



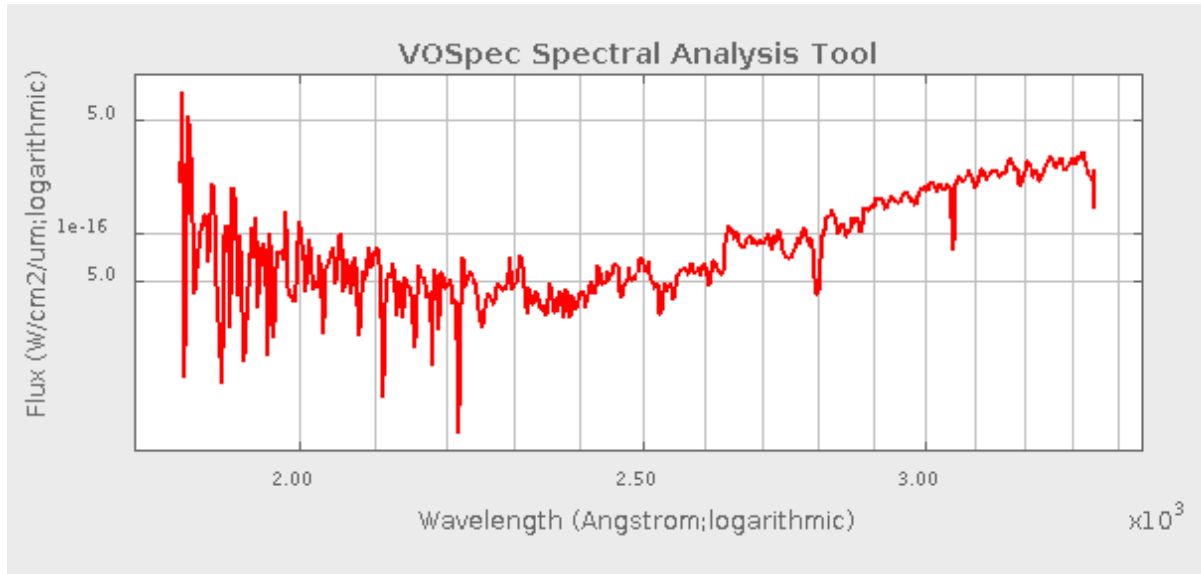
Possible extension of SSAP and SDM for light curves

**Almudena Velasco
Trasmonte**

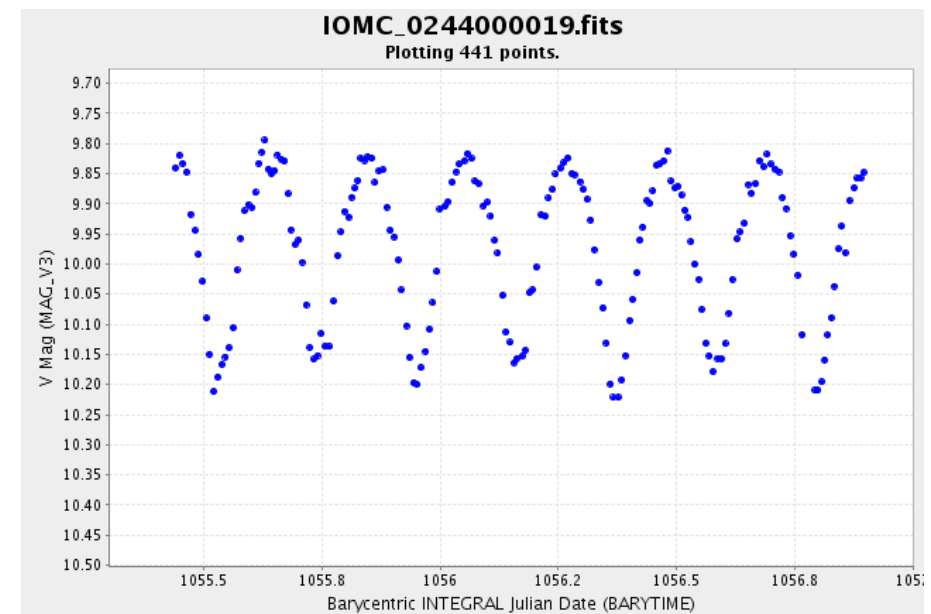
Spanish Virtual Observatory
avelasco@cab.inta-csic.es

