

S3: Simple Self-described Service

A simple access protocol for microphysics simulations

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Outline

- 1 S3 protocol
 - Requirements
 - Protocol
 - A working approach
 - Misunderstandings
- 2 Astroseismology
- 3 Work in progress



Requirements

- **Simplicity.**
 - The simpler the development of the service is, the more people will be willing to implement it \Rightarrow more theoretical models in the VO.
- **Flexibility.**
 - Self-described data/service.
 - The protocol explains how the service must describe itself and how that description must be understood and used.



S3 protocol

- **Dialog** between the application and the model server.
- The server must be able to answer three questions:
 - 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.
- Each answer is just a VOTable document (XML)

IVOA Note

International Virtual Observatory Alliance

IVOA Documents



S3: Proposal for a simple protocol to handle theoretical data (microsimulations) Version 1.00

IVOA Note 15 October 2008

Interest/Working Group:

[*Theory Interest Group*](#)

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Abstract

A working approach

- SSAP: a very similar approach for the case of theoretical spectra.
- Isochrones/evolutionary tracks servers.
 - Spanish VO: NextGen, COND, DUSTY, Siess.
 - Italian VO: BATSI.
 - An application using some services to compare with user data (*iDraw*)
- Synthetic photometry service.
 - An application using the service to infer physical parameters from observed data (*VOSA*).
 - Useful for science (*Bayo et al, A&A 2008, in press*).

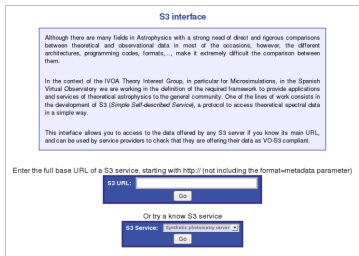


S3 wizard

- A wizard that helps to build a VO service for a theoretical model.
 - Two inputs are needed
 - A set of ascii files containing the data corresponding to each model.
 - An ascii file with the name of every data file and the values of the parameters that characterize each file.
 - (User inputs about the meaning of parameters, data columns, curation, credits... All by a web interface.)
 - The application builds:
 - The database
 - A web page with forms to download files in ascii and votable formats.
 - A VO service able to answer the three types of S3 queries.

S3 interface

- A web interface to test any S3 service.
 - Acting as an independent application.
 - You give it the S3 address of a service.
 - It shows how an application is expected to understand (or not) your service.



The screenshot shows a web browser window titled "S3 interface". The page contains the following text:

S3 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 IVOA Theory Interest Group, in particular for Microsimulations, in 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 S3 (Simple Self-described Service), a protocol to access theoretical spectral data in a simple way.

This interface allows you to access to the data offered by any S3 server if you know its main URL, and can be used by service providers to check that they are offering their data as VO-S3 compliant.

Enter the full base URL of a S3 service, starting with `http://` (not including the format-metadata parameter)

S3 URL:

Or try a know S3 service

S3 Service:



Misunderstandings

- Confusing Service/Protocol with the application using it.
- There is not a data model.
 - If the service offers a model corresponding to a physical case for which there exists a data model, the service should use it (utypes...)
- It depends on human interaction.
 - Typically, it does, because, after all, humans are who are using applications.
 - There are use cases where no human interaction is needed.

Astroseismology

1.- Application: query

<http://www.../s3p.php?format=metadata>

Astroseismology

1.- Application: query

<http://www.../s3p.php?format=metadata>

2.- Server: answer

```
<?XML version="1.1" xmlns:metadata="http://www.iana.org/rfc/5072#ch1.1" ->  
<DESCRIPTION>Granada Stellar Seismic Model (GSSM-V0) adapts the Granada Team numerical package outputs to </DESCRIPTION>  
<PARAM name="concepta" value="http://localhost:80/carlca/sos/theory/astrosim/concepta.php"/>  
<PARAM name="bibcode" scd="meta.bib" value="1297A2005...124...1070W">  
<DESCRIPTION>CEM5 evolutionary code</DESCRIPTION>  
</PARAM>  
<PARAM name="bibcode" scd="meta.bib" value="2008AJ2055...316...1209W">  
<DESCRIPTION>GrCo oscillation code</DESCRIPTION>  
</PARAM>  
<PARAM name="bibcode" scd="meta.bib" value="2008AJ2055...316...1555W">  
<DESCRIPTION>P2LOU oscillation code</DESCRIPTION>  
</PARAM>  
<PARAM name="INPUT: teff_range" scd="phys.temperature" unit="K" utype="Star Teff" datatype="float">  
<DESCRIPTION>Effective temperature</DESCRIPTION>  
<value>  
<min value="4300.54250462"/>  
<max value="9624.90066137"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: lum_range" scd="phys.luminosity" unit="Lsun" utype="Star Luminosity" datatype="float">  
<DESCRIPTION>Luminosity (L/Lsun), Lum=3.029 400 erg/s</DESCRIPTION>  
<value>  
<min value="2.4028780048"/>  
<max value="17.30905054897"/>  
</value>  
</PARAM>  
<PARAM name="INPUT:logg_range" scd="phys.gravity" unit="" utype="Star logg" datatype="float">  
<DESCRIPTION>Log(g) [g in cm/s2]</DESCRIPTION>  
<value>  
<min value="3.8406433001"/>  
<max value="4.43867892087"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: density_range" scd="phys.density" unit="g/cm3" utype="Star Density" datatype="float">  
<DESCRIPTION>Average density</DESCRIPTION>  
<value>  
<min value="0.18725362491"/>  
<max value="1.18750725442"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: time_age" scd="time.age" unit="Myr" utype="Star Age" datatype="float">  
<DESCRIPTION>Age</DESCRIPTION>  
<value>  
<min value="45.50"/>  
<max value="9800.8"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: fah_range" scd="phys.abund.Fe" unit="" utype="Star fah" datatype="float">  
<DESCRIPTION>[Fe/H]</DESCRIPTION>  
<value>  
<min value="-6.4004"/>  
<max value="0.03002"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: z_range" scd="phys.abund.Z" unit="" utype="Star Z" datatype="float">  
<DESCRIPTION>Relative fraction (in mass) of metals, i.e. elements heavier than He.</DESCRIPTION>  
<value>  
<min value="0.0072045059614"/>  
<max value="0.0177249368044"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: hcent_range" scd="phys.abund.3" unit="" utype="Star hcent" datatype="float">  
<DESCRIPTION>Hydrogen central fraction</DESCRIPTION>  
<value>
```

Astroseismology

1.- Application: query

<http://www.../s3p.php?format=metadata>

3.- Application: ...

