VOSA

A VO Spectral Energy Distribution Analyzer. New features.

Carlos Rodrigo Blanco[1,2]
Amelia Bayo Arán[3]
Enrique Solano[1,2]

[1]CAB,INTA-CSIC
[2]Spanish Virtual Observatory
[3]Instituto de Física y Astronomía, Universidad de Valparaíso

IVOA Interoperability Meeting.
Trieste, October 2016

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. *(∼ 10.000 objects)*
- Using VO services.
  - Coordinates, distances, extinction,
  - Photometry,
  - Theoretical spectra, isochrones, evolutionary tracks.
- Since 2007.
  - v5.1: October 2016
  - v5.0: September 2015
  - ...

VOSA Workflow

1. **Build object SEDs.**
   - User photometry + data from VO catalogues.
   - Object properties (from VO catalogues).
   - Infrared excess estimation.

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**.

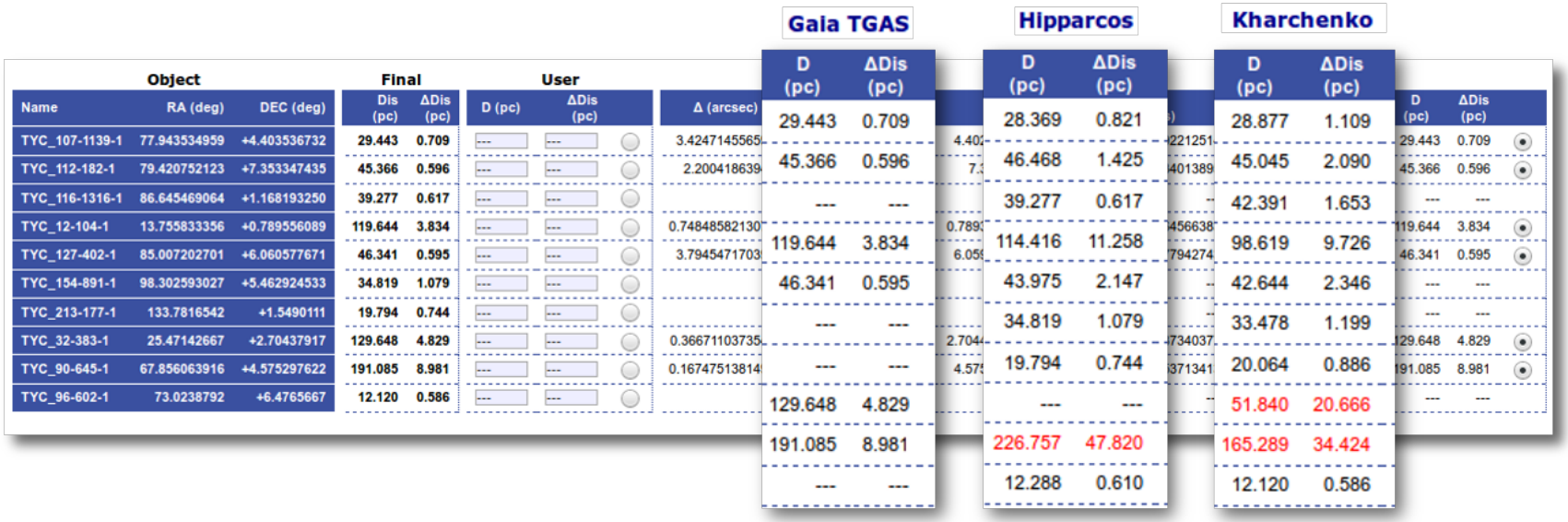
Object properties

- Distance.
  - Important to calculate Luminosities, radius, masses.
  - 3 VO catalogues.
  - New: Gaia TGAS

Object			Final		User			Gaia TGAS							
Name	RA (deg)	DEC (deg)	Dis (pc)	ΔDis (pc)	D (pc)	ΔDis (pc)		Δ (arcsec)	RA (deg)	DEC (deg)	Plx (mas)	ΔPlx (mas)	D (pc)	ΔDis (pc)	
TYC_107-1139-1	77.943534959	+4.403536732	29.443	0.709	---	---	○	3.4247145565951	77.94429665685281	4.402963821417519	33.96425292212514	0.8178882762457748	29.443	0.709	◉
TYC_112-182-1	79.420752123	+7.353347435	45.366	0.596	---	---	○	2.200418639441	79.42074844530981	7.3527362184493	22.042987734013895	0.2895643229033857	45.366	0.596	◉
TYC_116-1316-1	86.645469064	+1.168193250	39.277	0.617	---	---	○	---	---	---	---	---	---	---	
TYC_12-104-1	13.755833356	+0.789556089	119.644	3.834	---	---	○	0.74848582130788	13.755810345556045	0.7893494504201628	8.358107564566383	0.26784724688896766	119.644	3.834	◉
TYC_127-402-1	85.007202701	+6.060577671	46.341	0.595	---	---	○	3.7945471703909	85.00742027307332	6.059546073662654	21.579388777942743	0.27704155589672796	46.341	0.595	◉
TYC_154-891-1	98.302593027	+5.462924533	34.819	1.079	---	---	○	---	---	---	---	---	---	---	
TYC_213-177-1	133.7816542	+1.5490111	19.794	0.744	---	---	○	---	---	---	---	---	---	---	
TYC_32-383-1	25.47142667	+2.70437917	129.648	4.829	---	---	○	0.36671103735481	25.47152087272109	2.7044181745036484	7.713210387340377	0.2872650430209961	129.648	4.829	◉
TYC_90-645-1	67.856063916	+4.575297622	191.085	8.981	---	---	○	0.16747513814954	67.85606408948135	4.575251098309146	5.233260353713413	0.24595335514656652	191.085	8.981	◉
TYC_96-602-1	73.0238792	+6.4765667	12.120	0.586	---	---	○	---	---	---	---	---	---	---	

Object properties

- Distance.
  - Important to calculate Luminosities, radius, masses.
  - 3 VO catalogues.
  - New: Gaia TGAS