IVOA Interoperability Meeting.
Nara, 7-11 December 2010

Spectra-light curve similarities



	Spectrum	Light Curve
Y-Axis	Flux (or magnitude, counts, etc...)	
X-Axis	Wavelength	Time



SSAP and SDM lacks



SSAP:

- * **Dataset.TimeAxis**: necessary to identify time axis in native format.
- * **DatasetType= "TimeSeries"**, currently only "Spectrum" is accepted.
- * **Access.Format MIME type** to identify light curves.
- * **Char.SpectralAxis.Coverage.Bounds.Extent** is mandatory, make it recommended.

SDM:

In SSA document: "SSA is based on a more general data model capable of describing tabular spectrophotometric data ***including time series*** [...]"

- * **Data.SpectralAxis.Value** is mandatory, make it optional.

Light curve services @ SVO:COROT



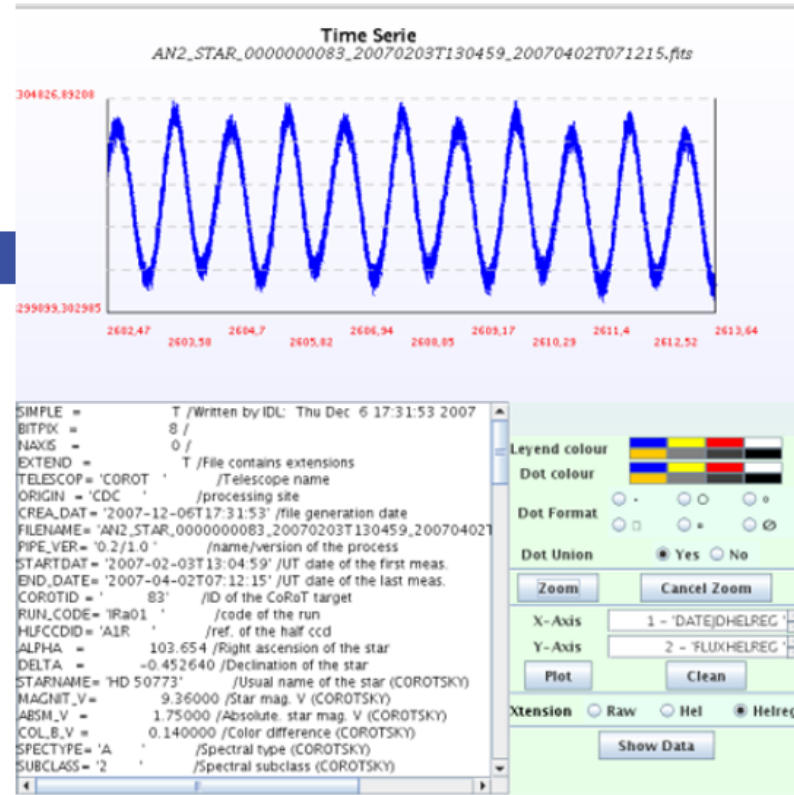
THE COROT PUBLIC ARCHIVE AT LAEFF

This data server provides access to the COROT Archive at LAEFF.

Resources

- ▶ Archive search and data retrieval
- ▶ News
- ▶ System Overview
- ▶ Help Desk
- ▶ Usage Statistics (private)

- ▶ Outreach/Divulgación
 - ▶ Transiting Exoplanets/ Planetas extrasolares detectados utilizando el método de tránsitos.



The COROT Public Archive has been developed in the framework of the Spanish Virtual Observatory project (AYA 2008-02156). The system is maintained by the Data Archive Unit of the CAB (CSIC -INTA).

