object	Model	T _{eff}	LogL	Age	Mass
L Ori001	siess	4000	-0.0496	0.0018	0.6992
L Ori002	BT-Settl	3700	-0.0168	0.0011	0.8333
L Ori003	siess	4000	-0.1015	0.0019	0.7000
L Ori004	BT-Settl	3500	-0.1203	—	[4] — [4]
L Ori005	BT-Settl	3900	-0.0863	0.0029	1.0515
L Ori006	siess	4000	-0.1509	0.0020	0.7000
L Ori007	siess	3500	-0.2199	0.0009	0.3700
L Ori008	BT-Settl	3500	-0.1527	—	[4] — [4]
L Ori009	BT-Settl	4100	-0.2411	0.0079	1.1052
L Ori010	BT-Settl	4100	-0.2847	0.0081	1.1000

[4] The point lies outside the area covered by the isochrones



- There is an increasing need in astronomy of analyzing big data samples containing thousands of objects.
 - SDSS, UKIDSS, VISTA... and in the near future, GAIA.



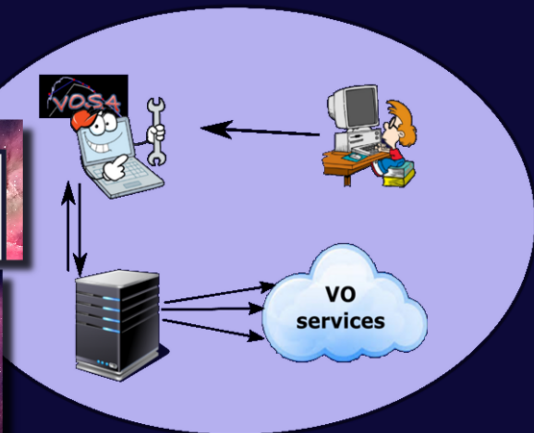
VOSA 5.0 is the response of the Spanish VO to the big data challenge (in particular, GAIA).

- Able to handle files with **tens of thousands** of objects.
- New architecture
 - **Asynchronous**/batch jobs.
 - **Distributed network** with more CPU capabilities.
 - **Parallelized** computing.
 - Much faster (and unattended) operations.
Model fit for 1000 objects → ~ 10 minutes.
- Re-design of VOSA front-end
 - Option to **cancel** long processes.
 - Progress visualization.
 - Web pagination of results.

VOSA 5.0

The image displays three screenshots of the VOSA VO SED-analyzer web interface, illustrating the workflow from initial setup to data analysis.

- Top Screenshot:** Shows the initial configuration page. It includes a navigation menu (Home, Reports, User Profile, Help) and a "Model File" section with instructions: "This option allows you to provide your profile description (such as model or data models) in a text file and generate the SEDs with them. You can select the model objects to generate the SEDs. You also select the corresponding VOSA Sectors and Objects from the corresponding Sector."
- Middle Screenshot:** Shows the "Model File" page with a progress bar indicating "70.52% completed". A message states: "The fit process has been submitted successfully. I expect the whole process to take around 7 minutes to finish. Please, check this page again in a while for updated info."
- Bottom Screenshot:** Shows the "Fit Results" page, which displays a detailed table of fit parameters and a list of model objects. The table includes columns for Name, Type, Value, and various fit parameters.



Improved, asynchronous, parallelized:



Object properties in VO catalogs.



VO photometry.



Model fit.



Bayes analysis.



HR diagram.

Expected to be ready, tested and public before next interop.

- Available since 2007.
- Being used
 - More than 300 users analysing data (last year).
 - More than 200.000 objects studied (last year).
- Useful for science
 - More than 60 papers published using VOSA.
 - For different science cases.

