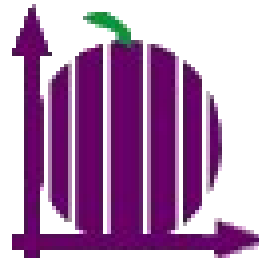


News of CASSIS

Jean-Michel Glorian & co



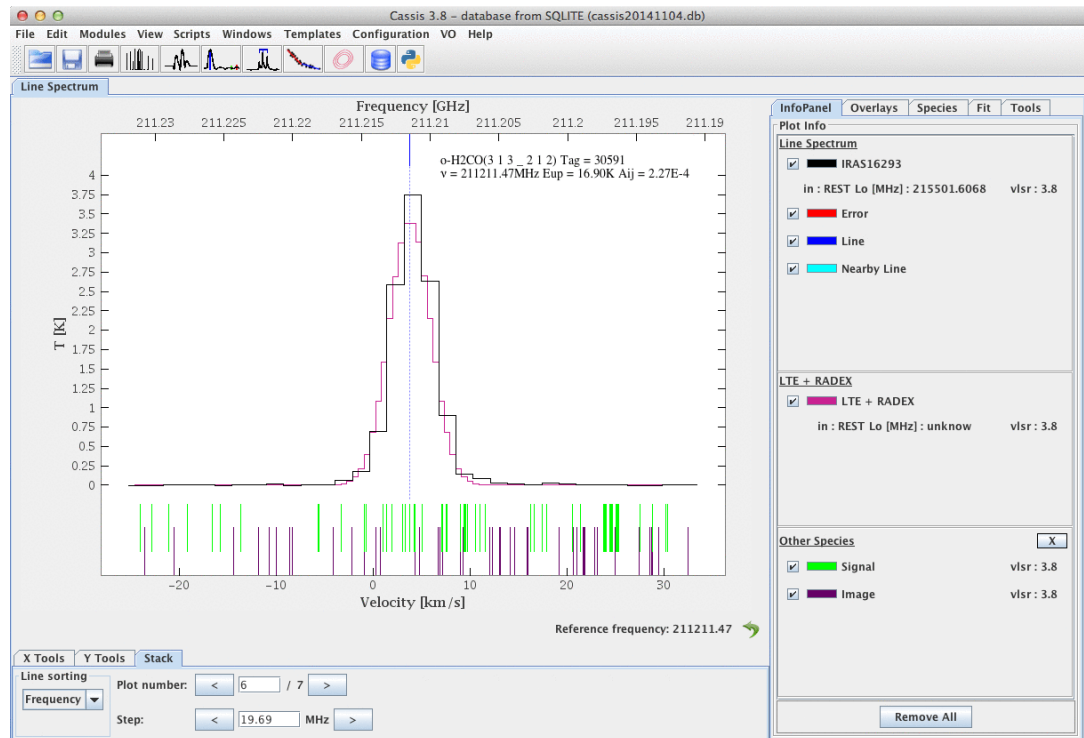
Summary

- General presentation
- What is new in the current version
 - Better SAMP integration
 - Module to read any ASCII spectrum file
 - Module Advanced fit module
- Use case with DataLink to process spectrum and
- Citation of data with VAMDC implementation in next version
- What is planned for the future version
- Links

- Tool to access, read, visualize, treat and analyze electromagnetic spectra using chemical species, models and other synthetic or observed spectra



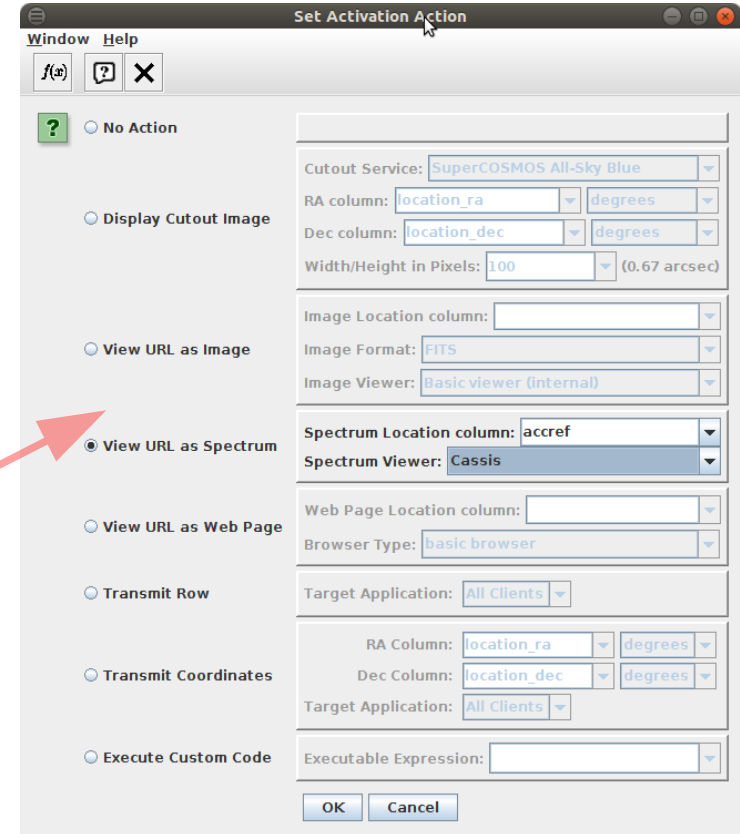
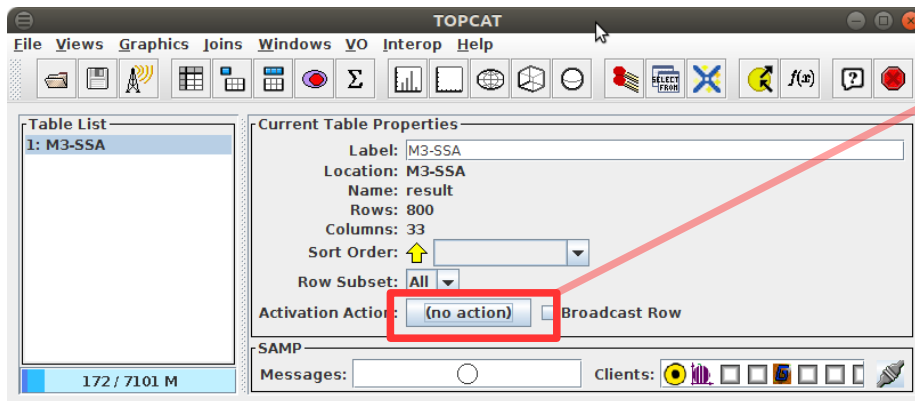
An example of the line analysis tool: inspecting o-H₂CO lines in the observed spectrum (black) overlaid with an LTE model (pink)