Object			Final		User			Gaia TGAS		Hipparcos		Kharchenko			
Name	RA (deg)	DEC (deg)	Dis (pc)	ΔDis (pc)	D (pc)	ΔDis (pc)	Δ (arcsec)	D (pc)	ΔDis (pc)	D (pc)	ΔDis (pc)	D (pc)	ΔDis (pc)	D (pc)	ΔDis (pc)
TYC_107-1139-1	77.943534959	+4.403536732	29.443	0.709	---	---	3.4247145565	29.443	0.709	28.369	0.821	28.877	1.109	29.443	0.709
TYC_112-182-1	79.420752123	+7.353347435	45.366	0.596	---	---	2.200418639	45.366	0.596	46.468	1.425	45.045	2.090	45.366	0.596
TYC_116-1316-1	86.645469064	+1.168193250	39.277	0.617	---	---		---	---	39.277	0.617	42.391	1.653	---	---
TYC_12-104-1	13.755833356	+0.789556089	119.644	3.834	---	---	0.74848582130	119.644	3.834	114.416	11.258	98.619	9.726	119.644	3.834
TYC_127-402-1	85.007202701	+6.060577671	46.341	0.595	---	---	3.7945471703	46.341	0.595	43.975	2.147	42.644	2.346	46.341	0.595
TYC_154-891-1	98.302593027	+5.462924533	34.819	1.079	---	---		---	---	34.819	1.079	33.478	1.199	---	---
TYC_213-177-1	133.7816542	+1.5490111	19.794	0.744	---	---		---	---	19.794	0.744	20.064	0.886	129.648	4.829
TYC_32-383-1	25.47142667	+2.70437917	129.648	4.829	---	---	0.36671103735	129.648	4.829	---	---	51.840	20.666	191.085	8.981
TYC_90-645-1	67.856063916	+4.575297622	191.085	8.981	---	---	0.16747513814	191.085	8.981	226.757	47.820	165.289	34.424	---	---
TYC_96-602-1	73.0238792	+6.4765667	12.120	0.586	---	---		---	---	12.288	0.610	12.120	0.586		

Object properties

- Distance.
  - Important to calculate Luminosities, radius, masses.
  - 3 VO catalogues.
  - New: Gaia TGAS
- Extinction.
  - Important to deredden observed SED.
  - 15 VO catalogues / extincion maps.
  - New: Footprints (using MOCs)

First select what VO services you want to search for extinction properties.

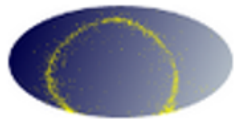
Mark All | Unmark All

Search

UBV Photometry of O & B Stars in Vela (Denoyelle 1977)

The Spatial Distribution of Young Stars in Vela
Info in catalogue: E(B-V)
More info
Search radius: 5 arcsec

Optically visible open clusters and Candidates (Dias+ 2002-2010)

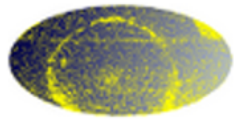


New catalog of optically visible open clusters and candidates (V3.0)
Info in catalogue: E(B-V)
More info
Search radius: 5 arcsec

SAI Open Clusters Catalog (Glushkova+, 2009)

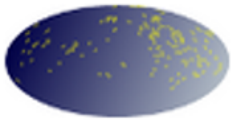
Automated search for star clusters in large multiband surveys. II. Discovery and investigation of open clusters in the Galactic plane
Info in catalogue: E(B-V)
More info
Search radius: 5 arcsec

Guarinos, 1992



Interstellar matter in the Galactic Disk (Guarinos J., 1992)
Info in catalogue: A_V
More info
Search radius: 5 arcsec

Stellar Spectrophotometric Atlas

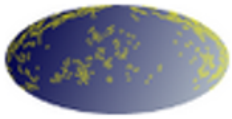


Stellar Spectrophotometric Atlas
Info in catalogue: A_V
More info
Search radius: 5 arcsec

6dF galaxy survey final redshift release (Jones+, 2009)

6dF galaxy survey final redshift release (Jones+, 2009)
Info in catalogue: A_V
More info
Search radius: 5 arcsec

Photometric Catalog of Northern Bright Galaxies (Kodaira+ 1992)



Photometric Catalog of Northern Bright Galaxies
Info in catalogue: A_V
More info
Search radius: 5 arcsec

Reddening and extinction at high galactic latitude (Larson+, 2005)

Reddening and the extinction law at high galactic latitude.
Info in catalogue: E(B-V)
More info
Search radius: 5 arcsec

RR Lyrae Metallicities (Layden 1994)

RR Lyrae data II. The Metallicities and

STELIB: A library of stellar spectra at R~2000 (Le Borgne+, 2003)

Build SED's: VO Photometry

VO SED Analyzer

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

Stars Test (Change) **File: OTS44 but part of the spec** (info) (Change)

VO photometry

This option allows you to increase the wavelength coverage of the SED
catalogues.

Take a look to the corresponding Help Section and Credits Page for mor

First select the VO services that yo

Mark All | Unmark All

Query selected services

- 33 VO catalogues.
- Infrared, optical and ultraviolet.
- New: Gaia, Stromgren, IPHAS DR2, APASS DR9

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
	<	2MASS/2MASS.J <	
	<	2MASS/2MASS.H <	
	<	2MASS/2MASS.Ks <	

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 SED Analyzer

- Handle multiple data for the same filter.
- Observation date, quality, etc.
- See the origin of each SED point.
- Exclude points with infrared or ultraviolet excess.
- Excess detection/modification.
- Upper limits.

Files | Objects | VO Phot. | SED | Chi-2 Fit | Bayes Analysis | HR Diag.

