

Theoretical models access with a TSAP-like protocol

What more is needed?

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Theory in the Virtual Observatory
Garching, March 7-9, 2008

Outline

- 1 Introduction
- 2 A simple protocol: TSAP
 - A simple protocol
 - A working protocol
 - An example: isochrones
- 3 How to build a TSAP service
 - Help available
- 4 Going further
 - Credits/References
 - Improving the protocol

Aim of this presentation

Trying to **convince you** that
it's **easy and worthy**
to publish your models in the VO.



What is the VO?

- An international effort in astrophysics for:
 - **Standardization**
 - common data formats (VOTable, Data Models,...)
(how the data are represented, written...)
 - **Interoperability**
 - common protocols (SIAP, SSAP, TSAP...)
(how to make questions and how to answer them)



Theoretical Models not in VO

Theoretical models available in internet:

- as a collection of files
- search form → file
- ASCII or FITS files

- special data format for each model

Theoretical Models not in VO

Kurucz/Grids of model atmospheres

Naming scheme:

Suffix

M01 = [-0.1] log metal abundance relative to solar

P00 = [+0.0] solar abundances from Anders and Grevesse ()

P05 = [-0.5] log metal abundance relative to solar

A = alpha enhanced, the alpha-process elements (O, Ne, Mg, Si, S, Ar, Ca, and Ti) enhanced by +0.4 in the log and Fe -4.53

B = alpha enhanced, the alpha-process elements (O, Ne, Mg, Si, S, Ar, Ca, and Ti) enhanced by +1.0 in the log and Fe -4.53

F = solar Fe abundance reduced to current value -4.51

HE = He number fraction specified in per cent

Y = He mass fraction specified in per cent

NOVER = models with no convective overshooting computed by Fiorella

Castelli [castelli@ts.astro.it] in Trieste. The convective

treatment is described in Casti

A&A 328, 841. Some colors are

labelled coubes* are Cousins w

instead of the obsolete Bessel

calculations.

ODFNEW = as NOVER but with newly comput

and better abundances. (Consult

**THESE ARE THE PREFERRED MODEL

Prefix

A = tables of temperatures-pressure rel.

Teff and log gravity

B = Balmer line profiles for each model

F = fluxes for each model

I = intensities for each model; limbdark

Index of /grids/gridm25ODFNEW/

Name	Last modified	Size	Description
Parent Directory			
aa25k2odfnew.dat	04-Nov-03 17:55	4M	
coubes25k2odfnew.dat	04-Nov-03 17:55	42K	
fg25k2odfnew.pck	04-Nov-03 17:55	11M	
rjklm25k2odfnew.dat	04-Nov-03 17:56	61K	
ubv25k2odfnew.dat	04-Nov-03 17:56	56K	
uvby25k2odfnew.dat	04-Nov-03 17:56	61K	

Theoretical Models not in VO

SPECTRAL LIBRARY 1Å

This database contains the subset of spectra with a 1Å uniform dispersion from the spectral library presented in the article by U. Munari, R.Sordo, F.Castelli and T.Zwitter, "An extensive library of 2500-10500 Å synthetic spectra", A&A (2005). Please refer to this document for a detailed explanation of the content of the SpectraLib 1Å database.

Provide parameter values for search in SpectraLib 1Å database:

Temperature: 2 K

Rotation velocity: 2 km s⁻¹

Metallicity: 2 [M/H]>=0

Gravity: 2 0.5

α-Enhancement [α/Fe]: 2 0.4

Micro-turbulence: 2 2 km s⁻¹

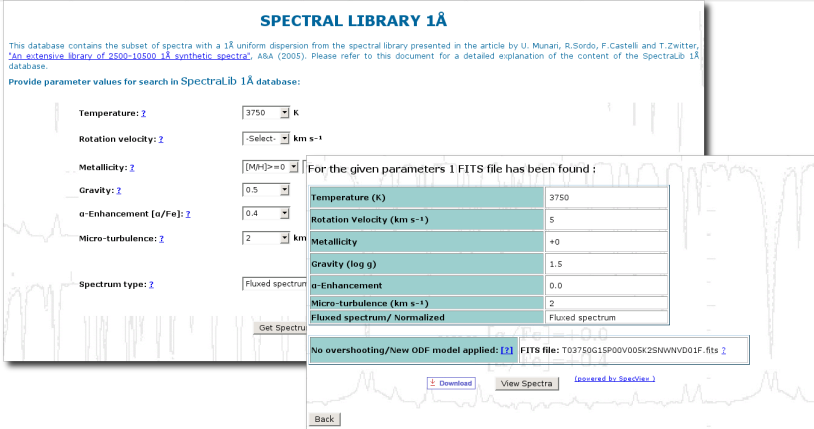
Spectrum type: 2 Fluxed spectrum

For the given parameters 1 FITS file has been found :

Temperature (K)	3750
Rotation Velocity (km s ⁻¹)	5
Metallicity	+0
Gravity (log g)	1.5
α-Enhancement	0.0
Micro-turbulence (km s ⁻¹)	2
Fluxed spectrum/ Normalized	Fluxed spectrum

No overshooting/New ODF model applied: [\[?\]](#) FITS file: T03750G1SP00V005K2SNWV01F.fits [?](#)

[Download](#) [powered by SpexView](#)



U. Munari, R.Sordo, F.Castelli and T.Zwitter, "An extensive library of 2500-10500 Å synthetic spectra", A&A (2005)

Theoretical Models not in VO

- It's **difficult** to **compare models** with each other and to compare them with observational data.
- It's **difficult** to **develop tools** that work with several different models.
- It's **impossible** to develop generic tools able to work with theoretical models **on-the-fly**.