- CASSIS is part of the french structure OV-GSO-DC (Great South Western Virtual Observatory Data Center)
- Several ways to run it
 - On the fly (directly or Using the Applauncher application from JMMC)
<http://cassis.irap.omp.eu/online/cassis.jnlp>
 - Via an installer
<http://cassis.irap.omp.eu/download/installCassis.jnlp>
 - Download the tar.gz file and run the jar file by script shell or batch
<http://cassis.irap.omp.eu/?page=installation>
- Regular update every 2 to 6 months
 - Last version 5.0 - July 2017
 - Next version expected before the end 2017

- Improvement of SAMP Connection to take into account all the SAMP metadata (not only url)
- Use case based on VO Tutorial: Discover rare galaxies (Igor Chilingarian and Ivan Zolothukin)
 - <http://rcsed.sai.msu.ru/article/tutorial-discover-rare-galaxies-rcsed-catalog-data/>
 - work with Pierre LeSidaner and Ivan Zolothukin
 - Use « Activation Action » functionality of Topcat

- Topcat → Menu VO → SSA
 - Service :
<http://rcsedvo.sai.msu.ru/specphot/ssap.q/ssa/ssap.xml?>
 - Target : M31



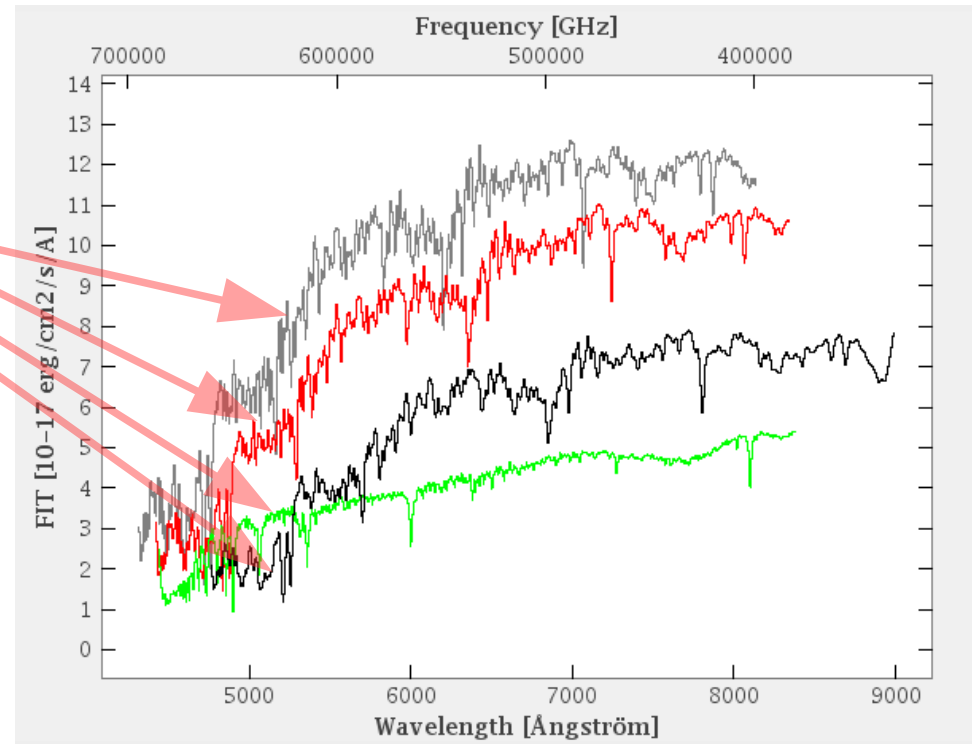
- Click on the Activation Action button
- Choose column accref and CASSIS as Spectrum Viewer