Stars and brown dwarfs (Change) **File: lori03**

Object data

See object: LOri038 excess See al

LOri038

Position: (83.458167,9.8436944) Distance: 400. p

Data for this object:

		Observed		Dereddened		Point Opts				Actions								
Filter	λ_{med}	Obs.Flux	ΔObs.Flux	Flux	ΔFlux	In SED	NoFit	Uplim	Bad	Ignore	Delete	Source	RA (VO)	DEC				
Misc/APASS.B	4297.17	5.581e-16	0.000e+00	8.703e-16	0.000e+00	✓						APASS	083.457990	+09.843840	0.0002271856218816	---	1	---	---	---
Misc/APASS.sdss_g	4640.42	9.866e-16	0.000e+00	1.487e-15	0.000e+00	✓						APASS	083.457990	+09.843840	0.0002271856218816	---	1	---	---	---
Misc/APASS.V	5394.29	1.463e-15	0.000e+00	2.062e-15	0.000e+00	✓						APASS	083.457990	+09.843840	0.0002271856218816	---	1	---	---	---
Misc/APASS.sdss_r	6122.33	1.919e-15	0.000e+00	2.580e-15	0.000e+00	✓						APASS	083.457990	+09.843840	0.0002271856218816	---	1	---	---	---
CFHT/CFHT.R	6515.87	1.910e-15	8.795e-16	2.507e-15	1.155e-15	✓						User								---
Misc/APASS.sdss_i	7439.49	2.639e-15	6.561e-17	3.305e-15	8.218e-17	✓						APASS	083.457990	+09.843840	0.0002271856218816	---	1	---	---	---
CFHT/CFHT.I	8090.45	2.723e-15	1.505e-15	3.323e-15	1.836e-15	✓						User								---
2MASS/2MASS.J	12350.00	2.641e-15	7.298e-17	2.927e-15	8.089e-17	✓						2MASS	083.458023	+09.843550	0.00020243979579469	0.0010513632283038	2	05334992+0950367	2000-01-10	[A]
2MASS/2MASS.J	12350.00	2.641e-15	7.298e-17	2.927e-15	8.089e-17					✓		User								---
2MASS/2MASS.H	16620.00	1.873e-15	5.004e-17	1.999e-15	5.339e-17	✓						2MASS	083.458023	+09.843550	0.00020243979579469	0.0010513632283038	2	05334992+0950367	2000-01-10	[A]
2MASS/2MASS.H	16620.00	1.873e-15	5.004e-17	1.999e-15	5.339e-17					✓		User								---
2MASS/2MASS.Ks	21590.00	8.530e-16	0.000e+00	8.895e-16	0.000e+00	✓	✓	✓				2MASS	083.458023	+09.843550	0.00020243979579469	0.0010513632283038	2	05334992+0950367	2000-01-10	[U]
WISE/WISE.W1	33526.00	2.122e-16	4.495e-18	2.174e-16	4.605e-18	✓						WISE	083.458001	+09.843597	0.00019035897739082	---	1	---	---	---
Spitzer/IRAC.I1	35075.11	1.769e-16	8.145e-19	1.809e-16	8.332e-19	✓						User								---
Spitzer/IRAC.I2	44365.78	8.085e-17	4.468e-19	8.228e-17	4.547e-19	✓						User								---
WISE/WISE.W2	46028.00	7.757e-17	1.500e-18	7.890e-17	1.526e-18	✓						WISE	083.458001	+09.843597	0.00019035897739082	---	1	---	---	---
Spitzer/IRAC.I3	56281.02	4.410e-17	5.686e-19	4.469e-17	5.763e-19	✓						User								---
Spitzer/IRAC.I4	75891.59	3.681e-17	2.713e-19	3.721e-17	2.742e-19	✓						User								---
WISE/WISE.W3	115608.00	1.944e-17	5.193e-19	1.982e-17	5.293e-19	✓						WISE	083.458001	+09.843597	0.00019035897739082	---	1	---	---	---
WISE/WISE.W4	220883.00	1.423e-17	8.255e-19	1.432e-17	8.311e-19	✓						WISE	083.458001	+09.843597	0.00019035897739082	---	1	---	---	---

Apply changes

Excess

Infrared excess detected from **Spitzer/IRAC.I2**. Points with larger wavelength will not be considered in model fit.

You can manually specify where excess applies *(please remember to click the 'Change excess' button to apply these changes).*

Apply infrared excess from Spitzer/IRAC.I2
Apply UV/blue excess up to Angstroms.
Change excess