If you use COROT data in your research, please include the following acknowledgement in any resulting publications: **"Based on data from the COROT Archive at LAEFF"**.

Available at: <http://sdc.cab.inta-csic.es/corotfa/> since February 2009
More than 92000 light curves with unprecedented temporal coverage and resolution.

Example of working services: COROT



Dataset characterization:

```
- <GROUP ID="Dataset" name="Dataset" utype="ssa:Dataset">
  <DESCRIPTION>General Dataset Metadata</DESCRIPTION>
  - <PARAM ID="DataModel" name="DataModel" utype="ssa:Dataset.DataModel"
    value="Spectrum -1.03" datatype="char" arraysize="*">
    <DESCRIPTION>Datamodel name and version.</DESCRIPTION>
  </PARAM>
  - <PARAM ID="Type" name="Type" utype="ssa:Dataset.Type" value="TimeSeries"
    datatype="char" arraysize="*">
    <DESCRIPTION>Dataset or segment type.</DESCRIPTION>
  </PARAM>
  <FIELDref ref="FluxAxis"/>
  <FIELDref ref="TimeAxis"/>
</GROUP>
- <FIELD ID="TimeAxis" name="TimeAxis" utype="ssa:Dataset.TimeAxis"
  datatype="char" arraysize="*">
  <DESCRIPTION> Table column containing time values </DESCRIPTION>
</FIELD>
- <FIELD ID="FluxAxis" name="FluxAxis" utype="ssa:Dataset.FluxAxis"
  datatype="char" arraysize="*">
  <DESCRIPTION> Table column containing flux values </DESCRIPTION>
```

Example of working services: COROT



Coordinate System Characterization:

```
-<GROUP ID="CoordSys" name="CoordSys" utype="ssa:CoordSys">
  <DESCRIPTION>Coordinate System Metadata.</DESCRIPTION>
  -<PARAM ID="SpaceFrameName" name="SpaceFrameName" utype="ssa:CoordSys.SpaceFrame.Name"
    value="ICRS" datatype="char" arraysize="*">
    <DESCRIPTION>Spatial coordinate frame.</DESCRIPTION>
  </PARAM>
  -<PARAM ID="SpaceFrameEquinox" name="SpaceFrameEquinox" utype="ssa:CoordSys.SpaceFrame.Equinox"
    value="2000.0" datatype="double">
    <DESCRIPTION>Equinox.</DESCRIPTION>
  </PARAM>
  -<PARAM ID="TimeFrameZero" name="TimeFrameZero" utype="ssa:CoordSys.TimeFrame.Zero"
    value="51545.0" datatype="double">
    <DESCRIPTION>Zero point of timescale in MJD.</DESCRIPTION>
  </PARAM>
  -<PARAM ID="TimeFrameRefPos" name="TimeFrameRefPos" utype="ssa:CoordSys.TimeFrameRefPos"
    value="HELIOCENTER" datatype="char" arraysize="*">
    <DESCRIPTION>Time frame origin.</DESCRIPTION>
  </PARAM>
</GROUP>
```

<http://sdc.cab.inta-csic.es/corotfa/jsp/ssap.jsp?pos=102.708,-0.54088&size=0.082>

Example of working services: COROT

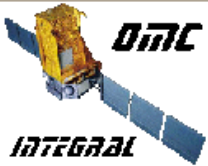


Output Data:

```
-<DATA>
  -<TABLEDATA>
    -<TR>
      -<TD>
        http://sdc.cab.inta-csic.es:80/corotfa/gateway?fitsfile=ftp://ftp.ias.u-psud.fr
        /corotpub/N2-1.3/2007/10
        /18/AN2_STAR_0000000020_20071018T085727_20080303T094937.fits&
        type=SSAP
      </TD>
      (Access.Format) <TD>timeseries/fits</TD>
      (Dataset.TimeAxis) <TD> CoRoT light curve. COROT_ID: 20</TD>
      (Dataset.FluxAxis) <TD>DATEJDHELREG</TD>
      <TD>FLUXHELREG</TD>
      <TD>LRa01</TD>
      <TD>20</TD>
      <TD>102.708 -0.54088</TD>
      <TD>2846.5</TD>
      <TD>2983.5</TD>
      <TD>F2</TD>
      <TD>V</TD>
      <TD>5.77</TD>
      <TD>0.39</TD>
    </TR>
```

