S3: Simple Self-described Service

A simple access protocol for microphysics simulations

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Garching, Nov 9-12, 2009

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)

Tool/Data servers VO (S3) interactions

Tool

1

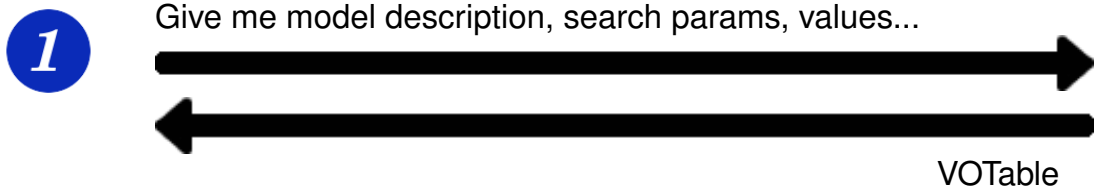
Give me model description, search params, values...

VOTable

Data server

Tool/Data servers VO (S3) interactions

Tool

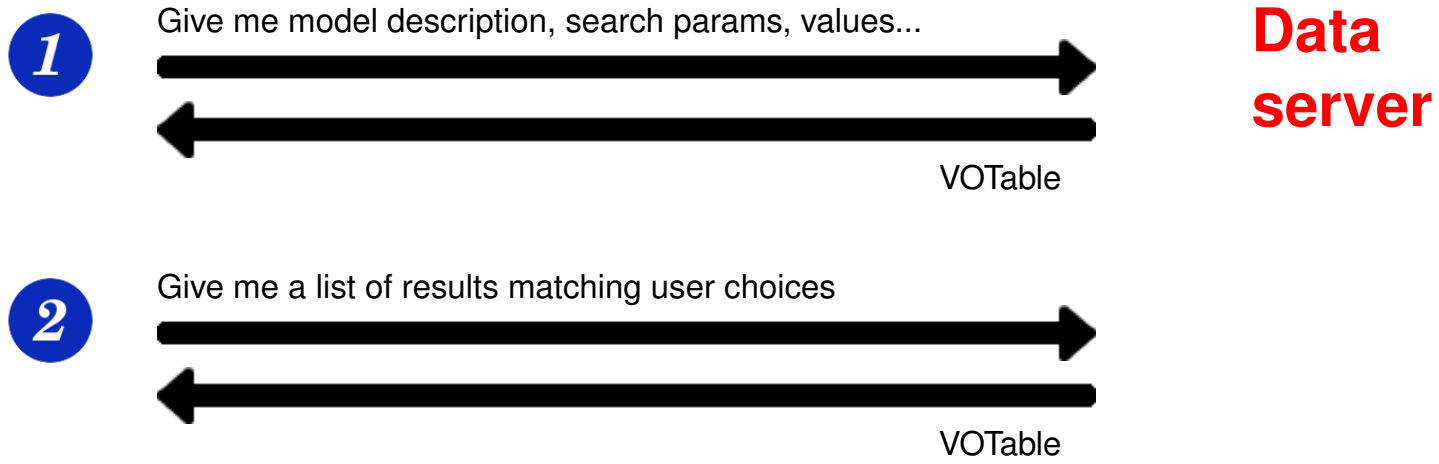


Data server

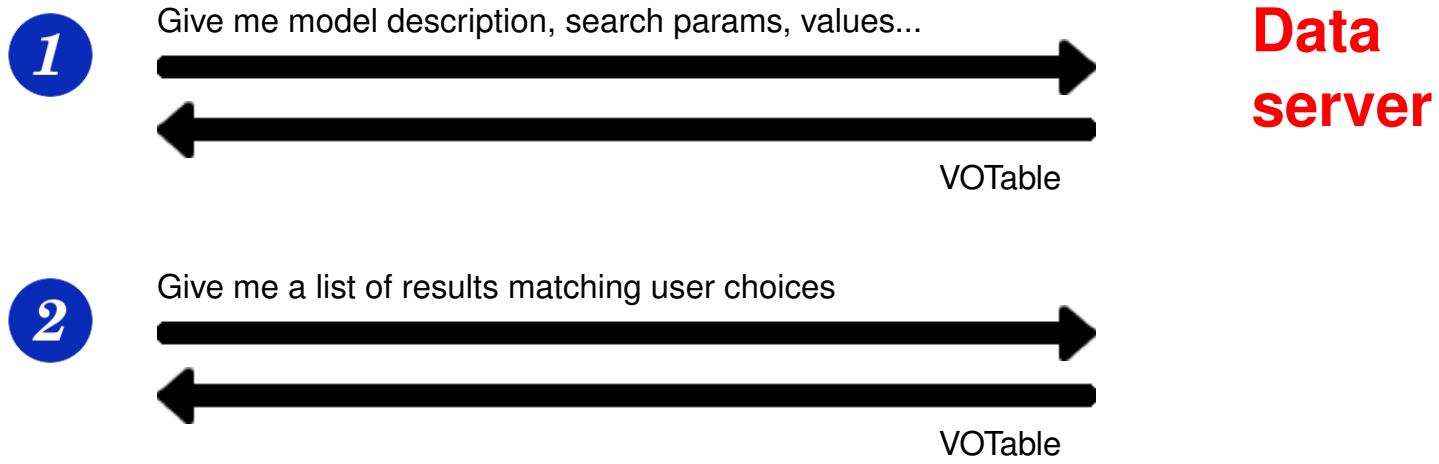
- The tool (typically) builds a form with search parameters.
- The user selects ranges for the model parameters

  (In S3 this can be a multi-step interaction)

Tool/Data servers VO (S3) interactions



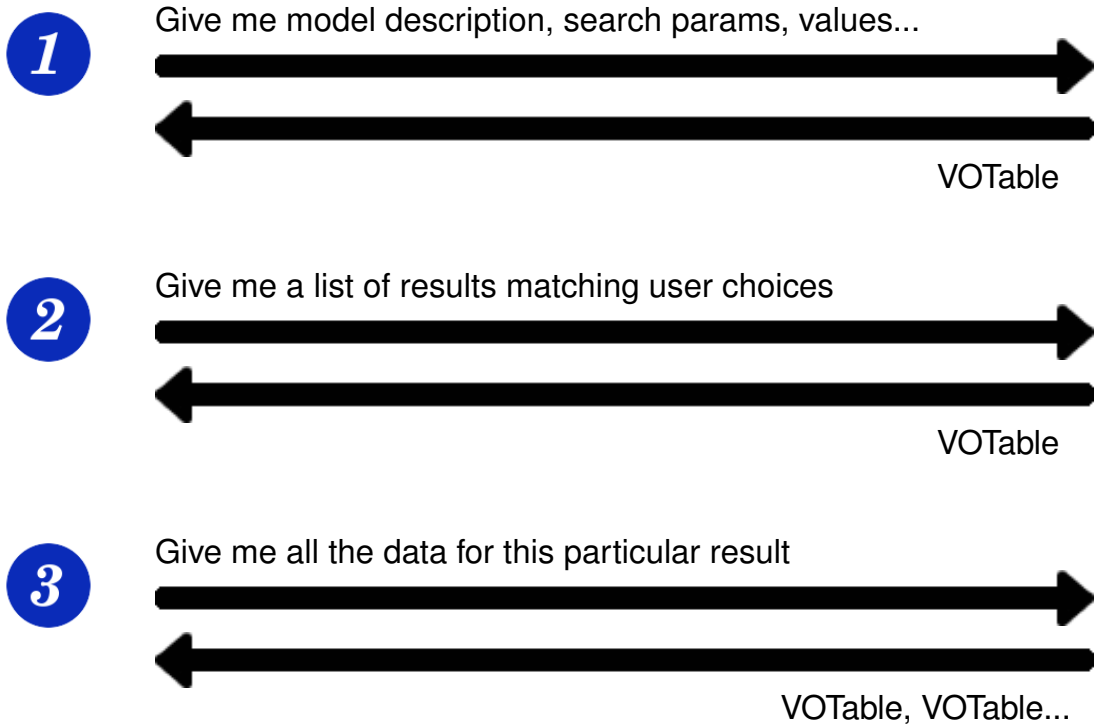
Tool/Data servers VO (S3) interactions



- The tool builds the table with the results and offers possible options to the user