Theoretical Models in VO

- **Final aim:** Full interoperability between observational and theoretical data.
- Efficiency
 - easier and faster to **compare models** with observations and with other models.
 - easier characterization
- Visibility
 - More people will have an **easier access** to the models.
 - The models will, eventually, be **more used** and referenced.



A simple protocol: TSAP

- Started as a collaboration ESAVO-SVO.
- Included in the SSAP standard (for theoretical spectra)
- Useful for other kind of theoretical data too.



A simple protocol: TSAP

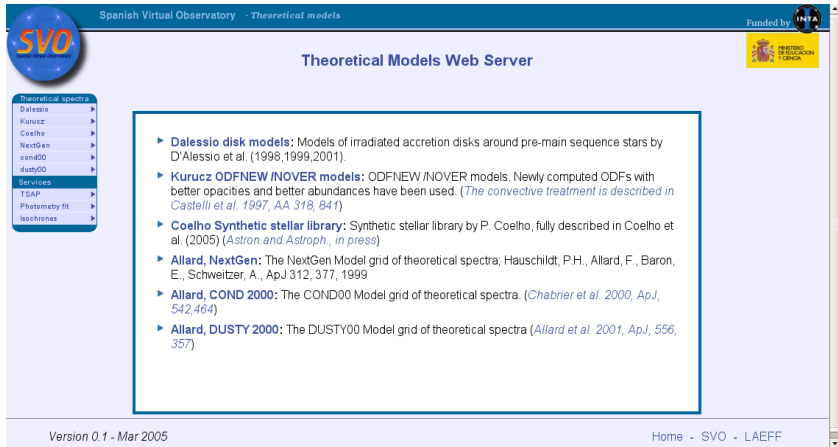
- **Dialog** between the application and the model server:
 - Which parameters define this model, and what values are allowed for each of them?
 - Which files are available for a given range of those parameters?
 - Give me a particular file.




TSAP: a working protocol



- **Servers** of theoretical models with TSAP
 - LAEFF, Pgos3(Mex), PEGASE, etc
- **Applications** accessing TSAP services
 - VOSpec
- **Analysis** tools
 - VOSed, VOSA
- **Science** with VO
 - SED analyzer for the case of Collinder 69 (Bayo et al 2008)

TSAP Server (LAEFF)



Spanish Virtual Observatory - Theoretical models

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 **Theoretical Models Web Server** 

Theoretical spectra

- Dallessio
- Kurucz
- Coelho
- NextGen
- cond00
- dusty00


Services

- TSAP
- Photometry fit
- Isochrones

- ▶ **Dallessio disk models:** Models of irradiated accretion disks around pre-main sequence stars by D'Alessio et al. (1998,1999,2001).
- ▶ **Kurucz ODFNEW /NOVER models:** ODFNEW /NOVER models. Newly computed ODFs with better opacities and better abundances have been used. (*The convective treatment is described in Castelli et al. 1997, AA 318, 841*)
- ▶ **Coelho Synthetic stellar library:** Synthetic stellar library by P. Coelho, fully described in Coelho et al. (2005) (*Astron. and Astroph., in press*)
- ▶ **Allard, NextGen:** The NextGen Model grid of theoretical spectra; Hauschildt, P.H., Allard, F., Baron, E., Schweitzer, A., ApJ 312, 377, 1999
- ▶ **Allard, COND 2000:** The COND00 Model grid of theoretical spectra. (*Chabrier et al. 2000, ApJ, 542,464*)
- ▶ **Allard, DUSTY 2000:** The DUSTY00 Model grid of theoretical spectra (*Allard et al. 2001, ApJ, 556, 357*)

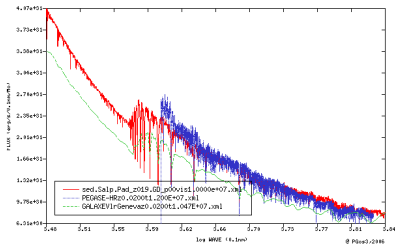
Version 0.1 - Mar 2005

Home - SVO - LAEFF



TSAP Server (PGos3)

- *Welcome
- *Scientific goals
- *Tracks and isochrones
- *Atmosphere libraries
- *SSP models
- *Galactic models
- *Photoionization models
- *Scientific tutorials
- *System features
- *System management
- *User's area
- My files



Zoom, Move Legends & Center
 Click on the plot to perform the action

Gph Type: (log.x,y) xmin: 3.477150 xmax: 3.844899

Scale: 1 x Zoom: x ymin: 6.3080e+ ymax: 4.0723e+

Action: Zoom In User Defined

Title: _____

Xlab: WAVE (0.1nm) Ylab: FLUX (erg/s/0.1nm)