Light curve services @ SVO:OMC

SVO
Space Virtual Observatory



Not logged in

Log in

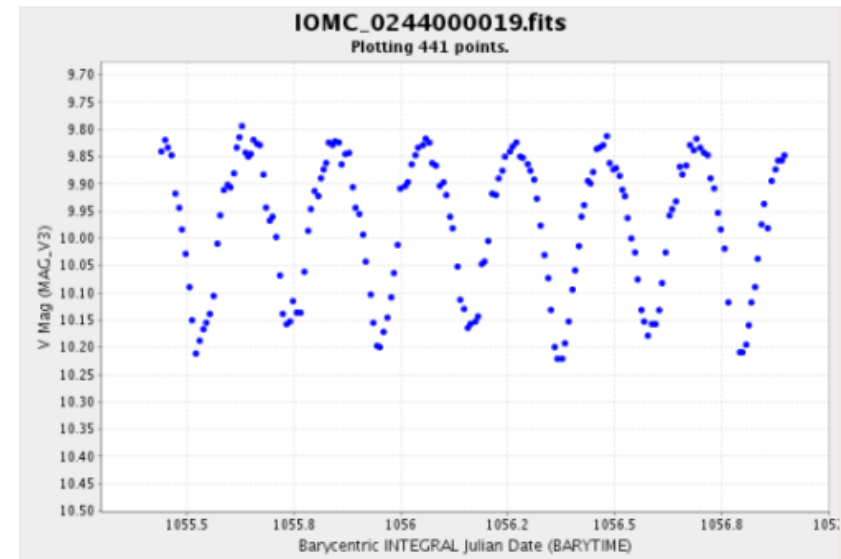
The OMC Archive

This data server provides access to the INTEGRAL Optical Monitoring Camera (OMC) Archive.

Resources

- ▶ Archive search and data retrieval
- ▶ News
- ▶ System Overview
- ▶ Help Desk
- ▶ Project Documentation

- ▶ Change your password



The system is developed and maintained by [LAEFF](#), based on data pre-processed by [ISDC](#). LAEFF is part of the Space Science Division of [INTA](#).

If you use OMC data in your research, please include the following acknowledgement in any resulting publications:
"Based on data from the OMC Archive at LAEFF, pre-processed by ISDC".

Available at <http://sdc.cab.inta-csic.es/omc/> since 2003
More than 62000 light curves, more than 50 photometric points.

Examples of working services OMC



OMC Light Curves:

Dataset characterization:

```
--<GROUP utype="spec:Data">  
  { <FIELDref ref="Time"/>  
    <FIELDref ref="Mag"/>  
      <FIELDref ref="MagErr"/>  
        <FIELDref ref="Problems"/>  
          <FIELDref ref="Exposure"/>  
    </GROUP>
```

```
<FIELD ID="Time" name="Time" datatype="double" ucd="time"  
utype="spec:Data.TimeAxis.Value" unit="d"/>  
<FIELD ID="Mag" name="Mag" datatype="float" ucd="phot.mag"  
utype="spec:Data.FluxAxis.Value" unit="mag"/>
```

Examples of working services OMC



OMC Light Curves:

Coordinate System Characterization:

```
- <GROUP ID="CoordSys" name="CoordSys" utype="spec:CoordSys">
  <DESCRIPTION>Coordinate System Metadata.</DESCRIPTION>
  - <PARAM ID="SpaceFrameName" datatype="char"
    name="SpaceFrameName"
    utype="spec:CoordSys.SpaceFrame.Name" value="ICRS"
    arraysize="*">
    <DESCRIPTION>Spatial coordinate frame.</DESCRIPTION>
  </PARAM>
  - <PARAM ID="SpaceFrameEquinox" datatype="double"
    name="SpaceFrameEquinox"
    utype="spec:CoordSys.SpaceFrame.Equinox" value="FK5">
    <DESCRIPTION>Equinox.</DESCRIPTION>
  </PARAM>
  - <PARAM ID="TimeFrameRefPos" datatype="char"
    name="TimeFrameRefPos" utype="spec:CoordSys.TimeFrame.RefPos"
    value="BARYCENTER" arraysize="*">
    <DESCRIPTION>Equinox.</DESCRIPTION>
  </PARAM>
</GROUP>
```

Other light curves archives: SuperWasp



SuperWASP
Public archive

119,930,299,362 data points
17,970,937 light curves
3,631,972 raw images

[Home](#) | [Light curve query](#) | [Image query](#) | [User guide](#) | [Help](#) | [Contact us](#)

Minimum magnitude = 1
Maximum magnitude = 20
Minimum number of data points = 1
Range_type = cone
Range = 0.1666666666667 degrees
R.A. = 359.9786 degrees
Dec = 30.019722 degrees

Services key

- LC - Download the light curve
- LC+ - Download the light curve with weather data (slow)
- lmg - Go to a list of all the images in this
- S - Query SIMBAD

73 results found in 0.2104 s
<<first <previous [1-73/73] next> last>>

No.	r	Object ID	R.A.	Declination	Start time	End time	No. of data points	Mag.	Services	Select
		(degrees from query centre)	(degrees)	(degrees)	(YYYY-MM-DD HH:MM:SS)	(YYYY-MM-DD HH:MM:SS)				
1	0.0000	1SWASP J235954.86+300111.0	359.978607	+30.019722	2004-05-27 05:02:0					
2	0.0195	1SWASP J235953.85+300220.1	359.974396	+30.038925	2004-05-27 05:02:0					
3	0.0445	1SWASP J235943.80+300221.9	359.932526	+30.039433	2004-05-27 05:02:0					
4	0.0481	1SWASP J235941.57+300055.1	359.923248	+30.015331	2004-05-27 05:02:0					
5	0.0502	1SWASP J235949.55+295823.9	359.956482	+29.973318	2004-05-27 05:02:0					
6	0.0622	1SWASP J235943.35+300357.5	359.930664	+30.065996	2004-05-27 05:02:0					
7	0.0624	1SWASP J000010.36+300250.8	0.043206	+30.047443	2004-05-27 05:02:0					
8	0.0645	1SWASP J235951.85+295722.1	359.966064	+29.956144	2004-05-27 05:02:0					
9	0.0661	1SWASP J235938.79+300305.2	359.911652	+30.051460	2004-05-27 05:02:0					
10	0.0688	1SWASP J000008.68+300401.8	0.036167	+30.067183	2004-05-27 05:02:0					
11	0.0742	1SWASP J235952.27+300536.0	359.967804	+30.093332	2004-05-27 05:02:0					
12	0.0749	1SWASP J235934.12+300120.7	359.892181	+30.022442	2004-05-27 05:02:0					
13	0.0760	1SWASP J235945.37+295706.6	359.939056	+29.951851	2004-05-27 05:02:0					
14	0.0765	1SWASP J235950.10+295642.6	359.958740	+29.945177	2004-05-27 05:02:0					
15	0.0786	1SWASP J235936.30+295843.0	359.901276	+29.978619	2004-05-27 05:02:0					
16	0.0809	1SWASP J000009.59+295731.5	0.039975	+29.958754	2004-05-27 05:02:0					
17	0.0819	1SWASP J000004.19+295642.0	0.017472	+29.945024	2004-05-27 05:02:0					

The screenshot displays a light curve plot with the following overlaid windows:

- Select Plot Columns:** A dialog box for selecting plot axes. The X-axis is set to 'TMID' and the Y-axis is set to 'FLUX2'. It includes options for 'X Error', 'Y Error', and 'Rows'.
- fv: Summary of 1SWASP+J235949.55+295823.9.fits:** A window showing file details:

Index	Extension	Type	Dimension	View
<input type="checkbox"/> 0	Primary	Image	0	Header Image Table
<input type="checkbox"/> 1	PHOTOMETRY	Binary	9 cols X 16182 rows	Header Hist Plot All Select
- Graph coordinates:** A window showing physical and image pixel coordinates for the selected data point.

Other light curves archives: KEPLER



[Mission Search](#) / [Missions](#) / [Contacts](#) / [STScI](#) / [MAST](#)

Kepler Data Search Results

[Display numeric columns graphically using VOPlot](#)

1001 rows displayed, but 882819 are available.

Click on top column headers to sort the table on the column contents.
Click on bottom column headers for more information about the data in that column.
Click on Ref entries to display list of published papers.

Plot marked Light Curves Submit marked data for retrieval from STDADS

Mark all Unmark all Mark public Unmark public Mark proprietary Unmark proprietary

◀ Previous 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 Next ▶ Page 1 of 21

Mark	Kepler ID	Investigation ID	Dataset Name	Quarter	RA (J2000)	Dec (J2000)	Target Type	Ref	Actual Start Time	Actual End Time	Release Date	R Mag	J Mag	KEP Mag
<input type="checkbox"/>	757076	EX	KPLR000757076-2009131105131	0	19 24 09.29	+36 35 53.3	LC	<u>1</u>	2009-05-02 00:54:56	2009-05-11 17:51:31	2010-06-15 00:00:00	11.614	10.125	11.678
<input type="checkbox"/>	757076	EX	KPLR000757076-2009166043257	1	19 24 09.29	+36 35 53.3	LC	<u>2</u>	2009-05-13 00:15:49	2009-06-15 11:32:57	2010-06-15 00:00:00	11.614	10.125	11.678
<input checked="" type="checkbox"/> @	757076	EX	KPLR000757076-2009350155506	3	19 24 09.29	+36 35 53.3	LC	0	2009-09-18 17:19:58	2009-12-16 23:55:06	2012-06-18 21:43:41	11.614	10.125	11.678
<input checked="" type="checkbox"/> @	757076	EX	KPLR000757076-2010078095331	4	19 24 09.29	+36 35 53.3	LC	0	2009-12-19 21:03:56	2010-03-19 16:53:31	2012-06-18 21:43:41	11.614	10.125	11.678
<input checked="" type="checkbox"/> @	757076	EX	KPLR000757076-2010174085026	5	19 24 09.29	+36 35 53.3	LC	0	2010-03-20 23:47:15	2010-06-23 15:50:26	2013-06-18 21:43:41	11.614	10.125	11.678
<input checked="" type="checkbox"/> @	757076	EX	KPLR000757076-2009259160929	2	19 24 09.29	+36 35 53.3	LC	0	2009-06-20 00:25:09	2009-09-16 23:09:29	2011-02-01 00:00:00	11.614	10.125	11.678
<input type="checkbox"/>	757099	EX	KPLR000757099-2009166043257	1	19 24 10.34	+36 35 37.7	LC	<u>2</u>	2009-05-13 00:15:49	2009-06-15 11:32:57	2010-06-15 00:00:00	13.135	11.656	13.152
<input checked="" type="checkbox"/> @	757099	EX	KPLR000757099-2009350155506	3	19 24 10.34	+36 35 37.7	LC	0	2009-09-18 17:19:58	2009-12-16 23:55:06	2012-06-18 21:43:41	13.135	11.656	13.152