Tool/Data servers VO (S3) interactions

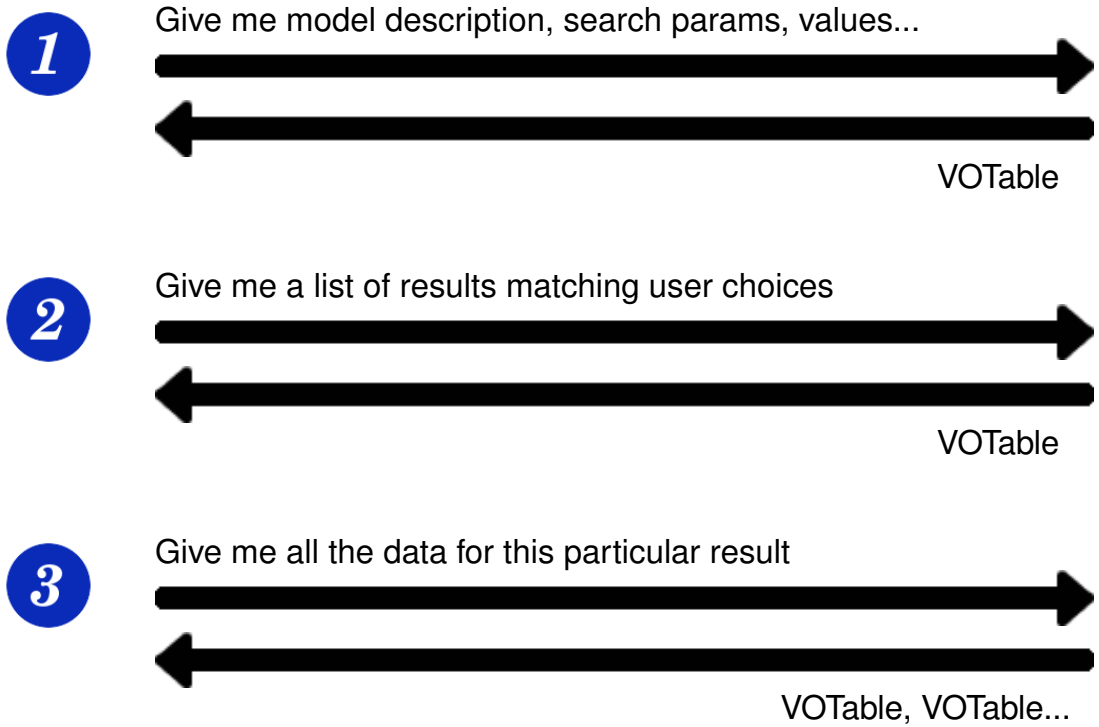
Tool



Data server

Tool/Data servers VO (S3) interactions

Tool



Data server

- The tool makes graphs with that data
- The user dowloads the data, etc

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

The aim of this document is to suggest a new protocol designed to provide access to theoretical data/services in the

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.
- Synthetic photometry service.
- An application using these services to infer physical parameters from observed data (*VOSA*)
  - $\sim$ 200 registered users
- Used for science (*Bayo et al, A&A 2008, 429,277B*)
- Asteroseismology.

Utilities

- S3 wizard
  - A wizard that helps to build a VO service for a theoretical model.
  - Simple inputs
  - The application builds the database, S3 services...
- S3 interface
  - A web interface to test any S3 service.
  - It shows how an application is expected to understand (or not) your service.

Asteroseismology services and VO tool

- Currently 4 different codes integrated.
  - CESAM, CESAM2k structure codes.
  - FILOU, GraCo oscillation codes.
  - More that 500.000 models.
  - Almost 1Tb of data.
  - Growing.
- All interactions between tool and data services: S3
- First version of a Data Model for asteroseismology data.
  - 17 star global properties.
  - 44 star shell variables.
  - 35 seismic properties.
- A complex case.