TOPCAT(1): Table Browser

Window Subsets Help

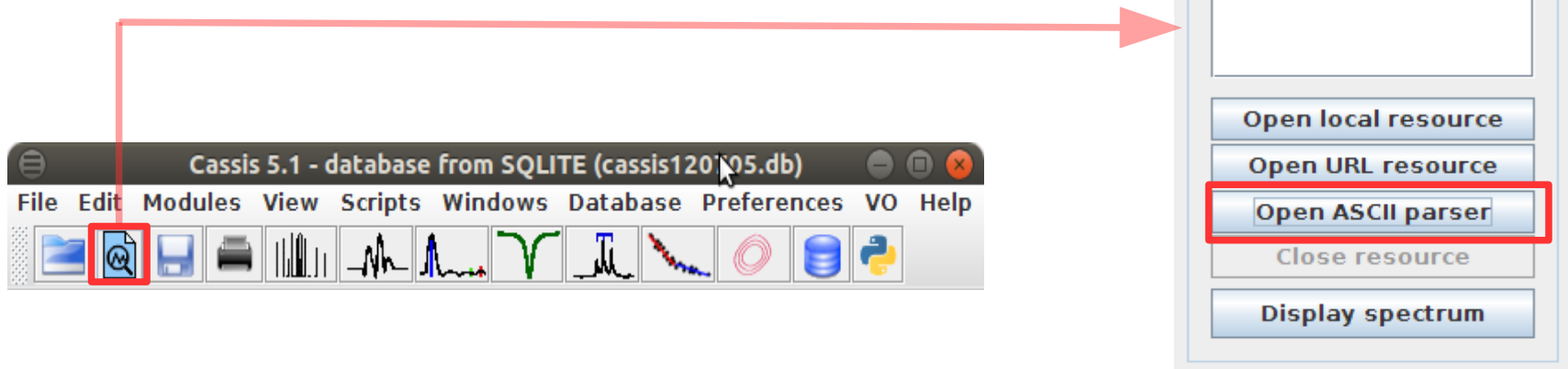
Table Browser for 1: M3-SSA

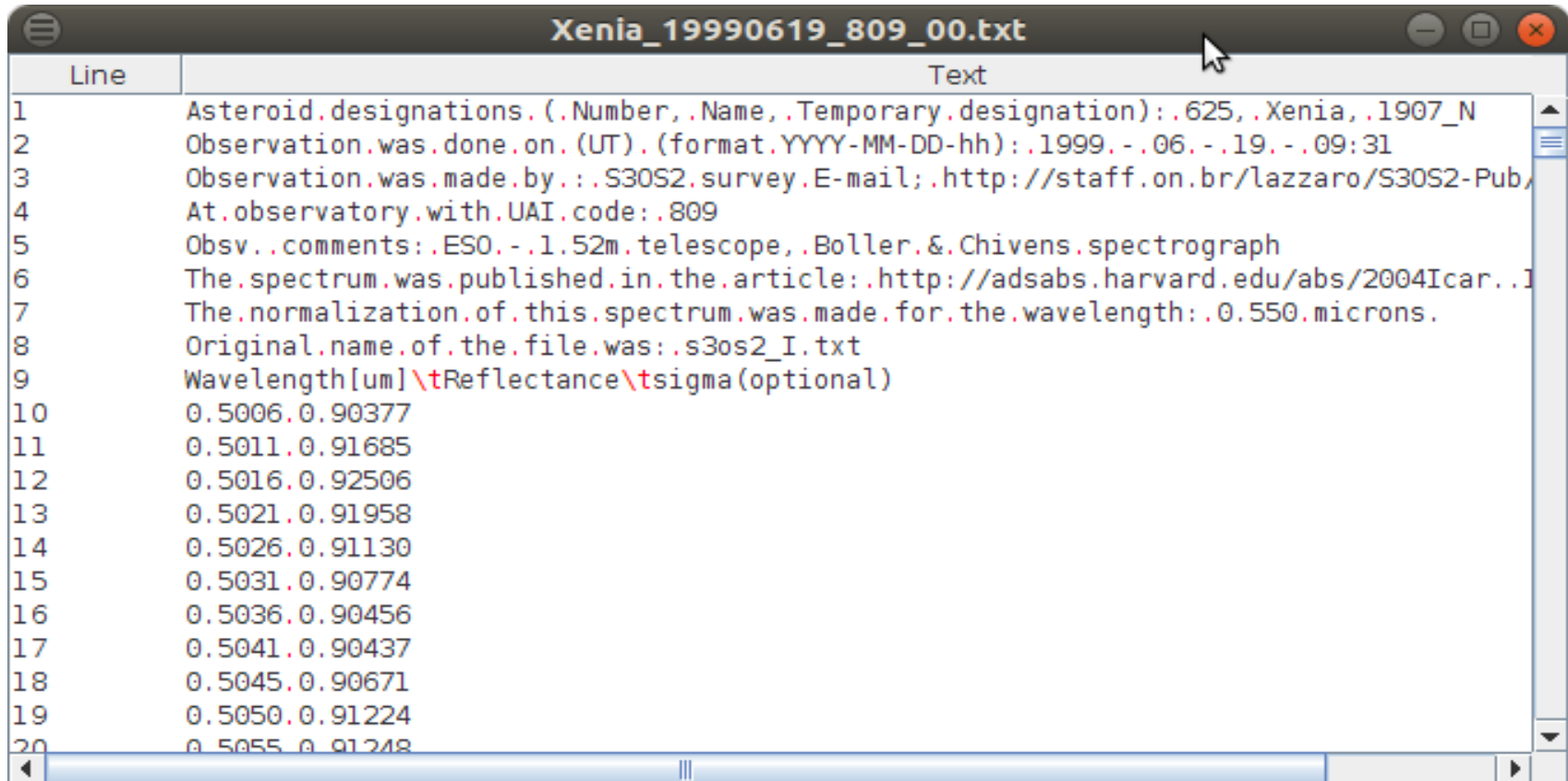
		accref
1	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
2	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
3	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
4	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
5	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
6	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
7	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
8	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
9	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
10	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
11	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
12	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
13	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
14	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
15	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
16	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
17	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph
18	specph...	http://rcsed-vo.sai.msu.ru/getproduct/specph