S3 interface

Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in V/O in order to perform on-line stellar seismology. This package contains the evolutionary code CESAM and two oscillation codes: GraCo and FLOU.

Teff:	<input type="text" value="0000"/>	-	<input type="text" value="0000"/>	More info
Lum:	<input type="text"/>	-	<input type="text"/>	More info
Log(g):	<input type="text"/>	-	<input type="text"/>	More info
Density:	<input type="text"/>	-	<input type="text"/>	More info
Age:	<input type="text"/>	-	<input type="text"/>	More info
[Fe/H]:	<input type="text"/>	-	<input type="text"/>	More info
Z:	<input type="text"/>	-	<input type="text"/>	More info
Hcent:	<input type="text"/>	-	<input type="text"/>	More info
Rv:	<input type="text"/>	-	<input type="text"/>	More info
Mass:	<input type="text"/>	-	<input type="text"/>	More info
Vrot:	<input type="text"/>	-	<input type="text"/>	More info
Wrot:	<input type="text"/>	-	<input type="text"/>	More info
Trot:	<input type="text"/>	-	<input type="text"/>	More info
OhLT:	<input type="text"/>	-	<input type="text"/>	More info
Over.:	<input type="text"/>	-	<input type="text"/>	More info
F0:	<input type="text"/>	-	<input type="text"/>	More info
F1:	<input type="text"/>	-	<input type="text"/>	More info
F0/F1:	<input type="text"/>	-	<input type="text"/>	More info

2.- Server: answer

```

<?XML version="1.1" xmlns:code="http://www.oca.eu/vol/007/abnl/1.1" ->
<DESCRIPTION Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in V/O in order to perform on-line stellar seismology. This package contains the evolutionary code CESAM and two oscillation codes: GraCo and FLOU.
</DESCRIPTION>
<PARAM name="concepta" value="http://localhost:80/carlca/vo/theory/astrosim/concepta.php"/>
<PARAM name="bibcode" ucd="meta.bib" value="1995AJ2005...124...107W" ->
</PARAM>
<DESCRIPTION CESAM evolutionary code/>
</DESCRIPTION>
<PARAM name="bibcode" ucd="meta.bib" value="2008ApJ2005...316...120R" ->
</PARAM>
<DESCRIPTION GraCo oscillation code/>
</DESCRIPTION>
<PARAM name="bibcode" ucd="meta.bib" value="2008ApJ2005...316...155W" ->
</PARAM>
<DESCRIPTION FLOU oscillation code/>
</DESCRIPTION>
<PARAM name="INPUT: teff: range" ucd="phys.temperature" unit="K" utype="Star: Teff" datatype="float" ->
<DESCRIPTION Effective temperature/>
</DESCRIPTION>
<value>
<min value="0000.54250462"/>
<max value="9024.90006137"/>
</value>
</PARAM>
<PARAM name="INPUT: lum: range" ucd="phys.luminosity" unit="Lsun" utype="Star: Luminosity" datatype="float" ->
<DESCRIPTION Luminosity (L/Lsun), Lum=3.029 400 erg/s/>
</DESCRIPTION>
<value>
<min value="2.40287700048"/>
<max value="17.9095504087"/>
</value>
</PARAM>
<PARAM name="INPUT: logg: range" ucd="phys.gravity" unit="cgs" utype="Star: logg" datatype="float" ->
<DESCRIPTION Log(g) [g cm/s^2]/>
</DESCRIPTION>
<value>
<min value="3.84064330011"/>
<max value="4.43867592877"/>
</value>
</PARAM>
<PARAM name="INPUT: density: range" ucd="phys.density" unit="g/cm^3" utype="Star: Density" datatype="float" ->
<DESCRIPTION Average density/>
</DESCRIPTION>
<value>
<min value="0.18725064931"/>
<max value="1.18750725442"/>
</value>
</PARAM>
<PARAM name="INPUT: age: range" ucd="time.age" unit="Myr" utype="Star: Age" datatype="float" ->
<DESCRIPTION Age/>
</DESCRIPTION>
<value>
<min value="45.95"/>
<max value="9865.8"/>
</value>
</PARAM>
<PARAM name="INPUT: feh: range" ucd="phys.abund.Fe" unit="%" utype="Star: feh" datatype="float" ->
<DESCRIPTION [Fe/H]/>
</DESCRIPTION>
<value>
<min value="-6.4004"/>
<max value="0.03003"/>
</value>
</PARAM>
<PARAM name="INPUT: z: range" ucd="phys.abund.Z" unit="%" utype="Star: Z" datatype="float" ->
<DESCRIPTION Relative fraction (in mass) of metals, i.e. elements heavier than He. />
</DESCRIPTION>
<value>
<min value="0.00720465050414"/>
<max value="0.01774290804"/>
</value>
</PARAM>
<PARAM name="INPUT: hcent: range" ucd="phys.abund.H" unit="%" utype="Star: hcent" datatype="float" ->
<DESCRIPTION Hydrogen central fraction/>
</DESCRIPTION>
<value>

```

Astroseismology

1.- Application: query

http://www.../.../s3p.php?format=metadata

3.- Application: ...

Granada Stellar Seismic Models

Granada Stellar Seismic Models (GSStM-H) adopts the Granada Team numerical package outputs to be used in VO in order to perform on-line stellar seismology. This package contains the evolutionary code CESAM and two oscillation codes: GraCo and FLIOU.

You can search the database in terms of several parameters (invo-year mouse over the (?) symbol to see a description and the available range of values for each one).