Coadd plot

MAST STScI Tools Mission Search Tubata Site Search

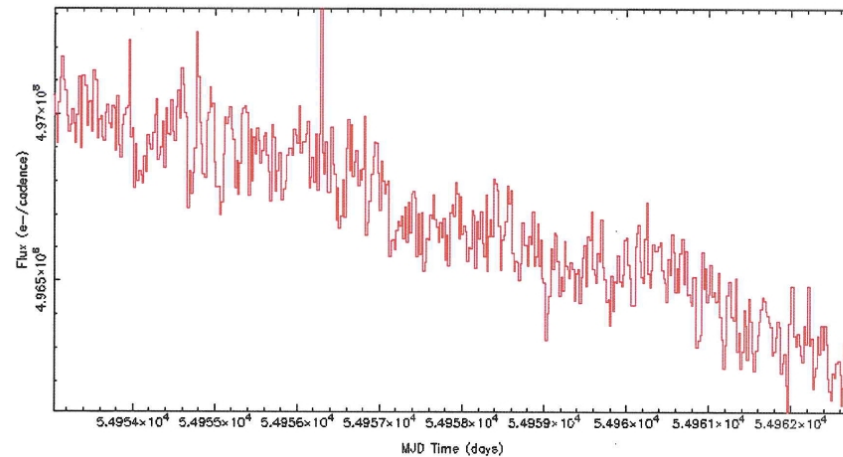
About MAST Getting Started Suggestions

Number of plotted points: 472
Time range (Days): 54953.0 to 54962.7 Flux range (e-/cadance): 4.961e+08 to 4.973e+08

Select Plot range (or click to autoscale):
Min Time: 5.4953e+04 Max Time: 5.4963e+04 Min Flux: 4.961e+08 Max Flux: 4.973e+08

Plot dimensions (800x640 max):
X size (pixels): 800 Y size (pixels): 450 [Redraw Plot](#) [Help](#)

Scale Factors:
kplr000757076-2009131105131: 1



Other light curves archives: AAVSO



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American Association of Variable Star Observers

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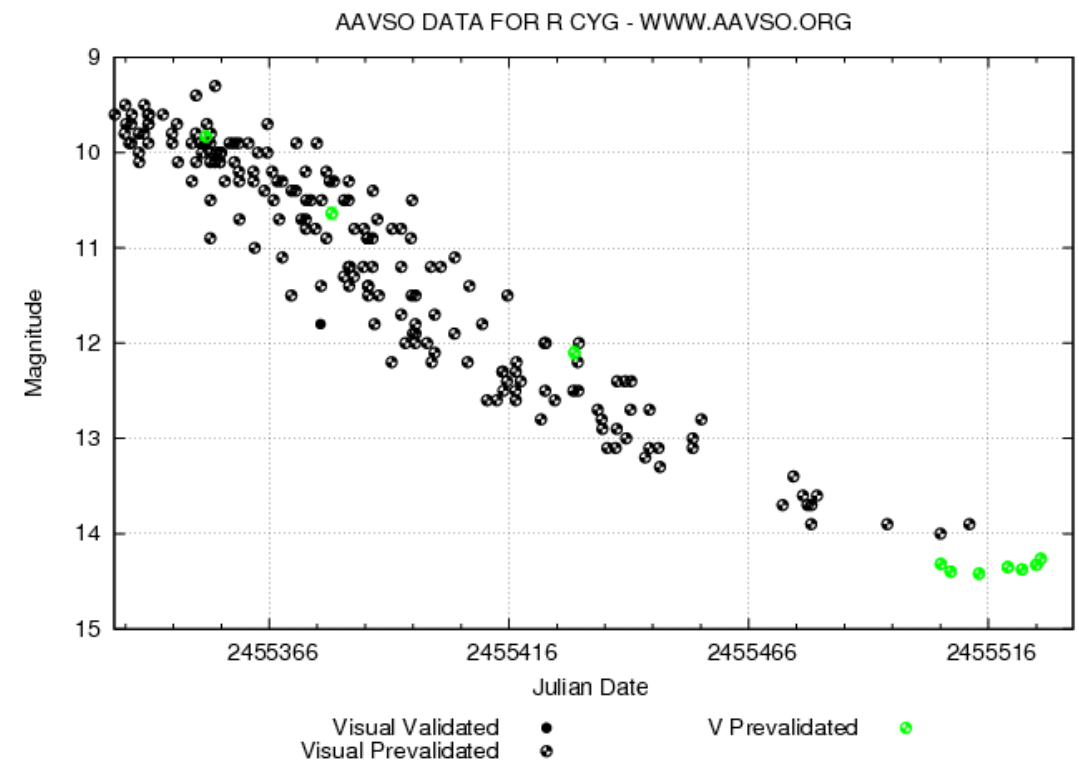
Home » [Quick Look View of AAVSO Observations](#)