- Each click on a line in the accref column displays a spectrum in CASSIS via SAMP

- Goal : read a spectrum ASCII data file (no standard format)
 - metadata
 - Name of the column with unit
 - Data
- Access through the Spectrum Manager Module





```
Xenia_19990619_809_00.txt
Line      Text
1 Asteroid.designations.(.Number,.Name,.Temporary.designation):.625,.Xenia,.1907_N
2 Observation.was.done.on.(UT).(format.YYYY-MM-DD-hh):.1999.-.06.-.19.-.09:31
3 Observation.was.made.by.:.S30S2.survey.E-mail;.http://staff.on.br/lazzaro/S30S2-Pub,
4 At.observatory.with.UAI.code:.809
5 Obsv..comments:.ESO.-.1.52m.telescope,.Boller.&.Chivens.spectrograph
6 The.spectrum.was.published.in.the.article:.http://adsabs.harvard.edu/abs/2004Icar..1
7 The.normalization.of.this.spectrum.was.made.for.the.wavelength:.0.550.microns.
8 Original.name.of.the.file.was:.s3os2_I.txt
9 Wavelength[um]\tReflectance\tsigma(optional)
10 0.5006.0.90377
11 0.5011.0.91685
12 0.5016.0.92506
13 0.5021.0.91958
14 0.5026.0.91130
15 0.5031.0.90774
16 0.5036.0.90456
17 0.5041.0.90437
18 0.5045.0.90671
19 0.5050.0.91224
20 0.5055.0.91248
```

▪ Raw text file

Advanced ASCII Reader - /home/jglorian/CassisDatas/Xenia_19990619_809_00.txt

Headers

Metadata

Check if the file contains metadata

Separator options: **Colon**

First line: 1

Last line: 8

Column values

Check if the file contains headers

Separator options: **Whitespace**

First line: 9

Last line: 9

Data Values

Data orientation: Columns Lines

Number of columns: 2

Separator options: **Space**

First line: 10

Last line: *

NaN default value: 0.0

Generate spectrum

Wave Column: **Wavelength** **μm**

Flux Column: **Reflectance** **None**

Preview

Metadata

Spectrum's title: Xenia_19990619_809_00.txt

Name	Value	Unit	Comment
AT observatory with IAR code	809		
Obsv. comments	ESO - 1.52m telescope, Boller ...		
The spectrum was published in...	http	//adsabs.harvard.edu/abs/200...	
The normalization of this spect...	0.550 microns.		
Original name of the file was	s3os2_l.txt		

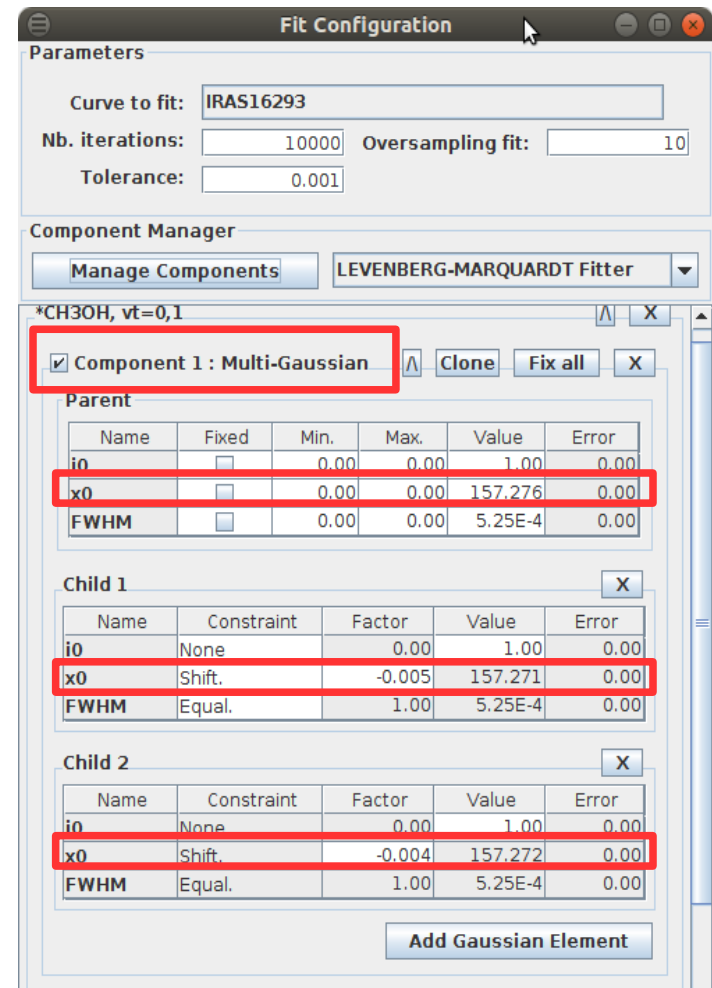
Data

Wavelength (μm)	Reflectance (None)
0.5006	0.90377
0.5011	0.91685
0.5016	0.92506
0.5021	0.91958
0.5026	0.9113
0.5031	0.90774
0.5036	0.90456
0.5041	0.90437
0.5045	0.90671
0.505	0.91224
0.5055	0.91248
0.506	0.90615
0.5065	0.89637
0.507	0.88984
0.5075	0.89935
0.508	0.91589
0.5085	0.91759
0.5089	0.91422
0.5094	0.92095
0.5099	0.9175
0.5104	0.91315
0.5109	0.9217
0.5114	0.92596
0.5119	0.92535
0.5124	0.9205
0.5129	0.91956