- Repeat, mark the parameters that you want to use in your search, select a range for each one and then click the "Search" button to retrieve a list of the available files.

Remember that only the searched parameters will be used in the search.
(this don't need to be the same than the ones marked to be shown in the result lists)

Structure search parameters		Seismology search parameters	
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		
[?] [v] [u] [x] [y] [z]	[?] [v] [u] [x] [y] [z]		

2.- Server: answer

```

<?XML version="1.0" xmlns:evolutionary="http://www.ivoa.net/vocab/evolutionary/1.0" ->
<DESCRIPTION type="meta">
<DESCRIPTION>Granada Stellar Seismic Models (GSStM-H) adopts the Granada Team numerical package outputs to be
</DESCRIPTION>
<PARAM name="concepta" value="http://localhost:80/carlisa/voa/theory/astrosam/concepta.php"/>
</PARAM>
<PARAM name="bibcode" ucd="meta.bib" value="1957AJOAS...124...107W" ->
<DESCRIPTION>CESAM evolutionary code</DESCRIPTION>
</PARAM>
<PARAM name="bibcode" ucd="meta.bib" value="2008ApJ...665...120R" ->
<DESCRIPTION>GraCo oscillation code</DESCRIPTION>
</PARAM>
<PARAM name="bibcode" ucd="meta.bib" value="2008ApJ...665...155Y" ->
<DESCRIPTION>FLIOU oscillation code</DESCRIPTION>
</PARAM>
<PARAM name="INPUT: t_eff_range" ucd="phys.temperature" ucd="t_eff" utype="Star T_eff" datatype="float">
<DESCRIPTION>Effective temperature</DESCRIPTION>
<value>
<min value="6300.54250482"/>
<max value="9624.390066137"/>
</value>
</PARAM>
<PARAM name="INPUT: L_sun_range" ucd="phys.luminosity" ucd="L_sun" utype="Star Luminosity" datatype="float">
<DESCRIPTION>Luminosity (L/L_sun), Lsun=3.829e40 erg/s</DESCRIPTION>
<value>
<min value="2.4028780048"/>
<max value="17.3895554887"/>
</value>
</PARAM>
<PARAM name="INPUT: log_g_range" ucd="phys.gravity" ucd="log_g" utype="Star log_g" datatype="float">
<DESCRIPTION>Log(g) [g in cm/s^2]</DESCRIPTION>
<value>
<min value="7.8406433051"/>
<max value="4.4385792087"/>
</value>
</PARAM>
<PARAM name="INPUT: density_range" ucd="phys.density" ucd="rho" utype="Star Density" datatype="float">
<DESCRIPTION>Average density</DESCRIPTION>
<value>
<min value="0.18712580491"/>
<max value="1.1875825442"/>
</value>
</PARAM>
<PARAM name="INPUT: age_range" ucd="time.age" ucd="H_yr" utype="Star Age" datatype="float">
<DESCRIPTION>Age</DESCRIPTION>
<value>
<min value="46.55"/>
<max value="9865.8"/>
</value>
</PARAM>
<PARAM name="INPUT: fah_range" ucd="phys.abund.Fa" ucd="f" utype="Star fah" datatype="float">
<DESCRIPTION>[Fe/H]</DESCRIPTION>
<value>
<min value="-8.4004"/>
<max value="0.43061"/>
</value>
</PARAM>
<PARAM name="INPUT: z_range" ucd="phys.abund.Z" ucd="z" utype="Star z" datatype="float">
<DESCRIPTION>Relative fraction (in mass) of metals, i.e. elements heavier than He.</DESCRIPTION>
<value>
<min value="0.0072045058614"/>
<max value="0.01774936804"/>
</value>
</PARAM>
<PARAM name="INPUT: hcent_range" ucd="phys.abund.X" ucd="hcent" utype="Star hcent" datatype="float">
<DESCRIPTION>Hydrogen central fraction</DESCRIPTION>
<value>

```

Astroseismology

1.- Application: query

<http://www.../s3p.php?format=metadata>

3.- Application: ...

it could even go directly to next step.

- the application is looking for models in a given T_{eff} range.
- it sees a T_{eff} parameter.
- directly queries for files in that range (no form, no human interaction)

2.- Server: answer

```
<?XML version="1.1" xmlns:code="http://www.xml.org/xml/02table/1.1" ->  
<DESCRIPTION>Granada Stellar Seismic Model (GSSM-V0) adapts the Granada Team numerical package outputs to </DESCRIPTION>  
<PARAM name="concepta" value="http://localhost:80/carlca/sos/theory/astrosim/concepta.php"/>  
<PARAM name="bibcode" scd="meta.bib" value="1297A2005...124...1070W">  
</PARAM>  
<DESCRIPTION>CEM evolutionary code</DESCRIPTION>  
</PARAM>  
<PARAM name="bibcode" scd="meta.bib" value="2008ApJ...665...216...1209W">  
<DESCRIPTION>Graco oscillation code</DESCRIPTION>  
</PARAM>  
<PARAM name="bibcode" scd="meta.bib" value="2008ApJ...665...1555W">  
<DESCRIPTION>PLOSU oscillation code</DESCRIPTION>  
</PARAM>  
<PARAM name="INPUT: teff_range" scd="phys.temperature" unit="K" utype="Star Teff" datatype="float">  
<DESCRIPTION>Effective temperature</DESCRIPTION>  
<value>  
  <min value="6300.54250462"/>  
  <max value="9624.90006137"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: lum_range" scd="phys.luminosity" unit="L_sun" utype="Star Luminosity" datatype="float">  
<DESCRIPTION>Luminosity (L/L_sun), Lum=3.699 400 erg/s</DESCRIPTION>  
<value>  
  <min value="2.40289700048"/>  
  <max value="17.30905054897"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: logg_range" scd="phys.gravity" unit="" utype="Star logg" datatype="float">  
<DESCRIPTION>Log g [g in cm/s^2]</DESCRIPTION>  
<value>  
  <min value="3.84064330011"/>  
  <max value="4.43867992087"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: density_range" scd="phys.density" unit="g/cm^3" utype="Star Density" datatype="float">  
<DESCRIPTION>Average density</DESCRIPTION>  
<value>  
  <min value="0.187125062493"/>  
  <max value="1.18750725442"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: time_range" scd="time.age" unit="Myr" utype="Star Age" datatype="float">  
<DESCRIPTION>Age</DESCRIPTION>  
<value>  
  <min value="48.95"/>  
  <max value="9865.8"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: feh_range" scd="phys.abund.Fe" unit="" utype="Star feh" datatype="float">  
<DESCRIPTION>[Fe/H]</DESCRIPTION>  
<value>  
  <min value="-6.4004"/>  
  <max value="0.03002"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: z_range" scd="phys.abund.Z" unit="" utype="Star Z" datatype="float">  
<DESCRIPTION>Relative fraction (in mass) of metals, i.e. elements heavier than He.</DESCRIPTION>  
<value>  
  <min value="0.0072045059614"/>  
  <max value="0.017724936804"/>  
</value>  
</PARAM>  
<PARAM name="INPUT: hcent_range" scd="phys.abund.S" unit="" utype="Star hcent" datatype="float">  
<DESCRIPTION>Hydrogen central fraction</DESCRIPTION>  
<value>
```

