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 itselt 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
Author(s):
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Editor(s):
Carlos Rodrigo, Enrique Solano

Abstract

A working approach

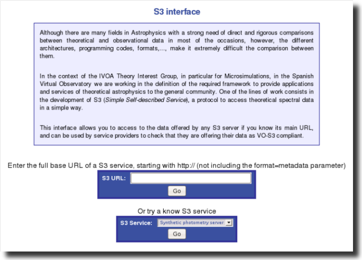
- SSAP: a very similar approach for the case of theoretical spectra.
- Isochrones/evolutionary tracks servers.
  - Spanish VO: NextGen, COND, DUSTY, Siess.
  - Italian VO: BATSI.
  - An application using some services to compare with user data (*iDraw*)
- Synthetic photometry service.
  - An application 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.



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
<VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1">  <RESOURCE type="meta">
    <DESCRIPTION>Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to b
    <PARAM name="concepts" value="http://localhost:80/carlos/svo/theory/astrosism/concepts.php"/>
    <PARAM name="bibcode" ucd="meta.bib" value="1997A%26AS..124..597M">
      <DESCRIPTION>CESAM evolutionary code</DESCRIPTION>
    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..129M">
      <DESCRIPTION>GraCo oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..155S">
      <DESCRIPTION>FILOU oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="INPUT:teff:range" ucd="phys.temperature" unit="K" utype="Star.Teff" datatype="float">
      <DESCRIPTION>Effective temperature</DESCRIPTION>
      <values>
        <min value="6330.54259462"/>
        <max value="8624.90808613"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:Lum:range" ucd="phys.luminosity" unit="Lsun" utype="Star.Luminosity" datatype="float">
      <DESCRIPTION>Luminosity (L/Lsun), Lsun=3.839 e33 erg/s</DESCRIPTION>
      <values>
        <min value="2.40289786048"/>
        <max value="17.3890505483"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:logg:range" ucd="phys.gravity" unit="" utype="Star.logg" datatype="float">
      <DESCRIPTION>Log(g) (g in cm/s2)</DESCRIPTION>
      <values>
        <min value="3.8486433931"/>
        <max value="4.41867992287"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:density:range" ucd="phys.density" unit="g/cm3" utype="Star.Density" datatype="float">
      <DESCRIPTION>Average density</DESCRIPTION>
      <values>
        <min value="0.137125362491"/>
        <max value="1.18750725442"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:age:range" ucd="time.age" unit="Myr" utype="Star.Age" datatype="float">
      <DESCRIPTION>Age</DESCRIPTION>
      <values>
        <min value="49.95"/>
        <max value="3803.8"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:feh:range" ucd="phys.abund.Fe" unit="" utype="Star.feh" datatype="float">
      <DESCRIPTION>[Fe/H]</DESCRIPTION>
      <values>
        <min value="-0.4004"/>
        <max value="0.01001"/>
      </values>
    </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>
      <values>
        <min value="0.00722845059614"/>
        <max value="0.0177724336804"/>
      </values>
    </PARAM>
    <PARAM name="INPUT:hcent:range" ucd="phys.abund.X" unit="" utype="Star.hcent" datatype="float">
      <DESCRIPTION>Hidrogen central fraction</DESCRIPTION>
      <values>
```

Astroseismology

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      <DESCRIPTION>GraCo oscillation code</DESCRIPTION>