Asteroseismology

1.- Application: query

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

2.- Server: answer


```
<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>
```


3.- 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

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	-	(muHz)
(?)	Lum	-	(Lsun)	(?)	F1	-	(muHz)
(?)	Log(g)	-		(?)	F0/F1	-	
(?)	Density	-	(g/cm3)	(?)	Δ(ν)	-	(muHz)
(?)	Age	-	(Myr)	(?)	δ(ν)	-	(muHz)
(?)	[Fe/H]	-		(?)	Freqs:	-	
(?)	Z	-		(?)	modes:	-	
(?)	Hcent	-					
(?)	R.	-	(Rsun)				
(?)	Mass	-	(Msun)				
(?)	Vrot	-	cm/s				
(?)	Wrot	-	rad/s				
(?)	Trot	-	sec				
(?)	α_{MLT}	-					
(?)	Over.	-					

Search | Reset

Asteroseismology

1.- Application: query

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

2.- Server: answer


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    </PARAM>
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(?)	Log(g)	-			(?)	F0/F1	-		
(?)	Density	-	(g/cm3)		(?)	Δ(ν)	-	(muHz)	
(?)	Age	-	(Myr)		(?)	δ(ν)	-	(muHz)	
(?)	[Fe/H]	-			(?) Freqs:		-		
(?)	Z	-			(?) modes:		-		
(?)	Hcent	-							
(?)	R.	-	(Rsun)						
(?)	Mass	-	(Msun)						
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Search | Reset

Asteroseismology

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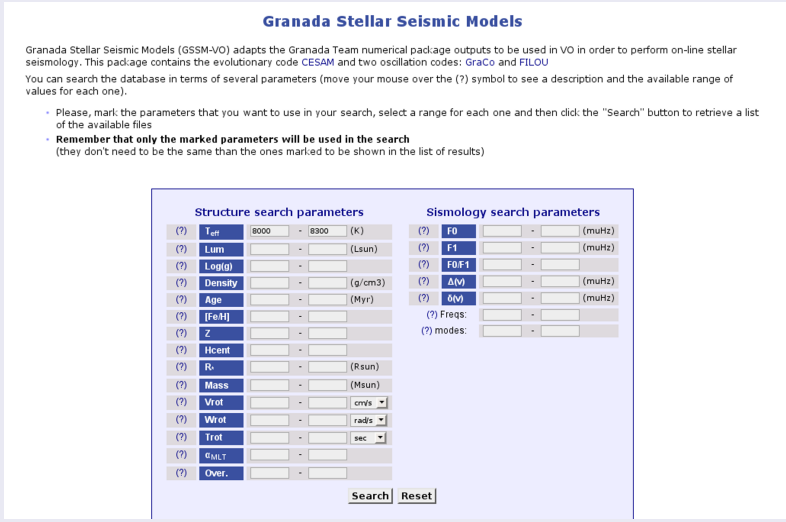
      <DESCRIPTION>Hidrogen central fraction</DESCRIPTION>
      <values>
```


3.- Application: ...



Asteroseismology

4.- Application: query

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

5.- Server: answer

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<VOTABLE version="1.1" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.1"> <INFO name="QUERY_STATUS" val
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  <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>
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  <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>
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     <TD>8241.7651</TD>  <TD>14.2238</TD>  <TD>4.1696</TD>  <TD>0.4104</TD>
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     <TD>8230.6270</TD>  <TD>14.2749</TD>  <TD>4.1657</TD>  <TD>0.4049</TD>
    <TR>
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    <TR>
     <TD>8196.3174</TD>  <TD>14.4306</TD>  <TD>4.1537</TD>  <TD>0.3885</TD>
    <TR>
     <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>
    <TR>
```
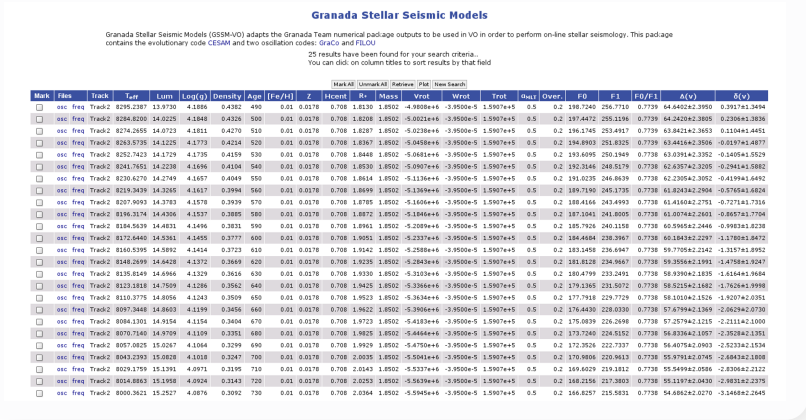

6.- Application: ...