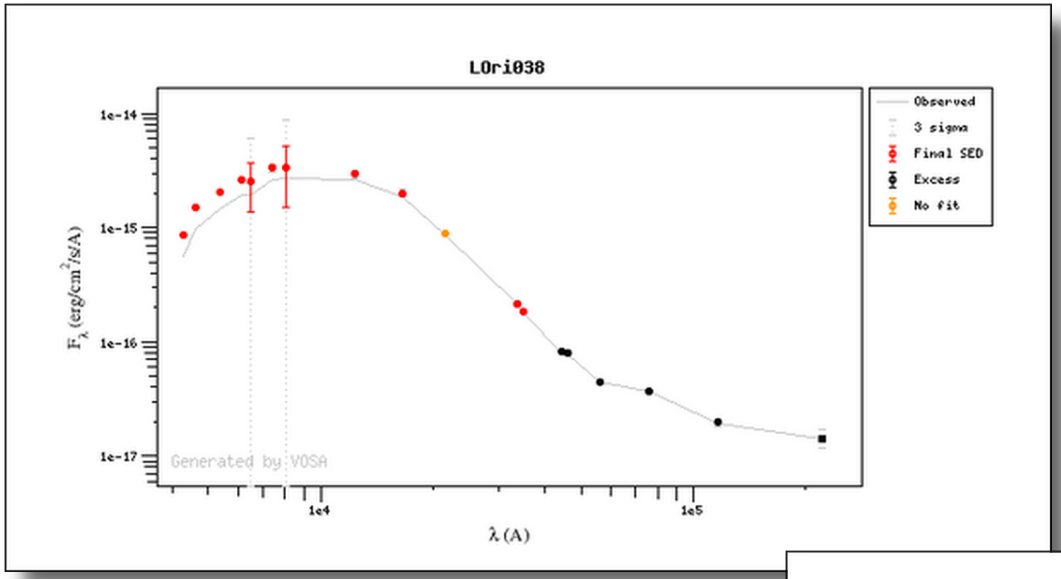
Help

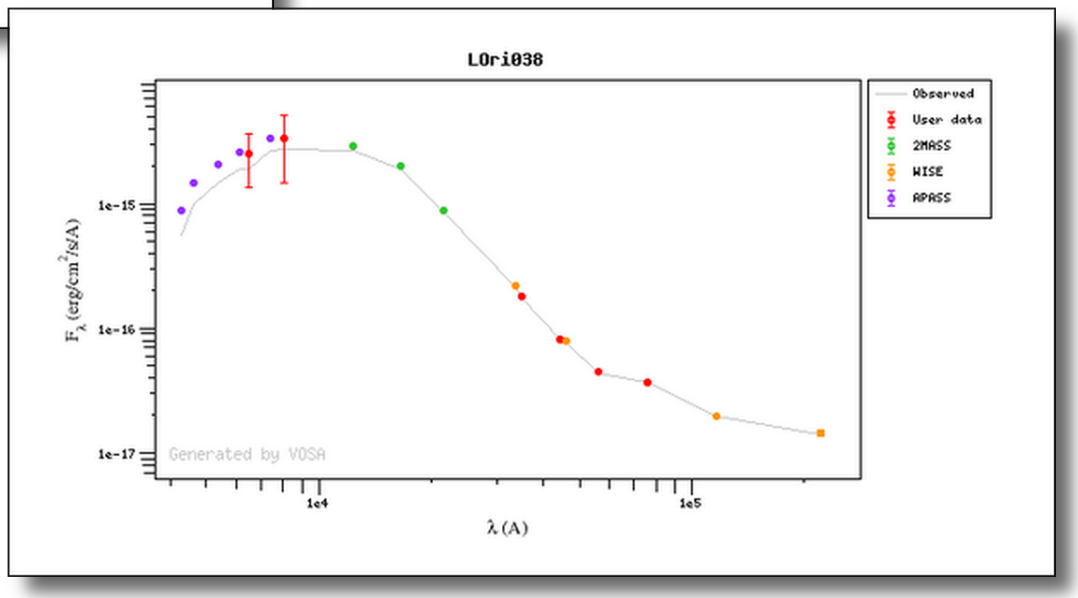
Be careful. If you mark any 'Delete' checkbox and click the 'Apply Changes' button, that point will be deleted without asking for confirmation).

Take into account that:

- Every point marked as 'Ignore' will not be considered for anything. It is as if these points were deleted (but they aren't).
- Every point marked as 'Nofit' will not be used for the fit.
- Every point marked as 'Bad' or 'Uplim' will be automatically marked as 'Nofit' and thus not used for the fit.
- If there exist two or more photometric values corresponding to the same filter (not marked as 'Ignore'), VOSA will calculate an average of the values and this will be the one included in the final SED.

Build SED's: visualize, edit, improve





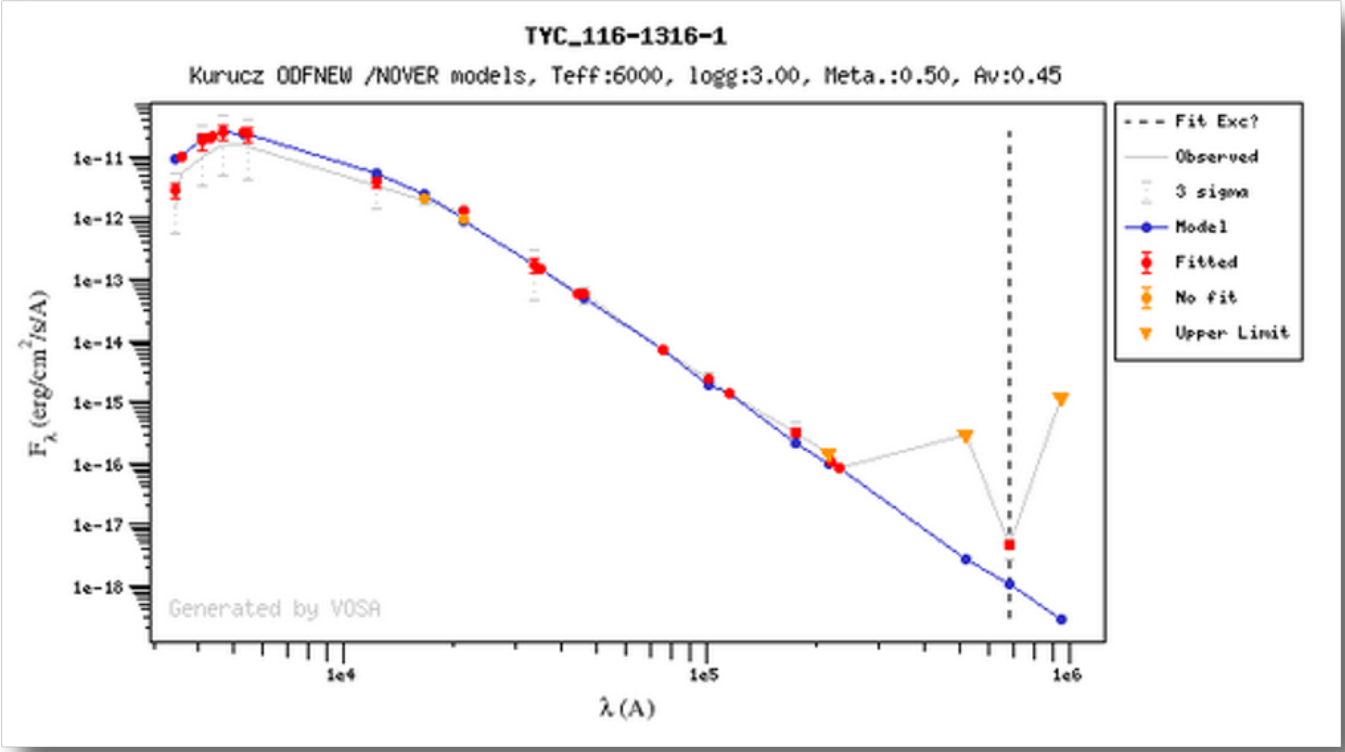
Analyze SED's

- Chi-square fit and Bayes analysis.
  - 27 collections of theoretical models and templates.
  - Choose ranges of parameters.
  - Extinction as an additional fit parameter.
  - Get best fit values: Teff, logg, metal., Lum., R, etc.
- HR diagram: age and mass.