Astroseismology

Granada Stellar Seismic Models

Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in VO in order to perform on-line stellar seismology. This package contains the evolutionary code [CESAM](#) and two oscillation codes: [GraCo](#) and [FILOU](#)

You can search the database in terms of several parameters (move your mouse over the (?) symbol to see a description and the available range of values for each one).

- Please, mark the parameters that you want to use in your search, select a range for each one and then click the "Search" button to retrieve a list of the available files
- **Remember that only the marked parameters will be used in the search** (they don't need to be the same than the ones marked to be shown in the list of results)

Structure search parameters			Sismology search parameters		
(?)	T_{eff}	8000 - 8300 (K)	(?)	F0	<input type="text"/> - <input type="text"/> (muHz)
(?)	L_{um}	<input type="text"/> - <input type="text"/> (Lsun)	(?)	F1	<input type="text"/> - <input type="text"/> (muHz)
(?)	Log(g)	<input type="text"/> - <input type="text"/>	(?)	F0:F1	<input type="text"/> - <input type="text"/>
(?)	Density	<input type="text"/> - <input type="text"/> (g/cm ³)	(?)	Δ(N)	<input type="text"/> - <input type="text"/> (muHz)
(?)	Age	<input type="text"/> - <input type="text"/> (Myr)	(?)	δ(N)	<input type="text"/> - <input type="text"/> (muHz)
(?)	[Fe:H]	<input type="text"/> - <input type="text"/>	(?)	Freqs:	<input type="text"/> - <input type="text"/>
(?)	Z	<input type="text"/> - <input type="text"/>	(?)	modes:	<input type="text"/> - <input type="text"/>
(?)	Hcent	<input type="text"/> - <input type="text"/>			
(?)	R_*	<input type="text"/> - <input type="text"/> (Rsun)			
(?)	Mass	<input type="text"/> - <input type="text"/> (Msun)			
(?)	Vrot	<input type="text"/> - <input type="text"/> cm/s			
(?)	Wrot	<input type="text"/> - <input type="text"/> rad/s			
(?)	Trot	<input type="text"/> - <input type="text"/> sec			

Astroseismology

Granada Stellar Seismic Models

Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in VO in order to perform on-line stellar seismology. This package contains the evolutionary code [CESAM](#) and two oscillation codes: [GraCo](#) and [FILOU](#)

You can search the database in terms of several parameters (move your mouse over the (?) symbol to see a description and the available range of values for each one).

- Please, mark the parameters that you want to use in your search, select a range for each one and then click the "Search" button to retrieve a list of the available files
- **Remember that only the marked parameters** (they don't need to be the same than

The user fills the form...

The application takes the inputs from the user and then what?

Structure search parameters		Sismology search parameters									
(?)	T_{eff}	8000	- 8300 (K)	(?)	F0		-		(muHz)		
(?)	L_{um}		-		(Lsun)	(?)	F1		-		(muHz)
(?)	Log(g)		-			(?)	F0.F1		-		
(?)	Density		-		(g/cm3)	(?)	Δ(v)		-		(muHz)
(?)	Age		-		(Myr)	(?)	δ(v)		-		(muHz)
(?)	[Fe/H]		-			(?)	Freqs:		-		
(?)	Z		-			(?)	modes:		-		
(?)	Hcent		-								
(?)	R_*		-		(Rsun)						
(?)	Mass		-		(Msun)						
(?)	Vrot		-		cm/s						
(?)	Wrot		-		rad/s						
(?)	Trot		-		sec						

Astroseismology

4.- Application: query

<http://www.../s3p.php?teff=8000/8300>

Astroseismology

Granada Stellar Seismic Models

Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in VO in order to perform on-line stellar seismology. This package contains the evolutionary code CESAM and two oscillation codes: [GraCo](#) and [FILOU](#)

25 results have been found for your search criteria.
You can click on column titles to sort results by that field