Move Legends places the Top-Left legend window at the chosen place

Filename	X	Y	Style	Color	Legend	Operation
<input checked="" type="checkbox"/> sed.Salp.Pad_z019.GD_p00vis1.0000e+07.xml	WAVE	FLUX	-----	Red	sed.Salp.P. Y=y	* ▾
<input checked="" type="checkbox"/> PEGASE-HR20_0200t1.200E+07.xml	WAVE	FLUX	-----	Blue	PEGASE-HI Y=y	* ▾
<input checked="" type="checkbox"/> GALAXEVirGenevaz0.0200t1.047E+07.xml	WAVE	FLUX	-----	Green	GALAXEVir Y=y	* ▾

Redraw



Using TSAP: VOSED (analysis)

Getting Started Latest Headlines

Mark	distance	RAJ2000	DEJ2000	Jmag
<input checked="" type="checkbox"/>	0.00057	279.234723	+38.783691	-0.177
<input type="checkbox"/>	1.52802	279.255240	+38.803520	9.482
<input type="checkbox"/>	1.76291	279.263609	+38.800240	13.777
<input type="checkbox"/>	1.83819	279.267115	+38.801660	13.517
<input type="checkbox"/>	1.95560	279.192932	+38.783916	14.268
<input type="checkbox"/>	1.95631	279.273403	+38.771267	13.779
<input type="checkbox"/>	2.00593	279.249541	+38.752316	14.588
<input type="checkbox"/>	2.06679	279.192254	+38.792816	15.412
<input type="checkbox"/>	2.07655	279.190348	+38.782921	14.241
<input type="checkbox"/>	2.10707	279.189683	+38.783005	13.456
<input type="checkbox"/>	2.11155	279.278737	+38.775826	15.084
<input type="checkbox"/>	2.16337	279.189174	+38.789921	14.291
<input type="checkbox"/>	2.18103	279.188127	+38.784870	14.457
<input type="checkbox"/>	2.23229	279.238363	+38.746578	14.097
<input type="checkbox"/>	2.21035	279.250795	+38.820107	15.462
<input type="checkbox"/>	2.31920	279.185157	+38.782997	14.598
<input type="checkbox"/>	2.37963	279.216519	+38.746662	13.524
<input type="checkbox"/>	2.38368	279.193279	+38.806808	14.988
<input type="checkbox"/>	2.41811	279.183956	+38.784882	14.800
<input type="checkbox"/>	2.44147	279.280215	+38.803673	14.493

20 nearest sources displayed but 43 are available.

Best ten models (most probable first):

Yeff (%)	Age (myr)	cosd	R _v (AU)	R _z (R _J)	Mdot (M _{Jup} /yr)	α	Slope	Amax (μ m)
9000	10	0.06	900	78	1e-6	0.01	2.5	1.0
9000	10	0.06	900	78	1e-6	0.01	3.5	1.0
9000	10	0.06	300	78	1e-6	0.01	2.5	1.0
9000	10	0.06	900	78	1e-6	0.01	3.5	10.0
9000	10	0.06	300	78	1e-6	0.01	3.5	1.0
9000	10	0.06	900	78	1e-6	0.01	3.5	100
9000	10	0.06	900	78	1e-6	0.01	3.5	1mm
9000	10	0.06	300	78	1e-6	0.01	3.5	10.0
9000	10	0.06	900	78	1e-6	0.01	3.5	1cm
9000	10	0.06	900	78	1e-6	0.01	2.5	10.0

Next time you ask for a display, the calculated models will be available for you to plot.

Version 0.93 - Sep 2005 © LAEFF-INTA Home - SVO - LAEFF

Done

Hipparcos Photometry (from Vizier: II/215) ^

distance	RAJ2000	DEJ2000	r	HIP	Vmag	Pix	e_Pix	B-V	SpType	reco
0.00055	279.234735	+38.783692	0.000853	91262	0.83	128.93	0.55	-0.001	A0Vvar	91180