    </PARAM>
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      <DESCRIPTION>FILOU oscillation code</DESCRIPTION>
    </PARAM>
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      </values>
    </PARAM>
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    <PARAM name="INPUT:feh:range" ucd="phys.abund.Fe" unit="" utype="Star.feh" datatype="float">
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      <values>
        <min value="-0.4004"/>
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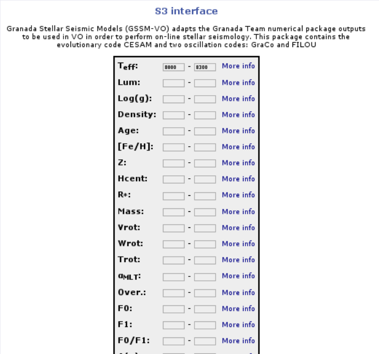
3.- Application: ...



S3 interface

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

Teff:	8000	-	8300	More info
Lum:		-		More info
Log(g):		-		More info
Density:		-		More info
Age:		-		More info
[Fe/H]:		-		More info
Z:		-		More info
Hcent:		-		More info
R*:		-		More info
Mass:		-		More info
Vrot:		-		More info
Wrot:		-		More info
Trot:		-		More info
α_{MLT}:		-		More info
Over.:		-		More info
F0:		-		More info
F1:		-		More info
F0/F1:		-		More info

Astroseismology

1.- Application: query

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

2.- Server: answer

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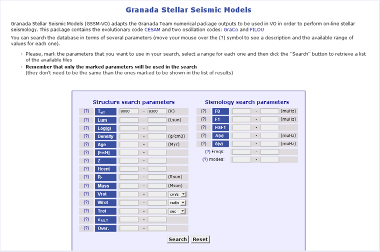

Astroseismology

1.- Application: query

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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 ineraction)

2.- Server: answer


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    </PARAM>
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    </PARAM>
    <PARAM name="INPUT:feh:range" ucd="phys.abund.Fe" unit="" utype="Star.feh" datatype="float">
      <DESCRIPTION>[Fe/H]</DESCRIPTION>
      <values>
        <min value="-0.4004"/>
        <max value="0.01001"/>
      </values>
    </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>
      <values>
        <min value="0.00722845059614"/>
        <max value="0.0177724336804"/>
      </values>
    </PARAM>
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      <values>
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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

(?)	T_{eff}	8000	-	8300	(K)
(?)	Lum		-		(Lsun)
(?)	Log(g)		-		
(?)	Density		-		(g/cm3)
(?)	Age		-		(Myr)
(?)	[Fe/H]		-		
(?)	Z		-		
(?)	Hcent		-		
(?)	R_*		-		(Rsun)
(?)	Mass		-		(Msun)
(?)	Vrot		-		cm/s
(?)	Wrot		-		rad/s
(?)	Trot		-		sec

Sismology search parameters

(?)	F0		-		(muHz)
(?)	F1		-		(muHz)
(?)	F0/F1		-		
(?)	$\Delta(\nu)$		-		(muHz)
(?)	$\delta(\nu)$		-		(muHz)
(?)	Freqs:		-		
(?)	modes:		-		

Astroseismology

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  (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

(?)	T_{eff}	8000	-	8300	(K)
(?)	Lum		-		(Lsun)
(?)	Log(g)		-		
(?)	Density		-		(g/cm3)
(?)	Age		-		(Myr)
(?)	[Fe/H]		-		
(?)	Z		-		
(?)	Hcent		-		
(?)	R_*		-		(Rsun)
(?)	Mass		-		(Msun)
(?)	Vrot		-		cm/s
(?)	Wrot		-		rad/s
(?)	Trot		-		sec

Sismology search parameters

(?)	F0		-		(muHz)
(?)	F1		-		(muHz)
(?)	F0/F1		-		
(?)	Δ(ν)		-		(muHz)
(?)	δ(ν)		-		(muHz)
(?) Freqs:			-		
(?) modes:			-		

Astroseismology

4.- Application: query

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

Astroseismology

4.- Application: query

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

5.- Server: answer