		<input type="checkbox"/> Mark All <input type="checkbox"/> Unmark All <input type="checkbox"/> Retrieve <input type="checkbox"/> Plot <input type="checkbox"/> New Search																					
Mark	Files	Track	T_{eff}	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	R+	Mass	Vrot	Wrot	Trot	α_{MLT}	Over.	F0	F1	F0/F1	$\Delta(v)$	$\delta(v)$	
<input type="checkbox"/>	osc freq	Track2	8295.2387	13.9730	4.1886	0.4382	490	0.01	0.0178	0.708	1.8130	1.8502	-4.9808e+6	-3.9500e-5	1.5907e+5	0.5	0.2	198.7240	256.7710	0.7739	64.6402±2.3950	0.3917±1.3494	
<input type="checkbox"/>	osc freq	Track2	8284.8200	14.0225	4.1848	0.4326	500	0.01	0.0178	0.708	1.8208	1.8502	-5.0021e+6	-3.9500e-5	1.5907e+5	0.5	0.2	197.4472	255.1196	0.7739	64.2420±2.3805	0.2306±1.3836	
<input type="checkbox"/>	osc freq	Track2	8274.2655	14.0723	4.1811	0.4270	510	0.01	0.0178	0.708	1.8287	1.8502	-5.0238e+6	-3.9500e-5	1.5907e+5	0.5	0.2	196.1745	253.4917	0.7739	63.8421±2.3653	0.1104±1.4451	
<input type="checkbox"/>	osc freq	Track2	8263.5735	14.1225	4.1773	0.4214	520	0.01	0.0178	0.708	1.8367	1.8502	-5.0458e+6	-3.9500e-5	1.5907e+5	0.5	0.2	194.8903	251.8325	0.7739	63.4416±2.3506	-0.0197±1.4877	
<input type="checkbox"/>	osc freq	Track2	8252.7423	14.1729	4.1735	0.4159	530	0.01	0.0178	0.708	1.8448	1.8502	-5.0681e+6	-3.9500e-5	1.5907e+5	0.5	0.2	193.6095	250.1949	0.7738	63.0391±2.3352	-0.1405±1.5529	
<input type="checkbox"/>	osc freq	Track2	8241.7651	14.2238	4.1696	0.4104	540	0.01	0.0178	0.708	1.8530	1.8502	-5.0907e+6	-3.9500e-5	1.5907e+5	0.5	0.2	192.3146	248.5179	0.7738	62.6357±2.3205	-0.2941±1.5882	
<input type="checkbox"/>	osc freq	Track2	8230.6270	14.2749	4.1657	0.4049	550	0.01	0.0178	0.708	1.8614	1.8502	-5.1136e+6	-3.9500e-5	1.5907e+5	0.5	0.2	191.0235	246.8639	0.7738	62.2305±2.3052	-0.4199±1.6492	
<input type="checkbox"/>	osc freq	Track2	8219.3439	14.3265	4.1617	0.3994	560	0.01	0.0178	0.708	1.8699	1.8502	-5.1369e+6	-3.9500e-5	1.5907e+5	0.5	0.2	189.7190	245.1735	0.7738	61.8243±2.2904	-0.5765±1.6824	
<input type="checkbox"/>	osc freq	Track2	8207.9093	14.3783	4.1578	0.3939	570	0.01	0.0178	0.708	1.8785	1.8502	-5.1606e+6	-3.9500e-5	1.5907e+5	0.5	0.2	188.4166	243.4993	0.7738	61.4160±2.2751	-0.7271±1.7316	
<input type="checkbox"/>	osc freq	Track2	8196.3174	14.4306	4.1537	0.3885	580	0.01	0.0178	0.708	1.8872	1.8502	-5.1846e+6	-3.9500e-5	1.5907e+5	0.5	0.2	187.1041	241.8005	0.7738	61.0074±2.2601	-0.8857±1.7704	
<input type="checkbox"/>	osc freq	Track2	8184.5639	14.4831	4.1496	0.3831	590	0.01	0.0178	0.708	1.8961	1.8502	-5.2089e+6	-3.9500e-5	1.5907e+5	0.5	0.2	185.7926	240.1158	0.7738	60.5965±2.2446	-0.9983±1.8238	
<input type="checkbox"/>	osc freq	Track2	8172.6440	14.5361	4.1455	0.3777	600	0.01	0.0178	0.708	1.9051	1.8502	-5.2337e+6	-3.9500e-5	1.5907e+5	0.5	0.2	184.4684	238.3967	0.7738	60.1843±2.2297	-1.1780±1.8472	
<input type="checkbox"/>	osc freq	Track2	8160.5395	14.5892	4.1414	0.3723	610	0.01	0.0178	0.708	1.9142	1.8502	-5.2588e+6	-3.9500e-5	1.5907e+5	0.5	0.2	183.1458	236.6947	0.7738	59.7705±2.2142	-1.3157±1.8952	
<input type="checkbox"/>	osc freq	Track2	8148.2699	14.6428	4.1372	0.3669	620	0.01	0.0178	0.708	1.9235	1.8502	-5.2843e+6	-3.9500e-5	1.5907e+5	0.5	0.2	181.8128	234.9667	0.7738	59.3556±2.1991	-1.4758±1.9247	
<input type="checkbox"/>	osc freq	Track2	8135.8149	14.6966	4.1329	0.3616	630	0.01	0.0178	0.708	1.9330	1.8502	-5.3103e+6	-3.9500e-5	1.5907e+5	0.5	0.2	180.4799	233.2491	0.7738	58.9390±2.1835	-1.6164±1.9684	
<input type="checkbox"/>	osc freq	Track2	8123.1818	14.7509	4.1286	0.3562	640	0.01	0.0178	0.708	1.9425	1.8502	-5.3366e+6	-3.9500e-5	1.5907e+5	0.5	0.2	179.1365	231.5072	0.7738	58.5215±2.1682	-1.7626±1.9998	
<input type="checkbox"/>	osc freq	Track2	8110.3775	14.8056	4.1243	0.3509	650	0.01	0.0178	0.708	1.9523	1.8502	-5.3634e+6	-3.9500e-5	1.5907e+5	0.5	0.2	177.7918	229.7729	0.7738	58.1010±2.1526	-1.9207±2.0351	
<input type="checkbox"/>	osc freq	Track2	8097.3448	14.8603	4.1199	0.3456	660	0.01	0.0178	0.708	1.9622	1.8502	-5.3906e+6	-3.9500e-5	1.5907e+5	0.5	0.2	176.4430	228.0330	0.7738	57.6799±2.1369	-2.0629±2.0730	
<input type="checkbox"/>	osc freq	Track2	8084.1301	14.9154	4.1154	0.3404	670	0.01	0.0178	0.708	1.9723	1.8502	-5.4183e+6	-3.9500e-5	1.5907e+5	0.5	0.2	175.0839	226.2896	0.7738	57.2579±2.1215	-2.2111±2.1000	
<input type="checkbox"/>	osc freq	Track2	8070.7140	14.9709	4.1109	0.3351	680	0.01	0.0178	0.708	1.9825	1.8502	-5.4464e+6	-3.9500e-5	1.5907e+5	0.5	0.2	173.7240	224.5152	0.7738	56.8336±2.1057	-2.3528±2.1351	
<input type="checkbox"/>	osc freq	Track2	8057.0825	15.0267	4.1064	0.3299	690	0.01	0.0178	0.708	1.9929	1.8502	-5.4750e+6	-3.9500e-5	1.5907e+5	0.5	0.2	172.3526	222.7337	0.7738	56.4075±2.0903	-2.5233±2.1534	
<input type="checkbox"/>	osc freq	Track2	8043.2393	15.0828	4.1018	0.3247	700	0.01	0.0178	0.708	2.0035	1.8502	-5.5041e+6	-3.9500e-5	1.5907e+5	0.5	0.2	170.9806	220.9613	0.7738	55.9791±2.0745	-2.6843±2.1808	
<input type="checkbox"/>	osc freq	Track2	8029.1759	15.1391	4.0971	0.3195	710	0.01	0.0178	0.708	2.0143	1.8502	-5.5337e+6	-3.9500e-5	1.5907e+5	0.5	0.2	169.6029	219.1812	0.7738	55.5499±2.0586	-2.8306±2.2122	
<input type="checkbox"/>	osc freq	Track2	8014.8863	15.1958	4.0924	0.3143	720	0.01	0.0178	0.708	2.0253	1.8502	-5.5639e+6	-3.9500e-5	1.5907e+5	0.5	0.2	168.2156	217.3803	0.7738	55.1197±2.0430	-2.9831±2.2375	
<input type="checkbox"/>	osc freq	Track2	8000.3621	15.2527	4.0876	0.3092	730	0.01	0.0178	0.708	2.0364	1.8502	-5.5945e+6	-3.9500e-5	1.5907e+5	0.5	0.2	166.8257	215.5831	0.7738	54.6862±2.0270	-3.1468±2.2645	