Display SED Retrieve Marked Data Compute Theoretical Model

Version 0.93 - Sep 2005 © LAEFF-INTA Home SVO LAEFF

Done

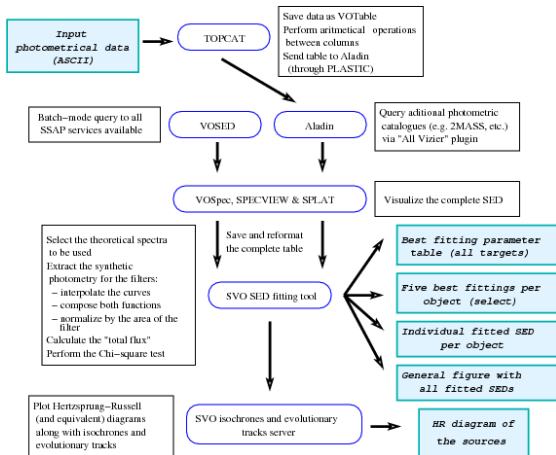


Science using TSAP

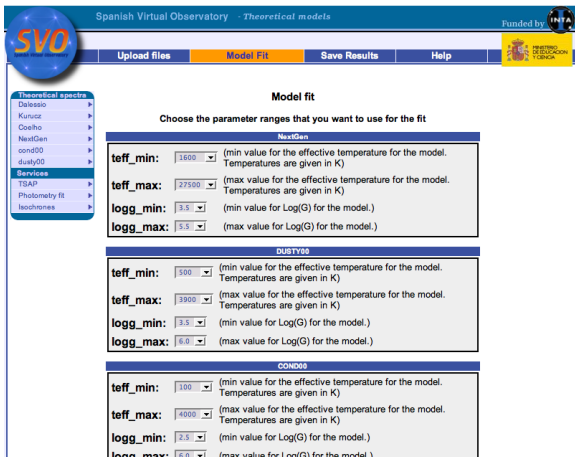
*VOSA: The VO Spectral Energy Distribution analyzer.
The case of the young cluster Collinder 69
(Bayo et al, 2008)*

- IRAC photometry for 167 candidate members of C69.
- VO archival data research (multi-wavelength range).
- Three different collections of theoretical models (with TSAP).
- Determination of the best physical parameters for the objects and the association (T_{eff} , gravity, mass and age)
- A **difficult task** without using the VO.
- **Much easier** using VO tools.

SED analysis using theoretical models



SED analysis using theoretical models



The screenshot shows the 'Model fit' interface of the Spanish Virtual Observatory (SVO). The page title is 'Spanish Virtual Observatory - Theoretical models'. The navigation bar includes 'Upload files', 'Model Fit' (highlighted), 'Save Results', and 'Help'. A sidebar on the left lists 'Theoretical spectra' (Dalessio, Kurucz, Coelho, NextGen, cond00, dusty00) and 'Services' (TSAP, Photometry fit, Isochrones). The main content area is titled 'Model fit' and contains the instruction 'Choose the parameter ranges that you want to use for the fit'. It features three model selection boxes: 'NextGen', 'DUSTY00', and 'COND00'. Each box contains dropdown menus for 'teff_min', 'teff_max', 'logg_min', and 'logg_max' with their respective units and descriptions.

Spanish Virtual Observatory - Theoretical models

Funded by INTA

Upload files Model Fit Save Results Help

Theoretical spectra

- Dalessio
- Kurucz
- Coelho
- NextGen
- cond00
- dusty00

Services

- TSAP
- Photometry fit
- Isochrones

Model fit

Choose the parameter ranges that you want to use for the fit

NextGen

teff_min: 1600 (min value for the effective temperature for the model. Temperatures are given in K)

teff_max: 27500 (max value for the effective temperature for the model. Temperatures are given in K)

logg_min: 3.5 (min value for Log(G) for the model.)

logg_max: 5.5 (max value for Log(G) for the model.)

DUSTY00

teff_min: 500 (min value for the effective temperature for the model. Temperatures are given in K)

teff_max: 3900 (max value for the effective temperature for the model. Temperatures are given in K)

logg_min: 3.5 (min value for Log(G) for the model.)

logg_max: 6.0 (max value for Log(G) for the model.)

COND00

teff_min: 100 (min value for the effective temperature for the model. Temperatures are given in K)

teff_max: 4000 (max value for the effective temperature for the model. Temperatures are given in K)

logg_min: 2.5 (min value for Log(G) for the model.)

logg_max: 6.0 (max value for Log(G) for the model.)

A TSAP generalization: Isochrones



Theoretical spectra

- Dafessis
- Kunucz
- Coelho
- NextGen
- cond00
- dusty00

Services

- TSAP
- Photometry fit
- Isochrones

Isochrone and Evolutionary Tracks Services

- COND99 isochrones

Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, accepted "Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

- COND99 evol. tracks

Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, accepted "Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

- DUSTY99 isochrones

Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 542, 464 "Evolutionary models for very-low-mass stars and brown dwarfs with dusty atmospheres"

Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 382, 563 "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"

- DUSTY99 evol. tracks

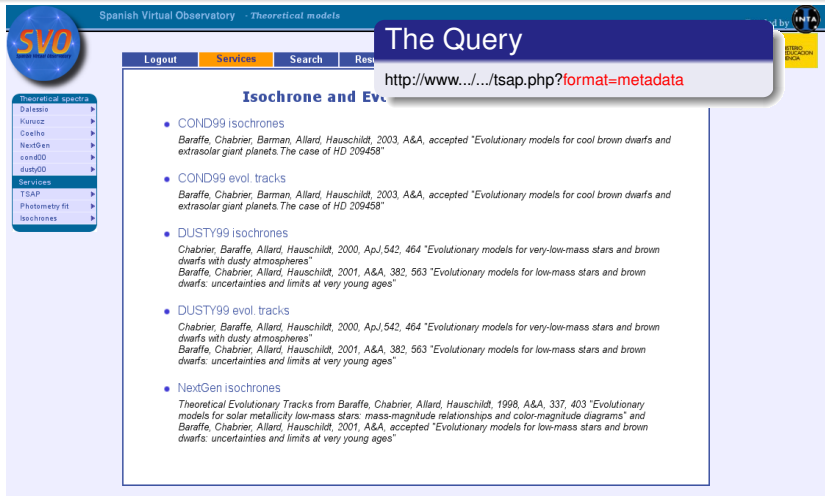
Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 542, 464 "Evolutionary models for very-low-mass stars and brown dwarfs with dusty atmospheres"

Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 382, 563 "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"

- NextGen isochrones

Theoretical Evolutionary Tracks from Baraffe, Chabrier, Allard, Hauschildt, 1998, A&A, 337, 403 "Evolutionary models for solar metallicity low-mass stars: mass-magnitude relationships and color-magnitude diagrams" and Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, accepted "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"

A TSAP generalization: Isochrones



Spanish Virtual Observatory - Theoretical models

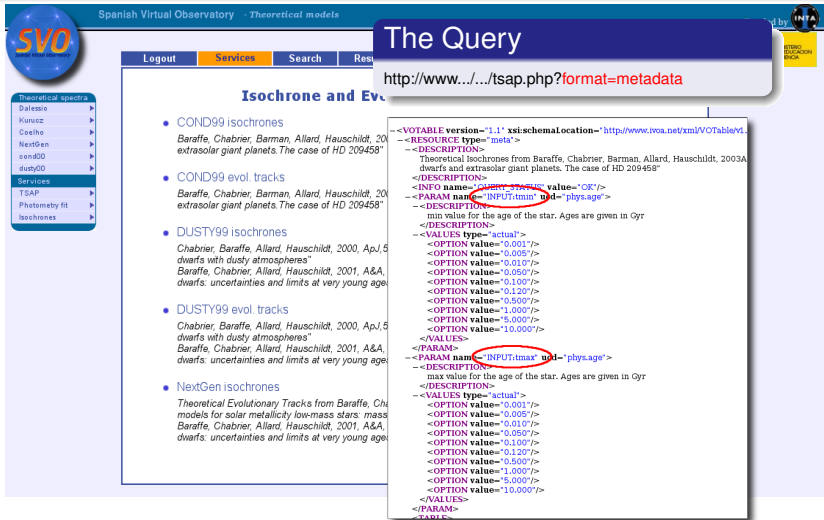
Logout Services Search Results

The Query
`http://www.../tsap.php?format=metadata`

Isochrone and Evolution

- **COND99 isochrones**
Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, accepted "Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"
- **COND99 evol. tracks**
Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, accepted "Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"
- **DUSTY99 isochrones**
Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 542, 464 "Evolutionary models for very-low-mass stars and brown dwarfs with dusty atmospheres"
Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 382, 563 "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"
- **DUSTY99 evol. tracks**
Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 542, 464 "Evolutionary models for very-low-mass stars and brown dwarfs with dusty atmospheres"
Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 382, 563 "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"
- **NextGen isochrones**
Theoretical Evolutionary Tracks from Baraffe, Chabrier, Allard, Hauschildt, 1998, A&A, 337, 403 "Evolutionary models for solar metallicity low-mass stars: mass-magnitude relationships and color-magnitude diagrams" and Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, accepted "Evolutionary models for low-mass stars and brown dwarfs: uncertainties and limits at very young ages"

A TSAP generalization: Isochrones



Spanish Virtual Observatory - Theoretical models

Logout Services Search Results

Isochrone and Evolutionary Tracks

- **COND99 isochrones**
Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, 417, 553-566, 2003A&A...417..553B
Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, 417, 553-566, 2003A&A...417..553B
extrasolar giant planets. The case of HD 209458"
- **COND99 evol. tracks**
Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003, A&A, 417, 553-566, 2003A&A...417..553B
extrasolar giant planets. The case of HD 209458"
- **DUSTY99 isochrones**
Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 528, 473-483, 2000ApJ...528..473C
Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 363, 103-113, 2001A&A...363..103B
dwarfs: uncertainties and limits at very young ages
- **DUSTY99 evol. tracks**
Chabrier, Baraffe, Allard, Hauschildt, 2000, ApJ, 528, 473-483, 2000ApJ...528..473C
dwarfs with dusty atmospheres"
Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 363, 103-113, 2001A&A...363..103B
dwarfs: uncertainties and limits at very young ages
- **NextGen isochrones**
Theoretical Evolutionary Tracks from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2001, A&A, 363, 103-113, 2001A&A...363..103B
models for solar metallicity low-mass stars: mass
Baraffe, Chabrier, Allard, Hauschildt, 2001, A&A, 363, 103-113, 2001A&A...363..103B
dwarfs: uncertainties and limits at very young ages