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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	Teff	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	Rc	Mass	Vrot	Wrot	Trot	Quiz	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	192.3166	248.5179	0.7738	62.6357±2.3205	-0.2941±1.5862
☐	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	61.0076±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
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☐	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
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☐	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
☐	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

Asteroseismology

4.- Application: query

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

5.- Server: answer

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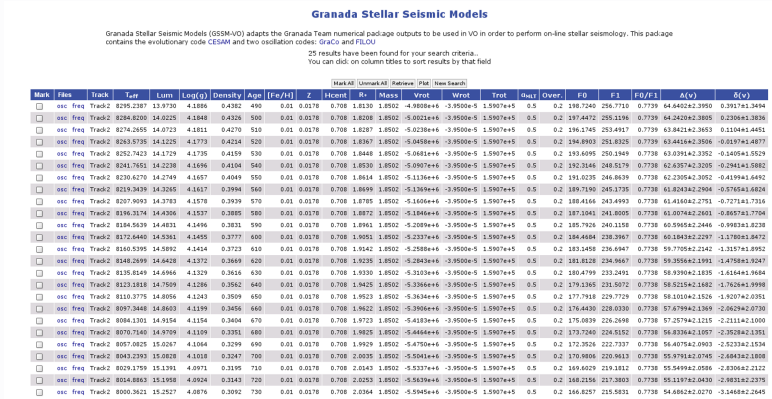
6.- Application: ...



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	Teff	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	Rc	Mass	Vrot	Wrot	Trot	Quiz	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	192.3166	248.5179	0.7738	62.6357±2.3205	-0.2941±1.5862
☐	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	61.0076±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	173.7260	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
☐	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

Asteroseismology

4.- Application: query

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

5.- Server: answer

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   <DESCRIPTION>FILOU oscillation code</DESCRIPTION>
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    <TR>
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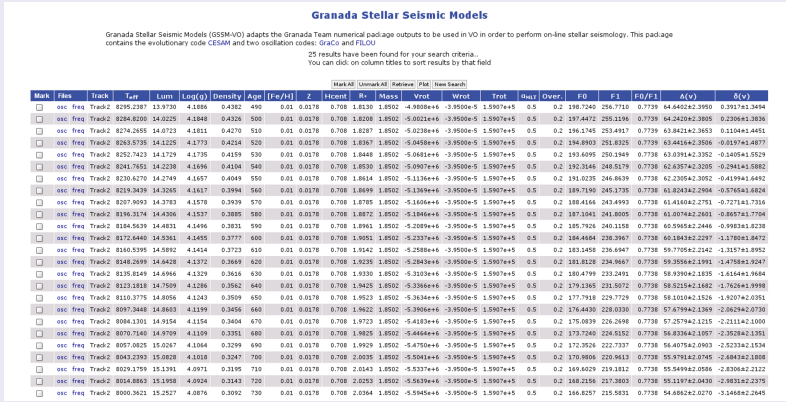
6.- Application: ...



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	Teff	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	Rc	Mass	Vrot	Wrot	Trot	Ωsurf	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	192.3166	248.5179	0.7738	62.6357±2.3205	-0.2941±1.5862
☐	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	61.0076±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	184.4484	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	173.7260	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
☐	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

Asteroseismology

SUMMARY request

- In some cases the search produces a huge amount of results
  - Big computation time in the server side
  - Big VOTable download time
  - Even browser dies trying to display it
- First ask for summary
  - ?...&request=summary
  - Number of results available
  - Range available for each search parameter (once user constrains are applied)
- Very useful

Asteroseismology

SUMMARY request

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 codes CESAM and CESAM2K and two oscillation codes: GraCo and FILOU

CESAM2k evolutionary code

136587 results have been found for your search criteria.