Astroseismology

Granada Stellar Seismic Models

Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to be used in VO in order to perform on-line stellar seismology. This package contains the evolutionary code CESAM and two oscillation codes: TrACo and FILOU

25 results have been found for your search criteria..
You can click on column titles to sort results by that field

Mark	Files	Track	T_{eff}	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	R*	Mass	Vrot	Wrot	Trot	α_{MLT}	Over.	F0	F1	F0/F1	$\Delta(v)$	$\delta(v)$
<input type="checkbox"/>	osc freq	Track2	8295.2387	13.9730	4.1886	0.4382	490	0.01	0.0178	0.708	1.8130	1.8502	-4.9808e+6	-3.9500e-5	1.5907e+5	0.5	0.2	198.7240	256.7710	0.7739	64.6402±2.3950	0.3917±1.3494
<input type="checkbox"/>	osc freq	Track2	8284.8200	14.0225	4.1848	0.4326	500	0.01	0.0178	0.708	1.8208	1.8502	-5.0021e+6	-3.9500e-5	1.5907e+5	0.5	0.2	197.4472	255.1196	0.7739	64.2420±2.3805	0.2306±1.3836
<input type="checkbox"/>	osc freq	Track2	8274.2655	14.0723	4.1811	0.4271	510	0.01	0.0178	0.708	1.8286	1.8502	-5.0142e+6	-3.9500e-5	1.5907e+5	0.5	0.2	196.1704	253.4680	0.7739	63.8442±2.3653	0.1104±1.4451
<input type="checkbox"/>	osc freq	Track2	8263.5735	14.1225	4.1773	0.4222	520	0.01	0.0178	0.708	1.8364	1.8502	-5.0263e+6	-3.9500e-5	1.5907e+5	0.5	0.2	194.8936	251.7264	0.7739	63.4464±2.3506	-0.0197±1.4877
<input type="checkbox"/>	osc freq	Track2	8252.7423	14.1729	4.1735	0.4173	530	0.01	0.0178	0.708	1.8442	1.8502	-5.0384e+6	-3.9500e-5	1.5907e+5	0.5	0.2	193.6168	249.9848	0.7739	63.0486±2.3352	-0.1405±1.5529
<input type="checkbox"/>	osc freq	Track2	8241.7651	14.2238	4.1696	0.4124	540	0.01	0.0178	0.708	1.8520	1.8502	-5.0505e+6	-3.9500e-5	1.5907e+5	0.5	0.2	192.3400	248.2432	0.7739	62.6508±2.3205	-0.2941±1.5882
<input type="checkbox"/>	osc freq	Track2	8230.6270	14.2749	4.1657	0.4075	550	0.01	0.0178	0.708	1.8598	1.8502	-5.0626e+6	-3.9500e-5	1.5907e+5	0.5	0.2	191.0632	246.5016	0.7739	62.2530±2.3052	-0.4199±1.6492
<input type="checkbox"/>	osc freq	Track2	8219.3439	14.3265	4.1617	0.3994	560	0.01	0.0178	0.708	1.8676	1.8502	-5.0747e+6	-3.9500e-5	1.5907e+5	0.5	0.2	189.7864	244.7600	0.7739	61.8552±2.2904	-0.5765±1.6824
<input type="checkbox"/>	osc freq	Track2	8207.9093	14.3783	4.1578	0.3939	570	0.01	0.0178	0.708	1.8754	1.8502	-5.1606e+6	-3.9500e-5	1.5907e+5	0.5	0.2	188.5096	243.0184	0.7738	61.4574±2.2751	-0.7271±1.7316
<input type="checkbox"/>	osc freq	Track2	8196.3174	14.4306	4.1537	0.3885	580	0.01	0.0178	0.708	1.8832	1.8502	-5.1846e+6	-3.9500e-5	1.5907e+5	0.5	0.2	187.2328	241.2768	0.7738	61.0596±2.2601	-0.8857±1.7704
<input type="checkbox"/>	osc freq	Track2	8184.5639	14.4831	4.1496	0.3831	590	0.01	0.0178	0.708	1.8910	1.8502	-5.2089e+6	-3.9500e-5	1.5907e+5	0.5	0.2	185.9560	239.5352	0.7738	60.6618±2.2446	-0.9983±1.8238
<input type="checkbox"/>	osc freq	Track2	8172.6440	14.5361	4.1455	0.3777	600	0.01	0.0178	0.708	1.9051	1.8502	-5.2337e+6	-3.9500e-5	1.5907e+5	0.5	0.2	184.6792	237.7936	0.7738	60.2640±2.2297	-1.1780±1.8472