```
<VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1">  <INFO name="QUERY_STATUS" val
  <RESOURCE type="results">
    <DESCRIPTION>Granada Stellar Seismic Models (GSSM-VO) adapts the Granada Team numerical package outputs to b
    <PARAM name="concepts" value="http://localhost:80/carlos/svo/theory/astrosism/concepts.php"/>
    <PARAM name="bibcode" ucd="meta.bib" value="1997A%26AS..124..597M">
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      <DESCRIPTION>GraCo oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..155S">
      <DESCRIPTION>FILOU oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="teff" ucd="phys.temperature" unit="K" value="8000/8300" utype="Star.Teff" datatype="float"/>
    <TABLE>
      <FIELD name="teff" ucd="phys.temperature" unit="K" utype="Star.Teff" datatype="float">
        <DESCRIPTION>Effective temperature</DESCRIPTION>
      </FIELD>
      <FIELD name="Lum" ucd="phys.luminosity" unit="Lsun" utype="Star.Luminosity" datatype="float">
        <DESCRIPTION>Luminosity (L/Lsun), Lsun=3.839 e33 erg/s</DESCRIPTION>
      </FIELD>
      <FIELD name="logg" ucd="phys.gravity" unit="" utype="Star.logg" datatype="float">
        <DESCRIPTION>Log(g) (g in cm/s2)</DESCRIPTION>
      </FIELD>
      <FIELD name="density" ucd="phys.density" unit="g/cm3" utype="Star.Density" datatype="float">
        <DESCRIPTION>Average density</DESCRIPTION>
```

```
      <FIELD name="link_osc" ucd="DATA_LINK">
        <DESCRIPTION>Link to structure data file</DESCRIPTION>
      </FIELD>
      <FIELD name="link_freq" ucd="DATA_LINK">
        <DESCRIPTION>Link to seismology data file</DESCRIPTION>
      </FIELD>
      <TABLEDATA>
        <TR>
          <TD>8295.2387</TD>     <TD>13.9730</TD>     <TD>4.1886</TD>     <TD>0.4382</TD>
        <TR>
          <TD>8284.8200</TD>     <TD>14.0225</TD>     <TD>4.1848</TD>     <TD>0.4326</TD>
        <TR>
          <TD>8274.2655</TD>     <TD>14.0723</TD>     <TD>4.1811</TD>     <TD>0.4270</TD>
        <TR>
          <TD>8263.5735</TD>     <TD>14.1225</TD>     <TD>4.1773</TD>     <TD>0.4214</TD>
        <TR>
          <TD>8252.7423</TD>     <TD>14.1729</TD>     <TD>4.1735</TD>     <TD>0.4159</TD>
        <TR>
          <TD>8241.7651</TD>     <TD>14.2238</TD>     <TD>4.1696</TD>     <TD>0.4104</TD>
        <TR>
          <TD>8230.6270</TD>     <TD>14.2749</TD>     <TD>4.1657</TD>     <TD>0.4049</TD>
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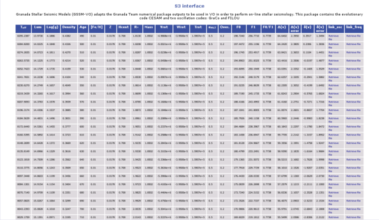
Astroseismology

4.- Application: query

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

6.- Application: ...



5.- Server: answer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      <DESCRIPTION>CESAM evolutionary code</DESCRIPTION>
    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..129M">
      <DESCRIPTION>GraCo oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..155S">
      <DESCRIPTION>FILOU oscillation code</DESCRIPTION>
    </PARAM>
    <PARAM name="teff" ucd="phys.temperature" unit="K" value="8000/8300" utype="Star.Teff" datatype="float"/>
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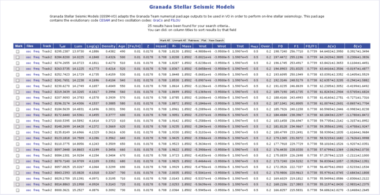
```

Astroseismology

4.- Application: query

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

6.- Application: ...



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

Mark All | Unmark All | Retrieve | Plot | 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	Δ(ν)	δ(ν)
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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	-0.8657±1.7704
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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	226.2698	0.7738	57.2579±2.1215	-2.2111±2.1000
☐	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
☐	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
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☐	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
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5.- Server: answer


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    <PARAM name="bibcode" ucd="meta.bib" value="1997A%26AS..124..597M">
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    </PARAM>
    <PARAM name="bibcode" ucd="meta.bib" value="2008Ap%26SS.316..129M">
      <DESCRIPTION>GraCo oscillation code</DESCRIPTION>
    </PARAM>
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          <TD>8184.5639</TD>      <TD>14.4831</TD>      <TD>4.1496</TD>      <TD>0.3831</TD>
        <TR>
          <TD>8172.6440</TD>      <TD>14.5361</TD>      <TD>4.1455</TD>      <TD>0.3777</TD>
```