New :

- Upper limits in the fit.
- 7 new collections of models.
- Partial "Refit".
- Radius and mass estimations in chi-square fit.
- Statistical information on parameter values.
- Normality test.

Analyze SED's: upper limits



Analyze SED's: chi-2

Best fit results

Click in the object name to see the best fits for that object.

Hide graphs | Delete this fit | Refine excess

Object	RA	DEC	D (pc)	Model	A_v	ΔA_v	T_{eff}	ΔT_{eff}	logg	Δlogg	Meta.	ΔMeta.	more	χ^2	M_d	F_{tot}	ΔF_{tot}	F_{obs}/F_{tot}	L_{bol}/L_{sun}	$\Delta L_{bol}/L_{sun}$
TYC_107-1139-1	77.943534959	+4.403536732	29.443	Kurucz	1.5	0.0529	8250	132.9	4.00	0.25	0.50	0.15	---	7.417e+1	5.571e-19	1.199e-7	7.505e-9	0.94	3.250e+0	3.599e-1
TYC_112-182-1	79.420752123	+7.353347435	45.366	Kurucz	1.5	2.23e-16	7750	125	4.00	0.25	0.50	0.15	---	1.041e+3	4.435e-19	8.666e-8	1.950e-11	0.91	5.575e+0	1.477e-1
TYC_116-1316-1	86.645469064	+1.168193250	39.277	Kurucz	0	0.161	5500	175.9	5.00	0.5	0.50	0.15	---	1.461e+1	2.298e-18	1.201e-7	1.257e-8	0.36	5.793e+0	7.881e-1
TYC_12-104-1	13.755833356	+0.789556089	119.644	Kurucz	0.3	0.131	5000	125	4.00	0.502	0.00	0.175	---	2.175e+1	6.932e-19	2.526e-8	2.206e-9	0.61	1.130e+1	1.711e+0
TYC_127-402-1	85.007202701	+6.060577671	46.341	Kuru											2.240e-19	1.023e-8	4.805e-10	0.64	6.869e-1	4.989e-2
TYC_154-891-1	98.302593027	+5.462924533	34.819	Kuru											4.60				42e+0	3.384e-1
TYC_32-383-1	25.47142667	+2.70437917	129.648	Kuru											6.68				11e+1	4.343e+0
TYC_90-645-1	67.856063916	+4.575297622	191.085	Kuru											9.60				35e+1	6.771e+0
TYC_96-602-1	73.0238792	+6.4765667	12.120	Kuru											5.12				60e-2	3.397e-3

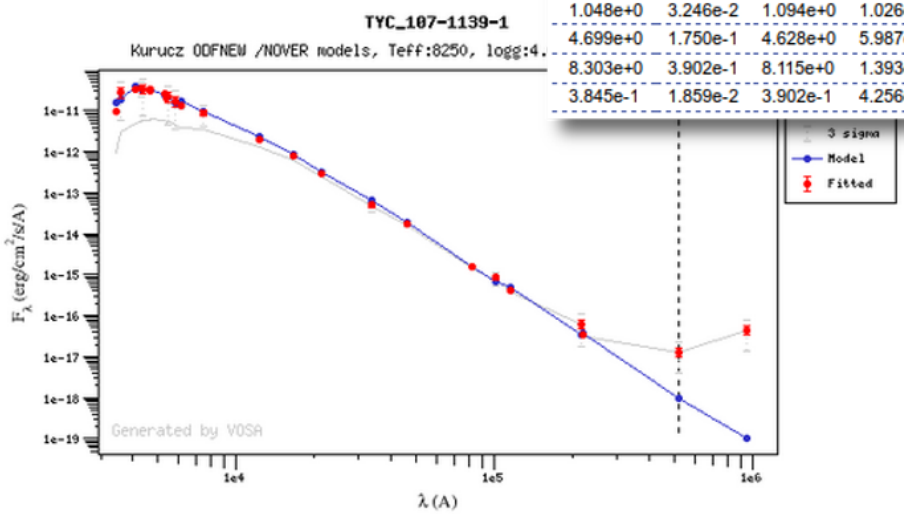
R_1	ΔR_1	R_2	ΔR_2	M_1	ΔM_1	M_2	ΔM_2
9.743e-1	2.346e-2	8.820e-1	5.650e-2	3.465e-1	2.001e-1	2.839e-1	1.674e-1
1.339e+0	1.760e-2	1.309e+0	4.565e-2	6.549e-1	3.774e-1	6.256e-1	3.627e-1
2.640e+0	4.146e-2	2.650e+0	2.474e-1	2.543e+1	2.929e+1	2.563e+1	2.989e+1
4.416e+0	1.415e-1	4.478e+0	4.063e-1	7.119e+0	8.235e+0	7.320e+0	8.558e+0
9.724e-1	1.248e-2	1.001e+0	5.997e-2	3.451e-1	1.989e-1	3.660e-1	2.152e-1
1.048e+0	3.246e-2	1.094e+0	1.026e-1	4.005e-1	2.319e-1	4.372e-1	2.647e-1
4.699e+0	1.750e-1	4.628e+0	5.987e-1	2.549e+1	2.476e+1	2.472e+1	2.478e+1
8.303e+0	3.902e-1	8.115e+0	1.393e+0	2.516e+2	2.589e+2	2.404e+2	2.598e+2
3.845e-1	1.859e-2	3.902e-1	4.256e-2	1.706e-1	1.298e-1	1.757e-1	1.380e-1