The Query


<http://www.../tsap.php?format=metadata>


```
--<VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1/VOTable.xsd" --<RESOURCE type="meta">
--<DESCRIPTION>
Theoretical isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...417..553B
dwarfs and extrasolar giant planets. The case of HD 209458"
--<INFO name="QUERY STATUS" value="OK"/>
--<PARAM name="INPUT.tmin" uid="phys.age">
--<DESCRIPTION>
min value for the age of the star. Ages are given in Gyr
--<DESCRIPTION>
--<VALUES type="actual">
--<OPTION value="0.001"/>
--<OPTION value="0.005"/>
--<OPTION value="0.010"/>
--<OPTION value="0.050"/>
--<OPTION value="0.100"/>
--<OPTION value="0.120"/>
--<OPTION value="0.500"/>
--<OPTION value="1.000"/>
--<OPTION value="5.000"/>
--<OPTION value="10.000"/>
--</VALUES>
--</PARAM>
--<PARAM name="INPUT.tmax" uid="phys.age">
--<DESCRIPTION>
max value for the age of the star. Ages are given in Gyr
--<DESCRIPTION>
--<VALUES type="actual">
--<OPTION value="0.001"/>
--<OPTION value="0.005"/>
--<OPTION value="0.010"/>
--<OPTION value="0.050"/>
--<OPTION value="0.100"/>
--<OPTION value="0.120"/>
--<OPTION value="0.500"/>
--<OPTION value="1.000"/>
--<OPTION value="5.000"/>
--<OPTION value="10.000"/>
--</VALUES>
--</PARAM>
--</TABLE>
```

A TSAP generalization: Isochrones

Spanish Virtual Observatory

Funded by 

 Logout Services **Search** Results My Data Upload Plot Help

 MINISTERIO DE EDUCACION Y CIENCIA

COND99 Isochrones

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
"Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

tmin: (min value for the age of the star. Ages are given in Gyr)

tmax: (max value for the age of the star. Ages are given in Gyr)

Data Publisher: LAEFF/Spanish Virtual Observatory
Contact: Enrique Solano esm@laeff.inta.es
Creator: France Allard, CRAL-ENS


If your research benefits from the use of the data obtained from this service, we would appreciate if you include the following **reference** in your publication:

- * Baraffe, I.; Chabrier, G.; Barman, T.S.; Allard, F.; Hauschildt, P.H., 2003A&A...402..701B

If your research benefits from the use of the data obtained from this service, we would appreciate if you include the following **acknowledgement** in your publication:

- * This research has made use of the VO Theoretical data Server of the Spanish Virtual Observatory (SVO) operated by the Laboratory for Space Astrophysics and Theoretical Physics (LAEFF)

A TSAP generalization: Isochrones



Spanish Virtual Observatory

Logout Services Search Results

The Query

<http://www.../tsap.php?tmin=0.5&tmax=1>

COND99 Isochrones

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
"Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

tmin: 0.001 (min value for the age of the star. Ages are given in Gyr)
tmax: 0.001 (max value for the age of the star. Ages are given in Gyr)

Search

Data Publisher: LAEFF/Spanish Virtual Observatory
Contact: Enrique Solano esm@laeff.inta.es
Creator: France Allard, CRAL-ENS

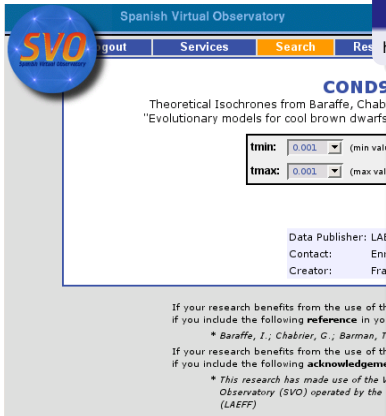
If your research benefits from the use of the data obtained from this service, we would appreciate if you include the following **reference** in your publication:

- * Baraffe, I.; Chabrier, G.; Barman, T.S.; Allard, F.; Hauschildt, P.H., 2003A&A...402..701B

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A TSAP generalization: Isochrones



Spanish Virtual Observatory

Logout Services Search Results

COND99 Isochrones

Theoretical Isochrones from Baraffe, Chabrier, & Barman (2003A&A...402...1001B) "Evolutionary models for cool brown dwarfs"

tmin: 0.001 (min value)
tmax: 0.001 (max value)

Data Publisher: LAEFF
Contact: Enrique Baraffe
Creator: Franck Baraffe

If your research benefits from the use of the SVO you should include the following **reference** in your publications:
* Baraffe, I.; Chabrier, G.; Barman, T. 2003, *A&A*, 402, 1001


If your research benefits from the use of the SVO you should include the following **acknowledgements** in your publications:
* This research has made use of the Spanish Virtual Observatory (SVO) operated by the Spanish Virtual Observatory Consortium (CONSO) at the Observatorio Astronómico Nacional (IGN) and the Spanish Research Council (CSIC).