Open file Visualize raw data Save configuration Load configuration Export to spectrum manager Display spectrum

- Automatic detection of metadata, columns and data
- Possibility to adjust them

- Works with fitting module developed in Hershel project by Do Kester
- Component constrain possible to simultaneously fit n-uplet transitions
 - Ex : 3 gaussians components with offset set on X0
- Initial guesses can be extracted from spectroscopic databases



Fit Configuration

Parameters

Curve to fit: IRAS16293

Nb. iterations: 10000 Oversampling fit: 10

Tolerance: 0.001

Component Manager

Manage Components LEVENBERG-MARQUARDT Fitter

*CH3OH, vt=0,1

Component 1 : Multi-Gaussian Clone Fix all X

Parent

Name	Fixed	Min.	Max.	Value	Error
i0	<input type="checkbox"/>	0.00	0.00	1.00	0.00
x0	<input type="checkbox"/>	0.00	0.00	157.276	0.00
FWHM	<input type="checkbox"/>	0.00	0.00	5.25E-4	0.00

Child 1

Name	Constraint	Factor	Value	Error
i0	None	0.00	1.00	0.00
x0	Shift.	-0.005	157.271	0.00
FWHM	Equal.	1.00	5.25E-4	0.00

Child 2

Name	Constraint	Factor	Value	Error
i0	None	0.00	1.00	0.00
x0	Shift.	-0.004	157.272	0.00
FWHM	Equal.	1.00	5.25E-4	0.00

Add Gaussian Element

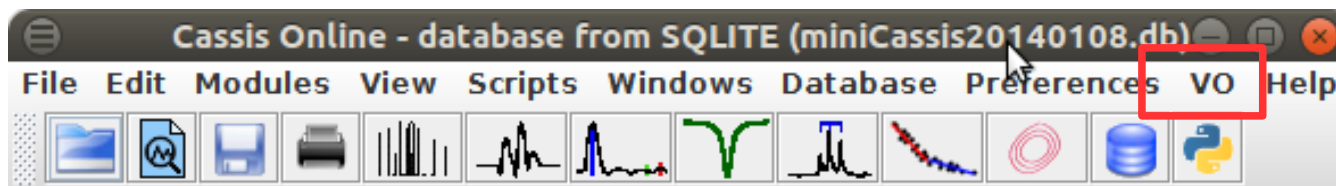
DataLink to process a spectrum 1/6

- Collaboration with M. Sanguillon concerning the synthetic spectra database POLLUX
 - Use case based on the tutorial of specflow
http://www.euro-vo.org/sites/default/files/images/specflow_tutorial.pdf
 - DataLink implementation allows users to apply a convolution module on a part of the synthetic spectrum