$$R_1 \equiv \sqrt{D^2 M_d}$$

$$R_2 = \sqrt{L_{bol}/(4\pi\sigma_{SB} T_{eff}^4)}$$

$$M_1 = 10^{logg} R_1^2 / G_{Nw}$$

$$M_2 = 10^{logg} R_2^2 / G_{Nw}$$



$A_{V,min,68}$	$A_{V,max,68}$	$A_{V,min,96}$	$A_{V,max,96}$	$F_{tot,min,68}$	$F_{tot,max,68}$	$F_{tot,min,96}$	$F_{tot,max,96}$
1.36	1.50	1.35	1.50	1.112e-7	1.200e-7	1.018e-7	1.264e-7
1.50	1.50	1.50	1.50	8.664e-8	8.668e-8	8.662e-8	8.670e-8
0.00	0.26	0.00	0.45	1.201e-7	1.433e-7	1.198e-7	1.562e-7
0.19	0.42	0.15	0.52	2.407e-8	2.915e-8	2.266e-8	2.922e-8
0.00	0.04	0.00	0.30	1.021e-8	1.078e-8	1.019e-8	1.246e-8
1.12	1.50	1.05	1.50	4.585e-8	5.919e-8	4.274e-8	5.929e-8
0.40	1.05	0.38	1.05	3.299e-8	4.608e-8	3.017e-8	4.621e-8
0.15	0.75	0.15	0.75	2.132e-8	3.004e-8	2.129e-8	3.009e-8
0.68	1.02	0.68	1.35	4.333e-9	4.922e-9	4.228e-9	5.377e-9

Analyze SED's: chi-2, statistics

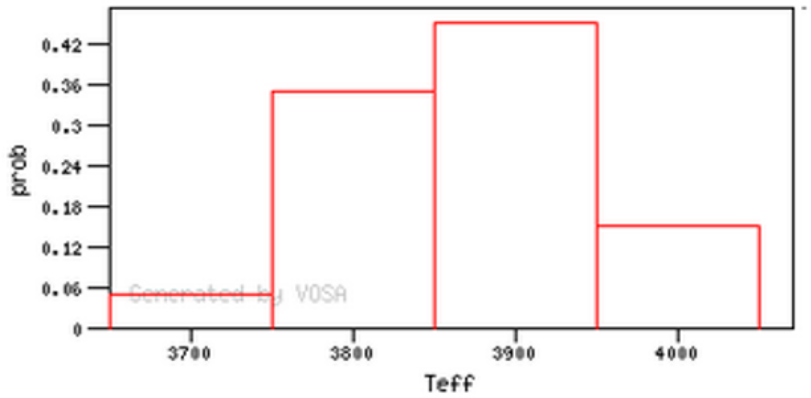
T_{eff}

Statistics

Average	3870
Std. Dev (σ)	78.496
Mode	3900
Median	3822.22
Skewness	-0.0501227
Kurtosis	2.48418
μ2	6161.62
μ3	-24242.4
μ4	9.43131e+7
Q1	3757.14
Q2	3822.22
Q3	3877.78
68%CL-Min	3731.43
68%CL--Max	3897.78
96%CL-Min	3700
96%CL-Max	4000
Norm_min	0.95
Norm_max	0.975

Value distribution

T_{eff}	ΔT_{eff}	min	max	prob
3700	50	3650	3750	0.05
3800	50	3750	3850	0.35
3900	50	3850	3950	0.45
4000	50	3950	4050	0.15



Analyze SED's: bayes, statistics

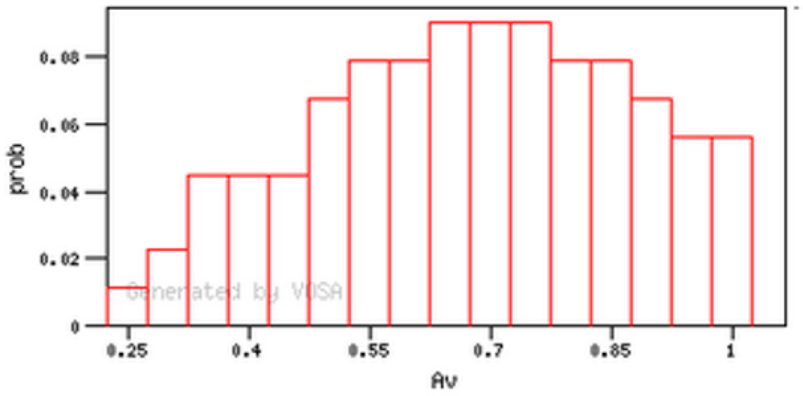
A_V

Statistics

Average	0.676404
Std. Dev (σ)	0.193956
Mode	0.65/0.7/0.75
Median	0.659375
Skewness	-0.175205
Kurtosis	2.13893
μ2	0.0376187
μ3	-0.00127836
μ4	0.00302695
Q1	0.508929
Q2	0.659375
Q3	0.805357
68%CL-Min	0.4405
68%CL--Max	0.864667
96%CL-Min	0.2695
96%CL-Max	1
Norm_min	0.95
Norm_max	0.975

Value distribution

A_v	ΔA_v	min	max	prob
0.25	0.025	0.225	0.275	0.011236
0.3	0.025	0.275	0.325	0.0224719
0.35	0.025	0.325	0.375	0.0449438
0.4	0.025	0.375	0.425	0.0449438
0.45	0.025	0.425	0.475	0.0449438
0.5	0.025	0.475	0.525	0.0674157
0.55	0.025	0.525	0.575	0.0786517
0.6	0.025	0.575	0.625	0.0786517
0.65	0.025	0.625	0.675	0.0898876
0.7	0.025	0.675	0.725	0.0898876
0.75	0.025	0.725	0.775	0.0898876
0.8	0.025	0.775	0.825	0.0786517
0.85	0.025	0.825	0.875	0.0786517
0.9	0.025	0.875	0.925	0.0674157
0.95	0.025	0.925	0.975	0.0561798
1	0.025	0.975	1.025	0.0561798



Analyze SED's: partial "refit"

Files | Objects | Build SEDs | Analyse SEDs | HR Diag. | Results | Help

Stars and brown dwarfs (Change) **File: enrique_fobs.vosa** (info) (Change)

Model Fit | Template fit | Model Bayes Analysis | Template Bayes Analysis

Model fit

The SED for 4 objects has changed after this fit was completed.