A&A 492, 277-287 (2008)
DOI: 10.1051/0004-6361/200810395

VOSA: virtual observatory SED analyzer

An application to the Collinder 69 open cluster

A. Bayo^{1,2}, C. Rodrigo Allard³

The first planet detected in the WTS: an inflated hot Jupiter in a 3.35 d orbit around a late F star

M. Cappetta^{1,2}, R. P. Saglia^{1,2}, J. L. Birkby^{1,2}, J. Koppenhoefer^{1,2}, D. J. Pinfield³, P. Cruz⁴, G. Kovács⁵, B. Sipőcz⁶, D. Barrado^{6,7}, B. Nefs⁸, Y. V. Pavlenko⁹, L. C. del Burgo^{10,11,12}, E. L. Martín¹³, I. Snellen¹⁴, J. Barnes¹⁵, A. Bayo¹⁶, D. A. C. M. C. Gálvez-Ortiz¹², N. Goulding³, C. Heavel³, O. Ivanyuk¹⁷, H. R. Jones¹⁸, N. Lodieu¹, F. Marocco¹⁹, D. Molis²⁰, F. Murgas^{15,18}, R. Napiwotzki⁶, E. Pallé¹¹, F. Acetuno²¹, L. Sarro Baro¹², E. Solano²², P. Steele³, H. Stoev³, R. Tata^{15,16} and J. Zendejas

A&A 560, A92 (2013)

Searching for transits in the Wide Field Camera Transit Survey with difference-imaging light curves

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The Seven Sisters DANCE

I. Empirical isochrones, luminosity, and mass functions of the Pleiades cluster^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100}

H. Bouy¹, E. Bertin², L. M. Sarro³, D. Barrado³, E. Moraux⁴, J. Bouvie⁵ and Y. Beletsky⁷ A&A 574, A57 (2015)

The Astrophysical Journal Supplement Series > Volume 216 > Number 2

A GALEX-based Search for the Sparse Young Taurus-Aurigae Star Forming Region

Ana I. Gómez de Castro¹, Javier Lopez-Santiago¹, Fatima López-Martínez¹, Néstor Sánchez¹, Paolo Manzi², and Javier Yañez Gestoso¹ A&A 556, A116 (2013)

A&A 566, A103 (2014)

High-resolution imaging of *Kepler* planet host candidate A comprehensive comparison of different techniques

J. Lillo-Box, D. Barrado and H. Bouy

HD 85567: A Herbig B[e] star or an interacting B[e] binary?

Resolving HD 85567's circumstellar environment with the VLTI and AMBER^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100}

H. E. Wheelwright, G. Weigelt, A. ... A&A 541, A38 (2012)

Warm debris disks candidates in transiting planets systems

A. Ribas¹, B. Merín¹, D. R. Ardila² and H. Bouy³

Fundamental parameters of the close interacting binary HD 170582 and its luminous accretion disc

R. E. Mennickent^{1,4}, G. Djurasević⁵, M. Cabezas⁶, A. Calki⁷, J. G. Rosales⁸, E. Niemczura⁹, I. Araya⁴ and M. Curi⁴

A&A 556, A144 (2013)

Proper motions of young stars in Chamaeleon II. New kinematical candidate members of Chamaeleon I and II

Belen López Martí¹, Francisco Jiménez-Esteban^{1,2,3}, Amelía Bayo^{4,5}, David Barrado^{1,6}, Enrique Solano^{1,2}, Hervé Bouy⁷ and Carlos Rodríguez^{1,2}

Age determination of the HR8799 planetary system using asteroseismology

A. Moya^{1,2}, P. J. Amado², D. Barrado^{1,3}, A. García Hernández², M. Aberasturi¹, B. Montesinos² and A&A 554, A20 (2013)

A Virtual Observatory Census to Address Dwarfs Origins (AVOCADO)

I. Science goals, sample selection, and analysis tools

R. Sánchez-Janssen¹, R. Amorín², M. García-Vargaa³, J. M. Gomes⁴, M. Huertas-Company⁵, F. Jiménez-Esteban^{6,7,8}, M. Mollá⁹, P. Papaderos⁴, E. Pérez-Montero², C. Rodríguez^{6,7}, J. Sánchez Almeida^{10,11} and E. Solano^{6,7}

The CoRoT chemical peculiar target star HD 49310*

W. W. Weiss¹ and T. Löffinger¹

THANK YOU!