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

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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	$\Delta(\nu)$	$\delta(\nu)$
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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	-0.8657±1.7704
☐	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
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☐	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
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☐	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: GraCo and FILOU

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

Mark All | Unmark All | Retrieve | Plot | 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	Δ(v)	δ(v)
☐	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
☐	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
☐	osc freq	Track2	8274.2655	14.0723	4.1811	0.427	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3421±2.3653	0.1104±1.4451
☐	osc freq	Track2	8263.5735	14.1225	4.1773	0.421	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.6±2.3506	-0.0197±1.4877
☐	osc freq	Track2	8252.7423	14.1729	4.1735	0.415	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1±2.3352	-0.1405±1.5529
☐	osc freq	Track2	8241.7651	14.2238	4.1696	0.410	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7±2.3205	-0.2941±1.5882
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☐	osc freq	Track2	8219.3439	14.3265	4.1617	0.3994	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	243±2.2904	-0.5765±1.6824
☐	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
☐	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	-0.8657±1.7704
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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
☐	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	226.2698	0.7738	57.2579±2.1215	-2.2111±2.1000
☐	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
☐	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
☐	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
☐	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
☐	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
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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

8.- Server: answers (...)


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      <FIELD name="thenergy" ucd="phys.energy" unit="" utype="Shell.ThermoEnergy" datatype="float">
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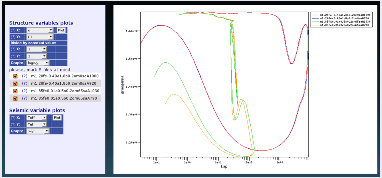
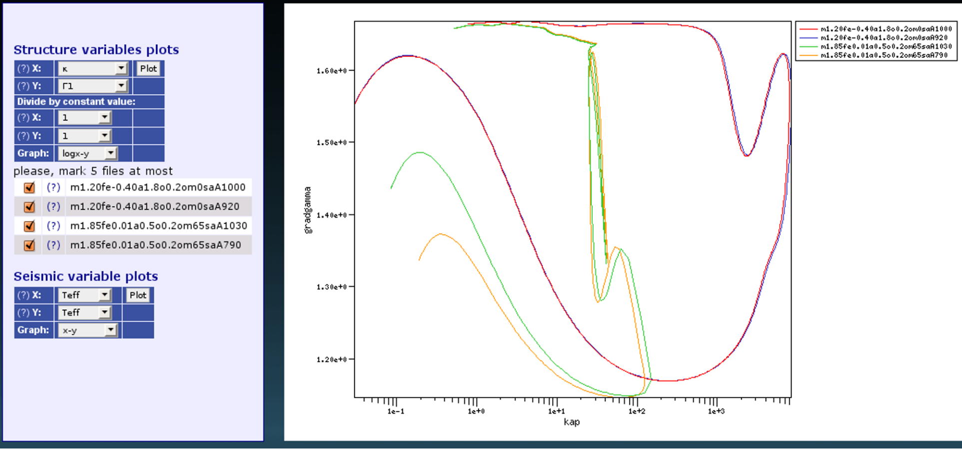
9.- Application: ...