<input type="checkbox"/>	osc freq	Track2	8160.5395	14.5892	4.1414	0.3723	610	0.01	0.0178	0.708	1.9142	1.8502	-5.2588e+6	-3.9500e-5	1.5907e+5	0.5	0.2	183.4024	236.0520	0.7738	59.8662±2.2142	-1.3157±1.8952
<input type="checkbox"/>	osc freq	Track2	8148.2699	14.6428	4.1372	0.3669	620	0.01	0.0178	0.708	1.9235	1.8502	-5.2843e+6	-3.9500e-5	1.5907e+5	0.5	0.2	182.1256	234.3104	0.7738	59.4684±2.1991	-1.4758±1.9247
<input type="checkbox"/>	osc freq	Track2	8135.8149	14.6966	4.1329	0.3616	630	0.01	0.0178	0.708	1.9330	1.8502	-5.3103e+6	-3.9500e-5	1.5907e+5	0.5	0.2	180.8488	232.5688	0.7738	59.0706±2.1835	-1.6164±1.9684
<input type="checkbox"/>	osc freq	Track2	8123.1818	14.7509	4.1286	0.3562	640	0.01	0.0178	0.708	1.9425	1.8502	-5.3366e+6	-3.9500e-5	1.5907e+5	0.5	0.2	179.5720	230.8272	0.7738	58.6728±2.1682	-1.7626±1.9998
<input type="checkbox"/>	osc freq	Track2	8110.3775	14.8056	4.1243	0.3509	650	0.01	0.0178	0.708	1.9523	1.8502	-5.3634e+6	-3.9500e-5	1.5907e+5	0.5	0.2	177.7918	229.0856	0.7738	58.2750±2.1526	-1.9207±2.0351
<input type="checkbox"/>	osc freq	Track2	8097.3448	14.8603	4.1199	0.3456	660	0.01	0.0178	0.708	1.9622	1.8502	-5.3906e+6	-3.9500e-5	1.5907e+5	0.5	0.2	176.0116	227.3440	0.7738	57.8772±2.1369	-2.0629±2.0730
<input type="checkbox"/>	osc freq	Track2	8084.1301	14.9154	4.1154	0.3404	670	0.01	0.0178	0.708	1.9723	1.8502	-5.4183e+6	-3.9500e-5	1.5907e+5	0.5	0.2	174.2314	225.6024	0.7738	57.4794±2.1215	-2.2111±2.1000
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<input type="checkbox"/>	osc freq	Track2	8057.0825	15.0267	4.1064	0.3299	690	0.01	0.0178	0.708	1.9929	1.8502	-5.4750e+6	-3.9500e-5	1.5907e+5	0.5	0.2	170.6710	222.1192	0.7738	56.6838±2.0903	-2.5233±2.1534
<input type="checkbox"/>	osc freq	Track2	8043.2393	15.0828	4.1018	0.3247	700	0.01	0.0178	0.708	2.0035	1.8502	-5.5041e+6	-3.9500e-5	1.5907e+5	0.5	0.2	168.8908	220.3776	0.7738	56.2860±2.0745	-2.6843±2.1808
<input type="checkbox"/>	osc freq	Track2	8029.1759	15.1391	4.0971	0.3195	710	0.01	0.0178	0.708	2.0143	1.8502	-5.5337e+6	-3.9500e-5	1.5907e+5	0.5	0.2	167.1106	218.6360	0.7738	55.8882±2.0586	-2.8306±2.2122
<input type="checkbox"/>	osc freq	Track2	8014.8863	15.1958	4.0924	0.3143	720	0.01	0.0178	0.708	2.0253	1.8502	-5.5639e+6	-3.9500e-5	1.5907e+5	0.5	0.2	165.3304	216.8944	0.7738	55.4904±2.0430	-2.9831±2.2375
<input type="checkbox"/>	osc freq	Track2	8000.3621	15.2527	4.0876	0.3092	730	0.01	0.0178	0.708	2.0364	1.8502	-5.5945e+6	-3.9500e-5	1.5907e+5	0.5	0.2	163.5502	215.1528	0.7738	55.0926±2.0270	-3.1468±2.2645

The user mark some files, click Plot...

What does the application do?

Astroseismology

7.- Application: queries (...)

<http://www.../s3p.php?id=100&type=osc>

Astroseismology

7.- Application: queries (...)

<http://www.../s3p.php?id=100&type=osc>

8.- Server: answers (...)

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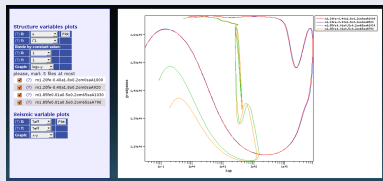
```


Astroseismology

7.- Application: queries (...)

<http://www.../s3p.php?id=100&type=osc>

9.- Application: ...



8.- Server: answers (...)