View AAVSO Observations

Displaying **2834** observations for **SS CYG** since **2010 Sep 2.6744** from **90** observer(s)

■ [Back to Quick Look Search](#)
■ [Light Curve Generator](#)
■ [Plot a Chart](#)

	Name	JD	CalendarDate	Mag	Filter	Comment Codes	Obsvr.	Err
1	SS CYG	2455631.52569	2010 Dec 1.0257	8.5	Vis.		DLA	
2	SS CYG	2455630.56136	2010 Nov 30.0614	8.578	V		BRAC	.007
3	SS CYG	2455630.27418	2010 Nov 29.7742	8.5	Vis.		BPO	
4	SS CYG	2455630.20833	2010 Nov 29.7083	8.5	Vis.	Y	KOS	
5	SS CYG	2455629.72138	2010 Nov 29.2214	8.725	I		JM	.02
6	SS CYG	2455629.72116	2010 Nov 29.2212	9.282	R		JM	.02



Proposal



SSA:

- * New **Dataset.TimeAxis** needed for light curves in native format (FITS, ASCII, ...)
- * New **Dataset.Type** possible value: “**TimeSeries**”
- * New **Access.format** values: “**timeseries/fits**”
- * **Char.SpectralAxis.Coverage.Bound.Extent** set as recommended.

SDM:

- * **SpectralAxis.Value** set as optional.

Registry:

- * **Subtype “TimeSeries”** in **SSAP** to identify such services.

REGISTRY



The screenshot displays the VOSpec application window with a 'Server Selector' dialog box open. The dialog is titled 'Server Selector' and contains two main sections: 'Query by Service' and 'Query by params'.

Query by Service: This section lists various services with checkboxes. The following services are highlighted with red ovals:

- OMC: The INTEGRAL Optical Monitoring Camera**
- The COROT PUBLIC ARCHIVE AT LAEFF**

Other visible services include: INES: The IUE Newly Extracted Spectra, International Ultraviolet Explorer, Optical spectra of the XMM-Newton Optical Follow-up, SSA Service for Optical Spectroscopy in the CDF-S, SSA Service for zCOSMOS Bright Spectroscopic Observations, ST-ECF Hubble Legacy Archive High-Level Spectra, ST-ECF Hubble Space Telescope Spectra, Spectrum interpolator for the ELODIE library, TBL Narval legacy, and The ISO Data Archive InterOperability System.

Query by params: This section shows a tree view of query parameters:

- Query
 - TARGET.NAME hd 141569
 - Simple Query
 - POS 237.49062042,-3.92121111
 - SIZE 1
 - Advanced Query
 - Service Specific Query

Query Outlook: This section contains buttons for 'Refresh', 'Add SSA/TSA', and 'Select All SSA'.

Insert Param Value: This section includes a text input field and a 'Query' button.

The background application window shows the 'VOSpec' logo and the 'Cesavo Virtual Observatory' logo. The menu bar includes 'File', 'Edit', 'View', 'Operations', 'Plastic', 'SAMP', and 'Help'. The left sidebar contains controls for 'Wave Unit' (micron), 'Flux Unit' (Jy), 'RedShift' (0.00), 'De-reddening', and 'Y-axis error'.



Thanks