The Query


<http://www.laeff.es/.../tsap.php?tmin=0.5&tmax=1>

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A TSAP generalization: Isochrones



Spanish Virtual Observatory

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COND99 Isochrones

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
"Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

Mark All UnMark All Save to MyData

	t	title	Data
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<input type="checkbox"/>	0.005	COND99 isocrone for $t=0.005$ Gyr	Retrieve file
<input type="checkbox"/>	0.010	COND99 isocrone for $t=0.010$ Gyr	Retrieve file
<input type="checkbox"/>	0.050	COND99 isocrone for $t=0.050$ Gyr	Retrieve file


Data Publisher: LAEFF/Spanish Virtual Observatory
Contact: Enrique Solano esm@laeff.inta.es
Creator: France Allard, CRAL-ENS

If your research benefits from the use of the data obtained from this service, we would appreciate if you include the following **reference** in your publication:

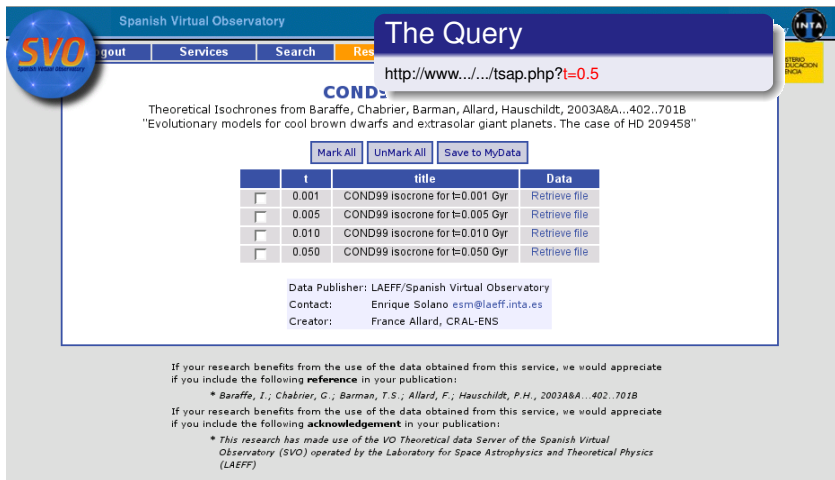
* Baraffe, I.; Chabrier, G.; Barman, T.S.; Allard, F.; Hauschildt, P.H., 2003A&A...402..701B

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* This research has made use of the VO Theoretical data Server of the Spanish Virtual Observatory (SVO) operated by the Laboratory for Space Astrophysics and Theoretical Physics (LAEFF)



A TSAP generalization: Isochrones



Spanish Virtual Observatory

[Logout](#) [Services](#) [Search](#) [Results](#)

The Query

<http://www.../tsap.php?t=0.5>

COND99

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
"Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

[Mark All](#) [UnMark All](#) [Save to MyData](#)

	t	title	Data
<input type="checkbox"/>	0.001	COND99 isocrone for $t=0.001$ Gyr	Retrieve file
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Data Publisher: LAEFF/Spanish Virtual Observatory
Contact: Enrique Solano esm@laeff.inta.es
Creator: France Allard, CRAL-ENS


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A TSAP generalization: Isochrones



Spanish Virtual Observatory

Logout Services Search Results



The Query

http://www.../tsap.php?t=0.5

COND99

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
 "Evolutionary models for cool brown dwarfs"

	t	
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Contact: Enric Pinyol

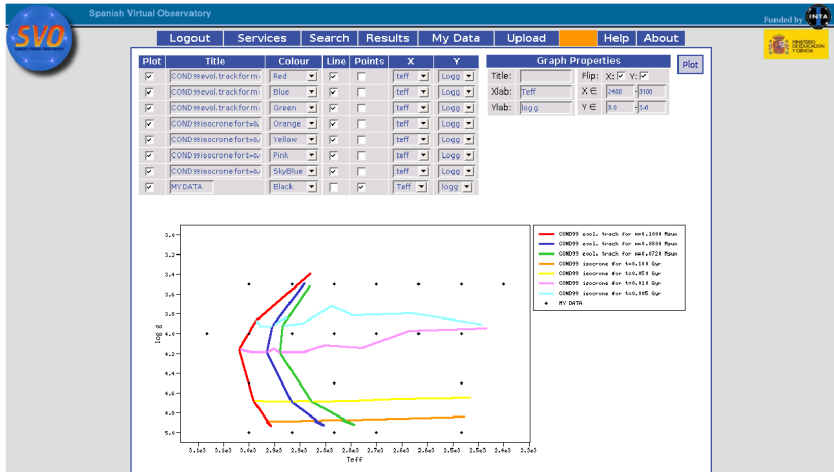
Creator: Francisco

If your research benefits from the use of the data, please include the following **reference** in your publications:
 * Baraffe, I.; Chabrier, G.; Barman, T. 2003, *Astronomy and Astrophysics*, 402, 701B
 If your research benefits from the use of the data, please include the following **acknowledgement** in your publications:
 * This research has made use of the Virtual Observatory (SVO) operated by the Institut de Ciències del Cosmos (ICC) at the Observatori de l'Ebre (OEB) (LAEFF)

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```

A TSAP generalization: Isochrones



How to build a TSAP service

- **Simple** to build
 - A web script able to answer 3 http questions:
 - What parameters define your model?
 - What files do you have in a given range of those parameters?
 - Give me the file for given values of those parameters.
 - Each answer is just a VOTable document (XML)
- **Simple** to access from a VO application



Help available

You **can** develop your own service

- You don't need to change your code.
 - Just add a layer to understand and answer TSAP queries.
- TSAP Documentation
 - SSAP documentation.
 - TSAP web guide/howto in SVO web page.
- EURO-VO DCA and some national VO's support
 - Attendance to VO schools, technical visits
- An available tool to check your service.