You could consider repeating the fit process (with the same options) only for these 4 objects.

(The fit results for the other objects will remain unchanged).

Repeat the fit process

Best fit results

Click in the object name to see the best fits for that object.

Show graphs | Delete this fit | Refine excess

Object	RA	DEC	D (pc)	Model	A_v	ΔA_v	T_{eff}	ΔT_{eff}	logg	Δlogg	Meta.	ΔMeta.	more	χ^2	M_d
TYC_107-1139-1	77.943534959	+4.403536732	10	Kurucz	0.45	0.127	6250	155.3	0.50	0.25	0.50	0.15	---	1.334e+1	6.2
TYC_112-182-1	79.420752123	+7.353347435	10	Kurucz	1.5	0.0302	7500	125	0.50	0.25	-1.50	0.404	---	4.920e+2	5.4
TYC_116-1316-1	86.645469064	+1.168193250	10	Kurucz	0.45	0.168	6000	224.7	3.00	0.465	0.50	0.236	---	8.073e+0	2.1
TYC_12-104-1	13.755833356	+0.789556089	10	Kurucz	0	0.168	4750	156.8	1.00	0.386	-1.00	0.289	---	1.796e+1	7.1
TYC_127-402-1	85.007202701	+6.060577671	10	Kurucz	0.375	0.174	5750	177.7	0.00	0.25	0.50	0.15	---	9.195e+0	2.0
TYC_154-891-1	98.302593027	+5.462924533	10	Kurucz	1.5	0.0462	6750	125	0.50	0.25	-0.50	0.25	---	1.217e+2	4.6
TYC_213-177-1	133.7816542	+1.5490111	---	Not enough points to make a fit											
TYC_32-383-1	25.47142667	+2.70437917	10	Kurucz	0.15	0.216	5000	219.4	1.50	0.426	-0.50	0.255	---	4.458e+0	7.3
TYC_90-645-1	67.856063916	+4.575297622	10	Kurucz	1.275	0.202	5500	218.2	2.00	0.463	-1.00	0.451	---	1.330e+2	8.2
TYC_96-602-1	73.0238792	+6.4765667	10	Kurucz	0.825	0.165	3500	125	4.50	0.364	0.00	0.175	---	3.826e+0	5.1

Analyze SED's: HR diagram

Files	Objects	Build SEDs	Analyse SEDs	HR Diag.	Results	Help

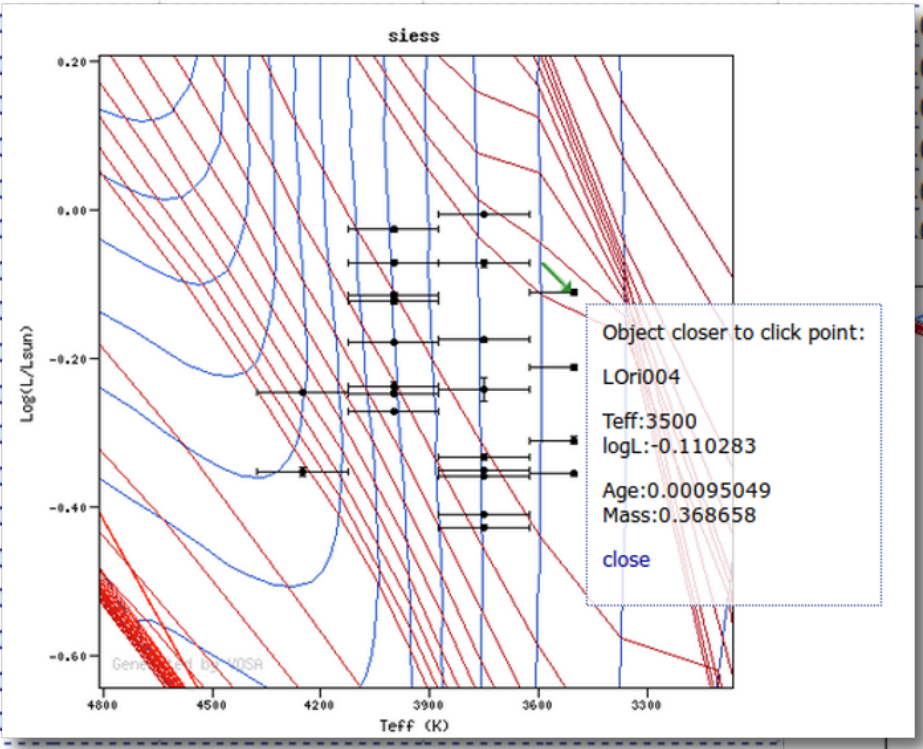
Test: Stars and brown dwarfs (Change) **File: lori1-23.txt** (info) (Change)