```

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```

Astroseismology

Structure variables plots

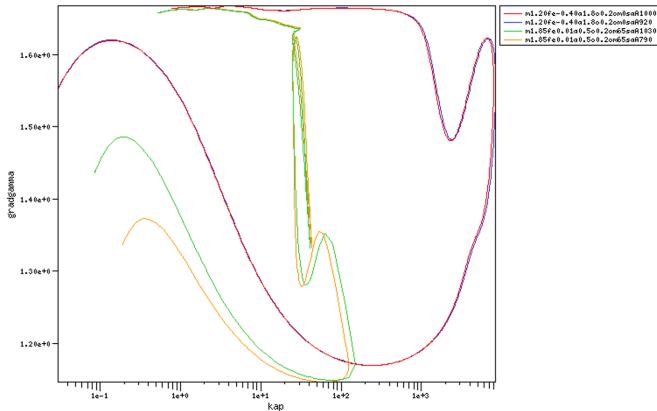
(?) X:	k	Plot
(?) Y:	Γ_1	
Divide by constant value:		
(?) X:	1	
(?) Y:	1	
Graph:	logx-y	

please, mark 5 files at most

- (?) m1.20fe-0.40a1.80o.2om0saA1000
- (?) m1.20fe-0.40a1.80o.2om0saA920
- (?) m1.85fe0.01a0.5o0.2om65saA1030
- (?) m1.85fe0.01a0.5o0.2om65saA790

Seismic variable plots

(?) X:	Teff	Plot
(?) Y:	Teff	
Graph:	x-y	

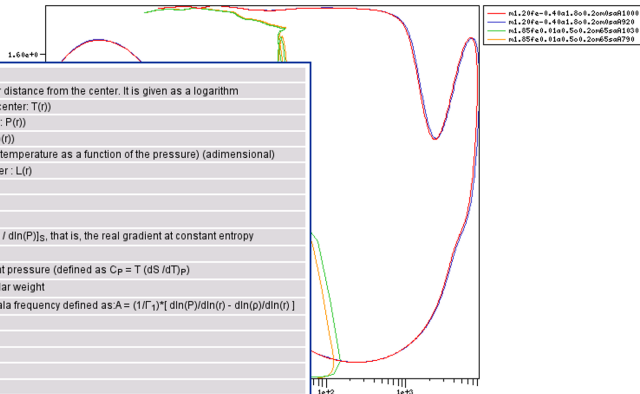


Astroseismology

Structure variables plots

(?) X: Plot

(?)	R	Distance to the center of the star
Div	log(m)	Logarithm of the mass of the shell at r distance from the center. It is given as a logarithm
(?)	T	Temperature at a distance r from the center: T(r)
(?)	P	Pressure at distance r from the center: P(r)
Gr	ρ	density at distance r from the center: $\rho(r)$
ple	dlnT/dlnP	Called "real gradient". Variation of the temperature as a function of the pressure (adimensional)
<input checked="" type="checkbox"/>	Lum	Luminosity at distance r from the center : L(r)
<input checked="" type="checkbox"/>	κ	Rosseland opacity
<input checked="" type="checkbox"/>	Th.Energy	Thermonuclear energy
<input checked="" type="checkbox"/>	Γ_1	$d \ln(P) / d \ln(\rho)$
	adiab. ∇	adiabatic gradient, defined as: $[d \ln(T) / d \ln(P)]_S$, that is, the real gradient at constant entropy
Sei	δ	$- d \ln(\rho) / d \ln(T)$
(?)	C_p	specific heat per unit mass at constant pressure (defined as $C_p = T (dS / dT)_p$)
(?)	$1/(\mu_e)$	$1/(\mu_e)$, where μ is the main molecular weight
Gr	A	A : Quantity proportional to Brunt-Vaisala frequency defined as: $A = (1/\Gamma_1) * [d \ln(P) / d \ln(r) - d \ln(\rho) / d \ln(r)]$
	Ω	angular velocity
	d ln κ / d ln T	d ln κ / d ln T
	d ln κ / d ln ρ	d ln κ / d ln ρ
	d ϵ / d ln T	d ϵ (nuc) / d ln T
	d ϵ / d ln ρ	d ϵ / d ln ρ
	P_{tot} / P_{gas}	P_{tot} / P_{gas} . $P_{tot} = P_{turb} + P_{gas} + P_{rad}$
	∇_{rad}	temperature radiative gradient (defined as: $\nabla_{rad} = (3 / [16 * \pi * a * c * G]) * (\kappa * P / T^3) * L(r) / M(r)$)



Astroseismology

Structure variables plots

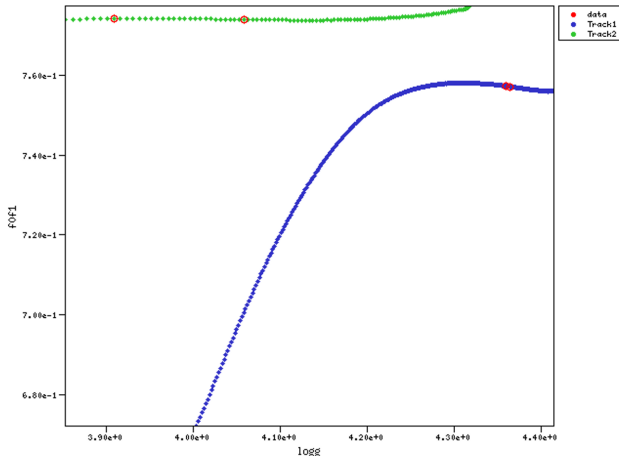
(?) X:	<input type="text" value="k"/>	<input type="button" value="Plot"/>
(?) Y:	<input type="text" value="Γ1"/>	
Divide by constant value:		
(?) X:	<input type="text" value="1"/>	
(?) Y:	<input type="text" value="1"/>	
Graph:	<input type="text" value="logx-y"/>	

please, mark 5 files at most

- (?) m1.20fe-0.40a1.8o0.2om0saA1000
- (?) m1.20fe-0.40a1.8o0.2om0saA920
- (?) m1.85fe0.01a0.5o0.2om65saA1030
- (?) m1.85fe0.01a0.5o0.2om65saA790

Seismic variable plots

(?) X:	<input type="text" value="Log(g)"/>	<input type="button" value="Plot"/>
(?) Y:	<input type="text" value="F0/F1"/>	
Graph:	<input type="text" value="x-y"/>	





Work in progress

- Minor changes to the IVOA note defining the protocol.
- Having the protocol considered by DAL people?
- Astroseismology case.

THANK YOU!