DataLink to process a spectrum 2/6

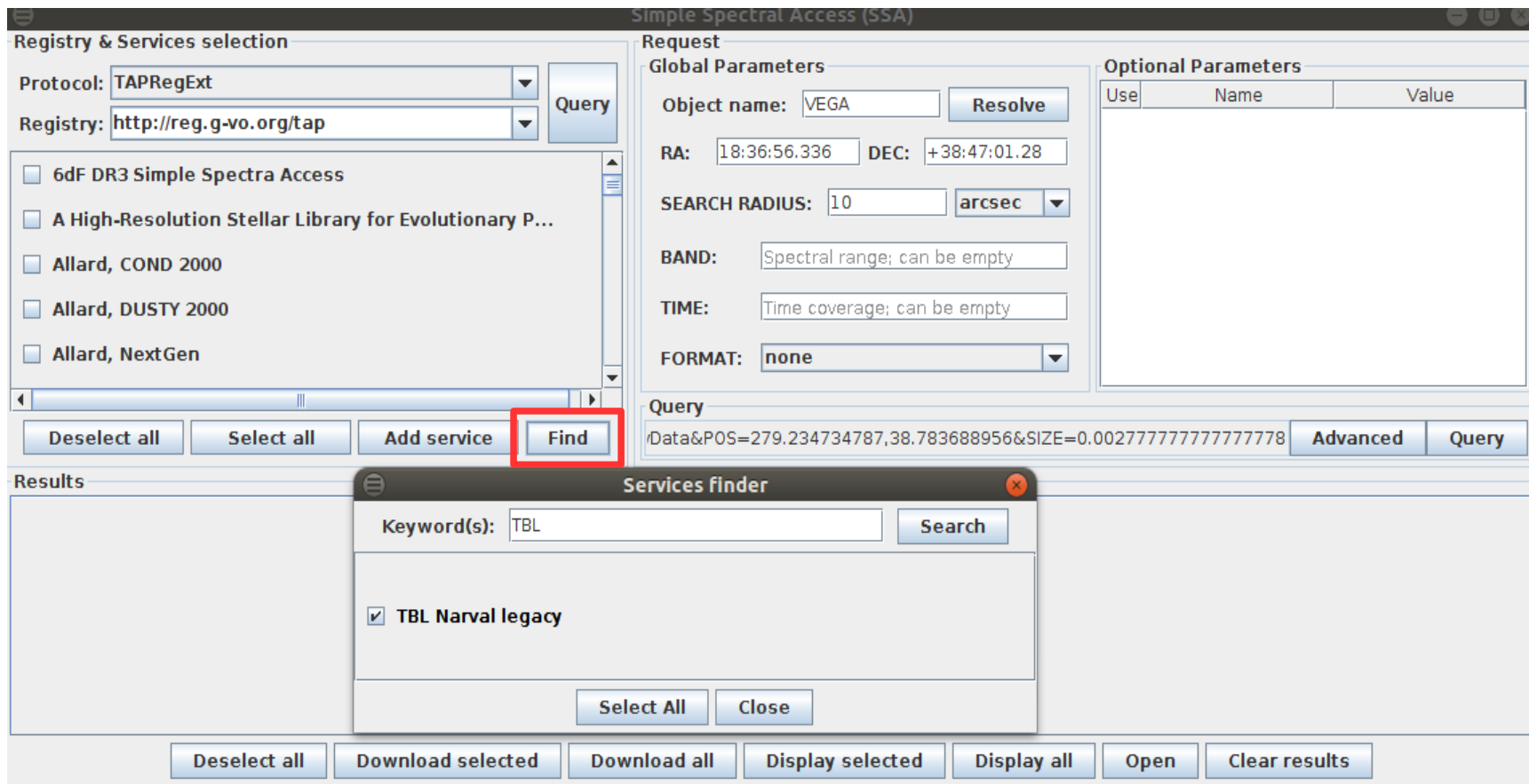


Run CASSIS from AppLauncher



Run SSA Module

DataLink to process a spectrum 3/6



Registry & Services selection

Protocol: TAPRegExt
Registry: http://reg.g-vo.org/tap

6dF DR3 Simple Spectra Access
A High-Resolution Stellar Library for Evolutionary P...
Allard, COND 2000
Allard, DUSTY 2000
Allard, NextGen

Deselect all Select all Add service **Find**

Request

Global Parameters

Object name: VEGA Resolve
RA: 18:36:56.336 DEC: +38:47:01.28
SEARCH RADIUS: 10 arcsec
BAND: Spectral range; can be empty
TIME: Time coverage; can be empty
FORMAT: none

Optional Parameters

Use	Name	Value
-----	------	-------

Query

Data&POS=279.234734787,38.783688956&SIZE=0.00277777777777778 Advanced Query

Results

Services finder

Keyword(s): TBL Search

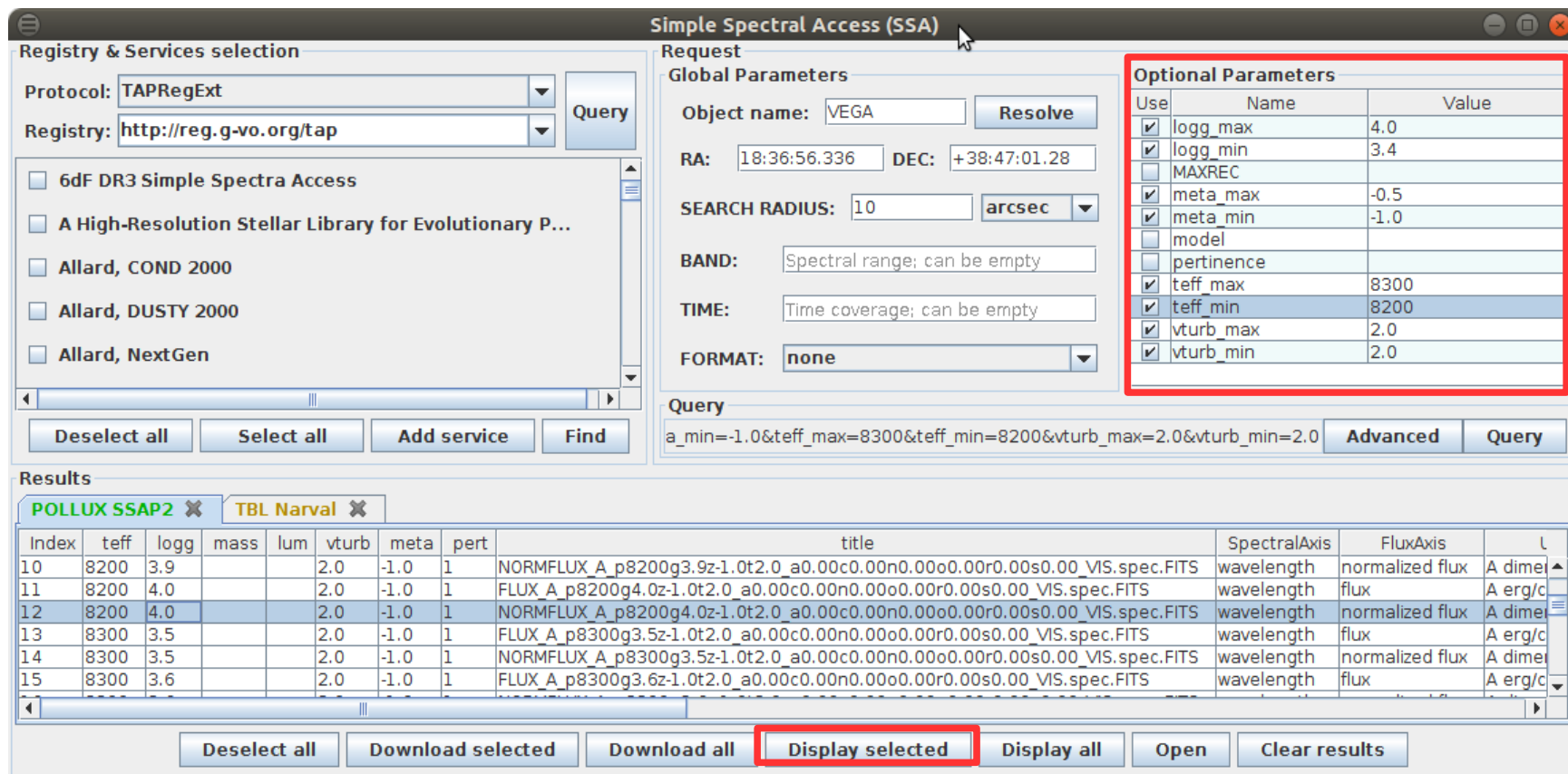
TBL Narval legacy

Select All Close

Deselect all Download selected Download all Display selected Display all Open Clear results