Astroseismology



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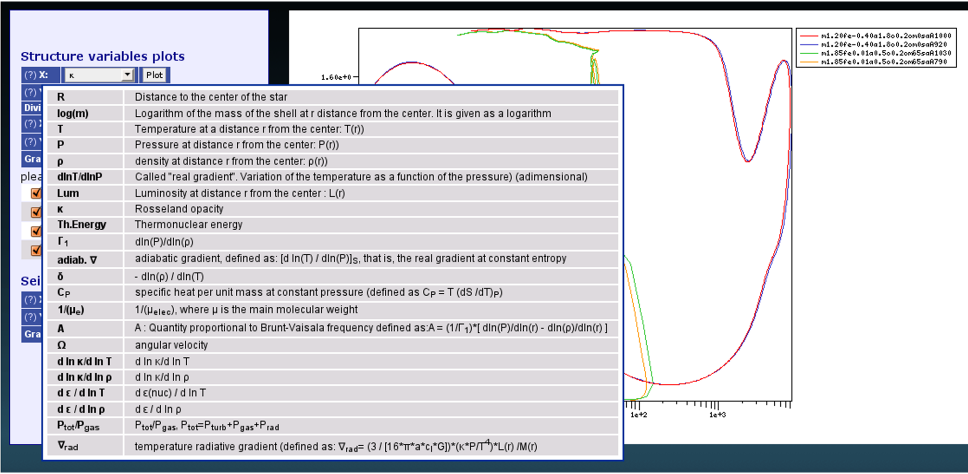
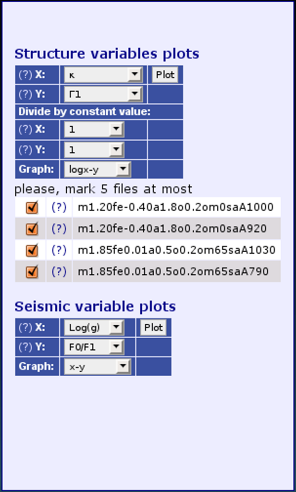
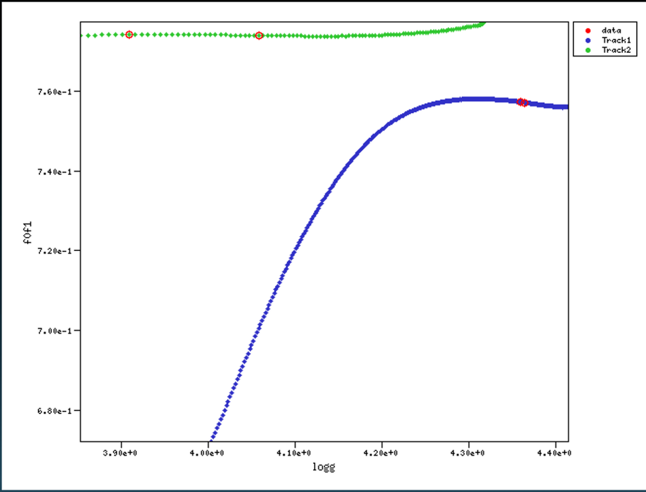


R	Distance to the center of the star
log(m)	Logarithm of the mass of the shell at r distance from the center. It is given as a logarithm
T	Temperature at a distance r from the center: T(r))
P	Pressure at distance r from the center: P(r))
ρ	density at distance r from the center: ρ(r))
dlnT/dlnP	Called "real gradient". Variation of the temperature as a function of the pressure) (adimensional)
Lum	Luminosity at distance r from the center : L(r)
κ	Rosseland opacity
Th.Energy	Thermonuclear energy
Γ_1	dln(P)/dln(ρ)
adiab. ∇	adiabatic gradient, defined as: $[d \ln(T) / d\ln(P)]_S$, that is, the real gradient at constant entropy
δ	- dln(ρ) / dln(T)
C_P	specific heat per unit mass at constant pressure (defined as $C_P = T\,(dS/dT)_P$)
$1/(\mu_e)$	$1/(\mu_{elec})$, where μ is the main molecular weight
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: $\nabla_{rad} = (3 / [16*\pi*a*c_l*G])*(\kappa*P/T^4)*L(r)/M(r)$)

Astroseismology





Work in progress

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

THANK YOU!