Summary table

Show Results | HR diag | New Search

	T_{eff}	Lum	Log(g)	Density	Age	[Fe/H]	Z	Hcent	R_*	Mass	Vrot	Wrot	Trot	α_{MLT}	Over.
Min	7000.0000	2.9811	3.2448	0.0159	0	-0.5200	0.0055	0.6991	1.1211	1.2502	0	0	0	0.5000	0.1000
Max	8000.0000	76.0390	4.4574	1.2884	3672.3000	0.0800	0.0206	0.7473	5.6848	2.1003				1.5000	0.3000

References:

- CESAM2k evolutionary code

- Very useful

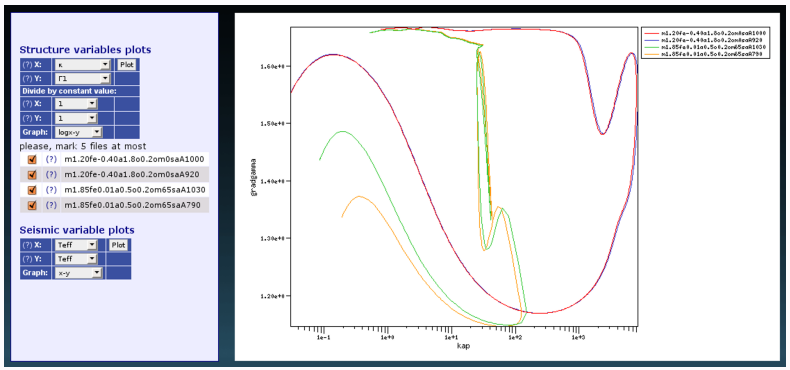
Asteroseismology

7.- Application: queries (...)

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

8.- Server: answers (...)

9.- Application: ...



Asteroseismology

7.- Application: queries (...)

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

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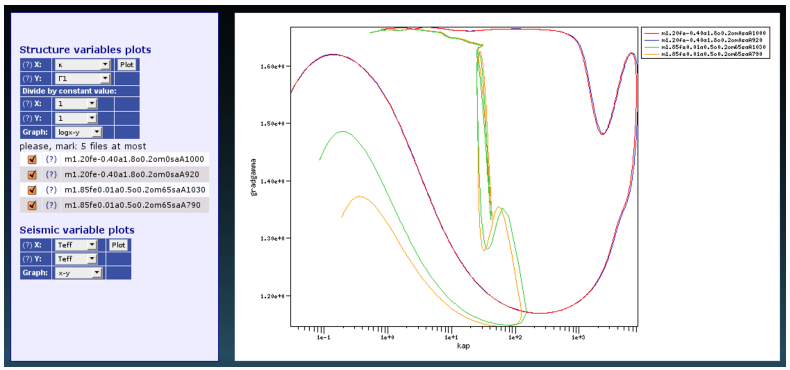
9.- Application: ...



Asteroseismology

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

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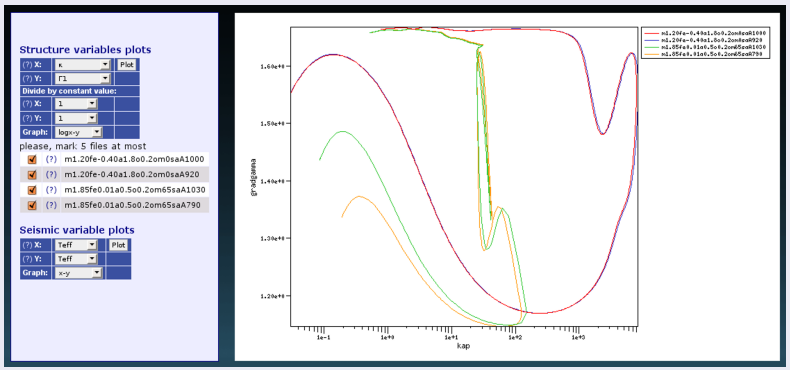

Asteroseismology

CUTOUT?

- Data files are often very big with many columns
  - Being able to ask only for the wanted columns
  - In the desired range for each one
  - ?...cols=alfa,beta...&ranges=a1/a2,b1/b2...
- Being able to ask which columns are available
  - request=summary ?
  - We don't really need it in this case (data model)
- More efficiency

In summary

- S3 is a useful protocol
  - Even for quite complex cases.
- First version of a data model for asteroseismology
- Some improvements
  - SUMMARY
  - CUTOUT

THANK YOU!