- Select observed spectrum from SSA TBL service with VEGA target

DataLink to process a spectrum 4/6



Registry & Services selection

Protocol: TAPRegExt
Registry: http://reg.g-vo.org/tap

Request

Global Parameters

Object name: VEGA [Resolve]
RA: 18:36:56.336 DEC: +38:47:01.28
SEARCH RADIUS: 10 arcsec
BAND: Spectral range; can be empty
TIME: Time coverage; can be empty
FORMAT: none

Use	Name	Value
<input checked="" type="checkbox"/>	logg_max	4.0
<input checked="" type="checkbox"/>	logg_min	3.4
<input type="checkbox"/>	MAXREC	
<input checked="" type="checkbox"/>	meta_max	-0.5
<input checked="" type="checkbox"/>	meta_min	-1.0
<input type="checkbox"/>	model	
<input type="checkbox"/>	pertinence	
<input checked="" type="checkbox"/>	teff_max	8300
<input checked="" type="checkbox"/>	teff_min	8200
<input checked="" type="checkbox"/>	vturb_max	2.0
<input checked="" type="checkbox"/>	vturb_min	2.0

Query: a_min=-1.0&teff_max=8300&teff_min=8200&vturb_max=2.0&vturb_min=2.0 [Advanced] [Query]

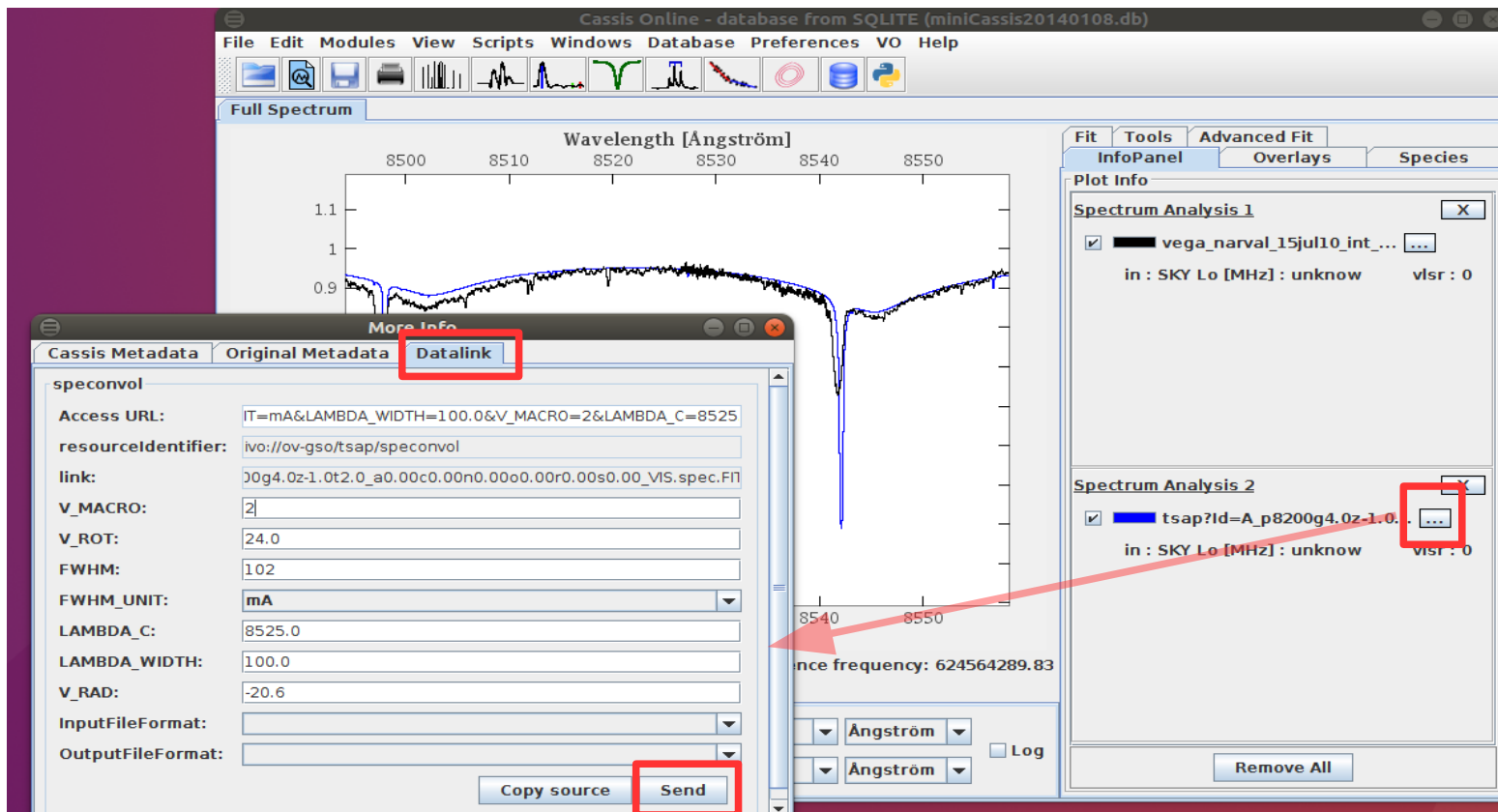
Results