Checking your TSAP service



Theoretical spectra

- Daliesio ▶
- Kurucz ▶
- Coeelho ▶
- NextGen ▶
- cond00 ▶
- dusty00 ▶

Services

- TSAP ▶
- Photometry fit ▶
- Isocrones ▶



TSAP interface

Although there are many fields in Astrophysics with a strong need of direct and rigorous comparisons between theoretical and observational data in most of the occasions, however, the different architectures, programming codes, formats,..., make it extremely difficult the comparison between them.

In the context of the Spanish Virtual Observatory we are working in the definition of the required framework to provide applications and services of theoretical astrophysics to the general community. One of the lines of work consists in the development of a protocol to access theoretical spectral data. This is being done in collaboration with ESAVO.

This interface allows you to access to the data offered by any TSAP server if you know its main URL, and can be used by service providers to check that they are offering their data as VO-TSAP compliant.

Enter the full URL of a TSAP service, starting with `http://` and including the `format=metadata` parameter

TSAP URL:

Go

Or try a know TSAP service

TSAP Service:

SVO: ATLAS9 Kurucz ODFNEW/NOVER models

Go



Help available

But, if you **can't/ don't wish**
to become a data center and maintain and manage
yourself the data server,

do not worry,
there are data centers in the EuroVO-DCA project that will
do it for you (with the due credits, of course).



Credits/References

- In the VO, it's important that the user can recover easily:
 - the origin of the data (theoretical and observational)
 - the processes and tools used to transform and analyze the original data
- Why?
 - scientific reasons
 - adequately reference or acknowledge the scientific work and technical tools used.
 - For the user: easier to be aware of the origin of his results and reference them correctly.
 - For the authors: an incentive to put their work in the VO.



Credits/References

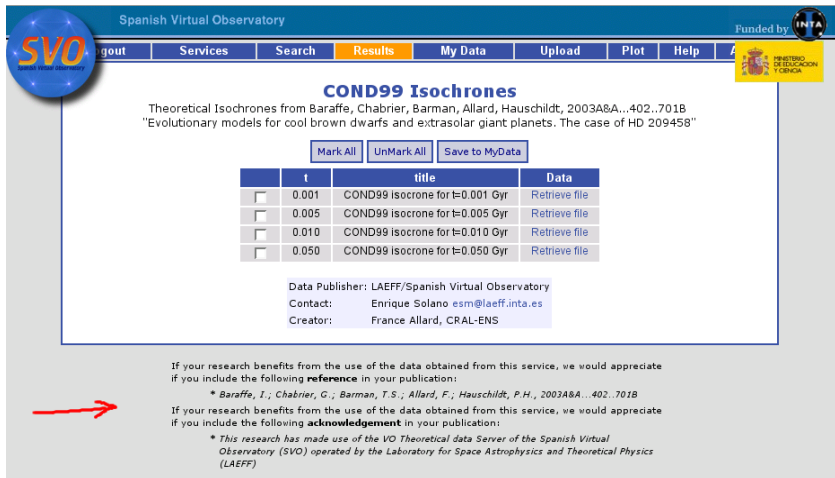
- VO services should:
 - Give that information in their VOTables
- VO applications should:
 - **Keep track** of the information related to the data they use.
 - **Include** all of it in the resulting VOTables.
 - Give an **easy way** to the final user **to recover** that information (a "get credits" button?)
- There is a group in the VO working on it
 - **You** are encouraged to participate



Credits/References

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--<TABLE>
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  Chabrier, G.; Barman, T.S.; Allard, F.; Hauschildt, P.H., 2003A&A...402..701B \n\nAcknowledgement: This research has made use of the VO
  Theoretical data Server of the Spanish Virtual Observatory (SVO) operated by the Laboratory for Space Astrophysics and Theoretical Physics
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  value="http://www.laeff.esa.es/projects/svo/theory/isocr/cond99/getiso.php"/>
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Credits/References



Spanish Virtual Observatory

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COND99 Isochrones

Theoretical Isochrones from Baraffe, Chabrier, Barman, Allard, Hauschildt, 2003A&A...402..701B
"Evolutionary models for cool brown dwarfs and extrasolar giant planets. The case of HD 209458"

Mark All UnMark All Save to MyData

	t	title	Data
<input type="checkbox"/>	0.001	COND99 isocrone for $t=0.001$ Gyr	Retrieve file
<input type="checkbox"/>	0.005	COND99 isocrone for $t=0.005$ Gyr	Retrieve file
<input type="checkbox"/>	0.010	COND99 isocrone for $t=0.010$ Gyr	Retrieve file
<input type="checkbox"/>	0.050	COND99 isocrone for $t=0.050$ Gyr	Retrieve file


Data Publisher: LAEFF/Spanish Virtual Observatory
Contact: Enrique Solano esm@laeff.inta.es
Creator: France Allard, CRAL-ENS

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Improving TSAP

- Data models
 - A universal way to describe models other than spectra.
- Ability to manage more complicate models in TSAP.
 - A more recursive metadata dialog (not always just one step).
- Registry
 - A proper way to register theoretical models other than spectra.



THANK YOU!