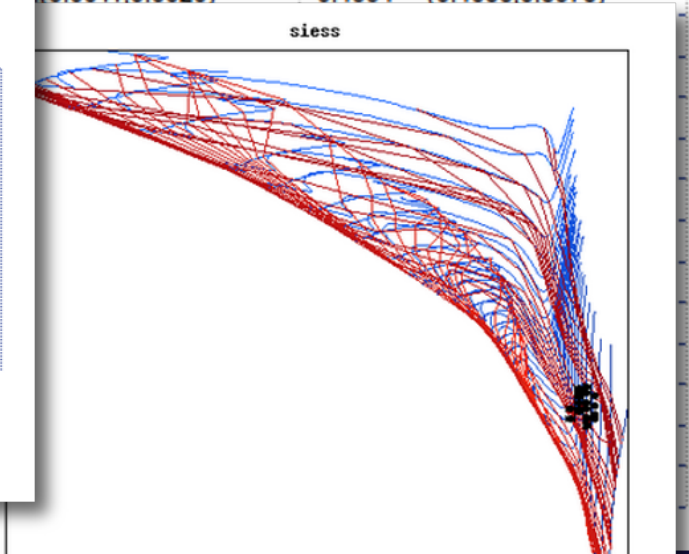
HR Diagram

Delete this HR Diagram

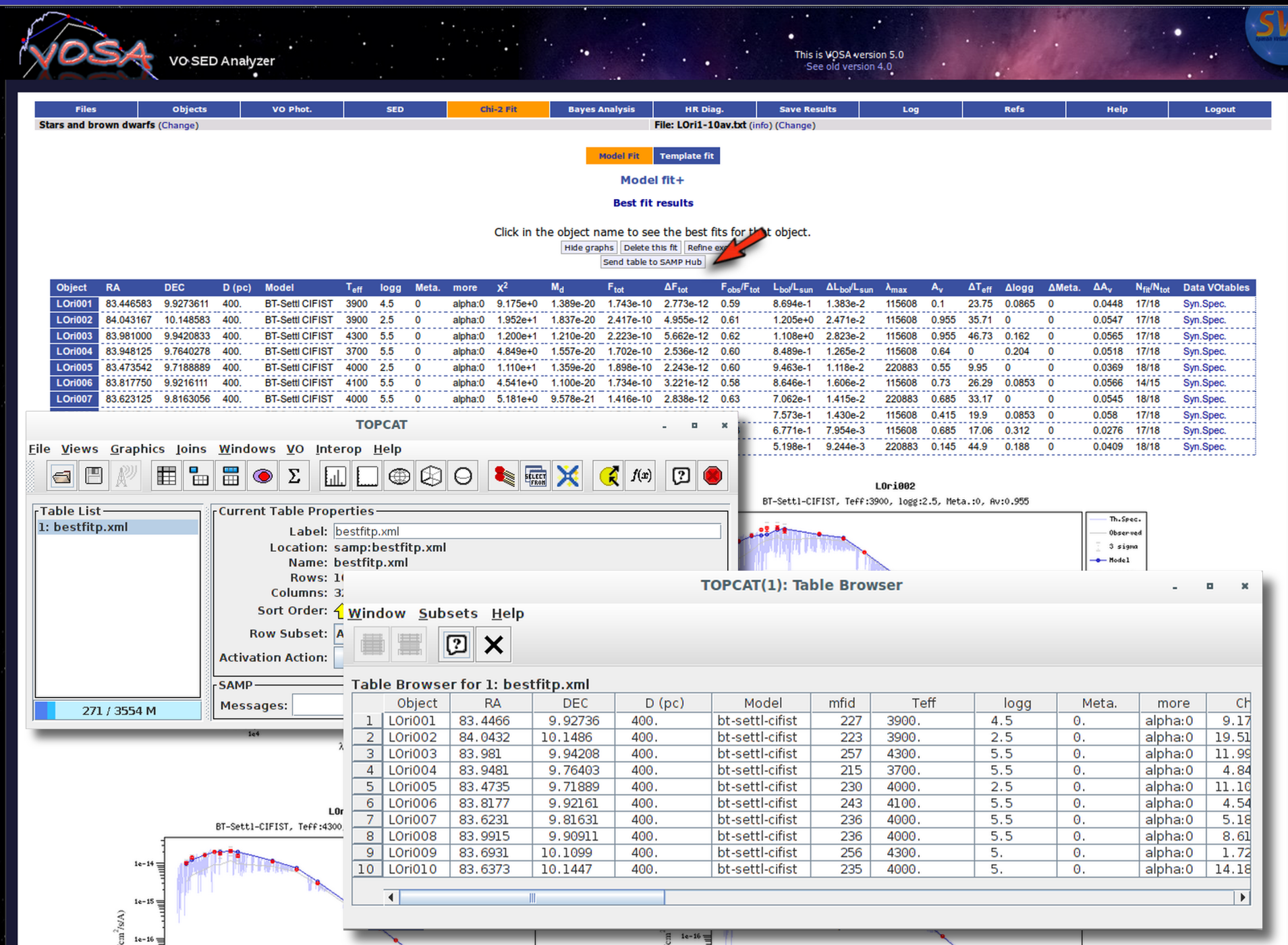
Objects

Object	Model	T_{eff}		LogL		Age			Mass		
LOri001	siess	4000	(3875,4125)	-0.0258	(-0.0281,-0.0235)	0.0018	..(0.0011,0.0021)		0.6986	(0.5946,0.8119)	
LOri002	siess	3750	(3625,3875)	-0.0059	(-0.0077,-0.0042)	0.0009	..(0.0009,0.0011)		0.4989	(0.4046,0.5939)	
LOri003	siess	4000	(3875,4125)	-0.0696	(-0.0722,-0.0670)	0.0020	..(0.0014,0.0027)	[1]	0.6996	(0.5936,0.8180)	[1]
LOri004	siess	3500	(3500,3625)	-0.1103	(-0.1144,-0.1062)	0.0010	..(0.0009,0.0010)		0.3687	(0.3685,0.4051)	[1]
LOri005	siess	3750	(3625,3875)	-0.0714	(-0.0769,-0.0661)	0.0010	..(0.0010,0.0014)		0.4986	(0.4042,0.5938)	
LOri							(0.0017,0.0030)		0.7000	(0.5953,0.8295)	
LOri							(0.0020,0.0039)		0.7001	(0.5975,0.8586)	
LOri							(0.0018,0.0030)		0.7000	(0.5957,0.8333)	[1]
LOri							(0.0020,0.0049)		0.7024	(0.5987,0.8766)	
LOri							(0.0049,0.0100)		1.0001	(0.8762,1.0909)	
LOri							(0.0011,0.0020)		0.4994	(0.4056,0.5975)	





Save results: SAMP



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- Available since 2007.
- Being used
  - More than 800 users analysing data.
  - More than 1.000.000 objects studied.
- Useful for science
  - More than 90 papers published using VOSA.
  - For different science cases.

THANK YOU!