Index	teff	logg	mass	lum	vturb	meta	pert	title	SpectralAxis	FluxAxis	U
10	8200	3.9			2.0	-1.0	1	NORMFLUX_A_p8200g3.9z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	normalized flux	A dime
11	8200	4.0			2.0	-1.0	1	FLUX_A_p8200g4.0z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	flux	A erg/c
12	8200	4.0			2.0	-1.0	1	NORMFLUX_A_p8200g4.0z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	normalized flux	A dime
13	8300	3.5			2.0	-1.0	1	FLUX_A_p8300g3.5z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	flux	A erg/c
14	8300	3.5			2.0	-1.0	1	NORMFLUX_A_p8300g3.5z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	normalized flux	A dime
15	8300	3.6			2.0	-1.0	1	FLUX_A_p8300g3.6z-1.0t2.0_a0.00c0.00n0.00o0.00r0.00s0.00_VIS.spec.FITS	wavelength	flux	A erg/c

[Deselect all] [Download selected] [Download all] [Display selected] [Display all] [Open] [Clear results]

- Select synthetic spectrum from SSA POLLUX service with VEGA SIMBAD and Vizier parameters

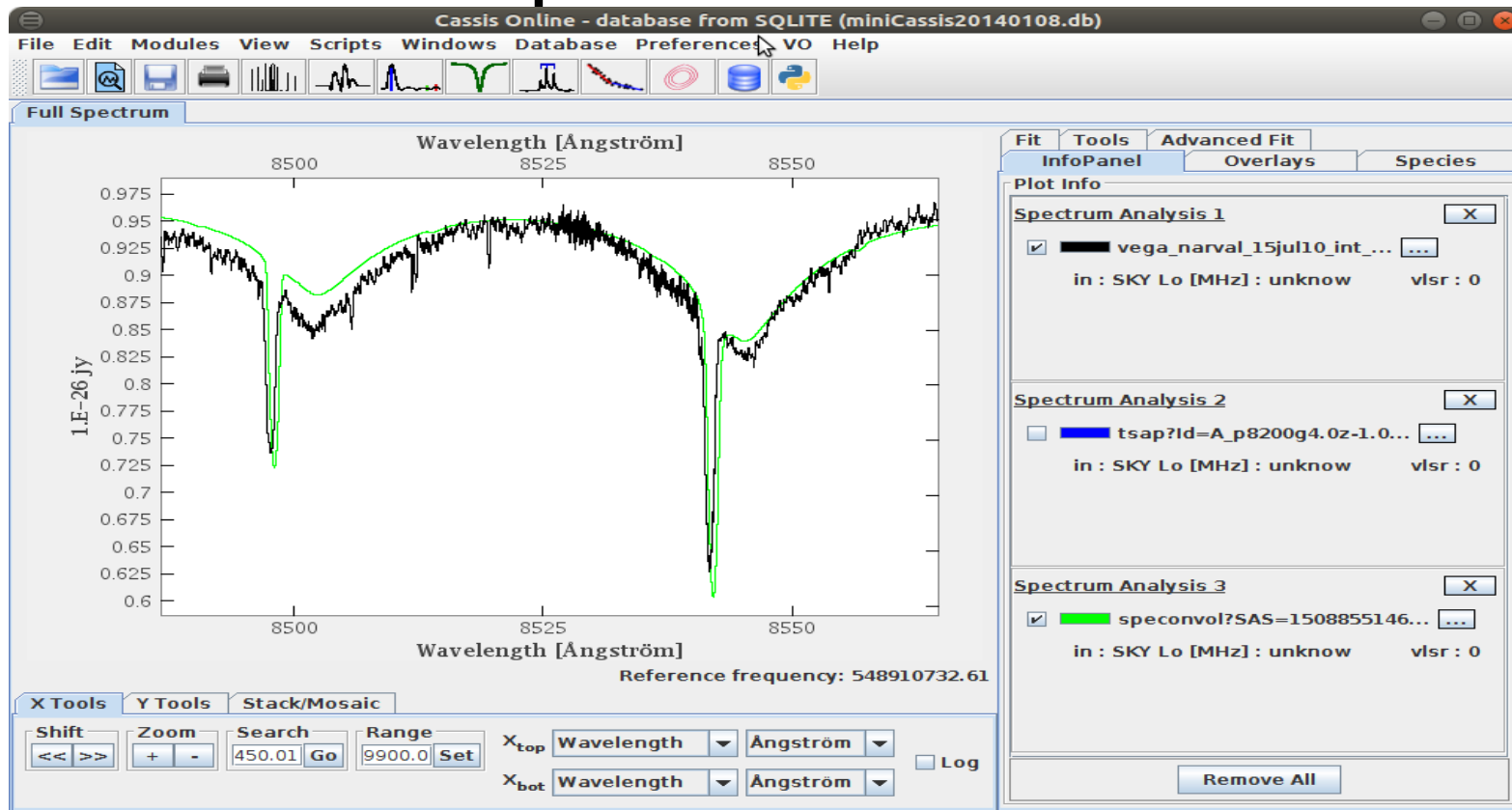
DataLink to process a spectrum 5/6



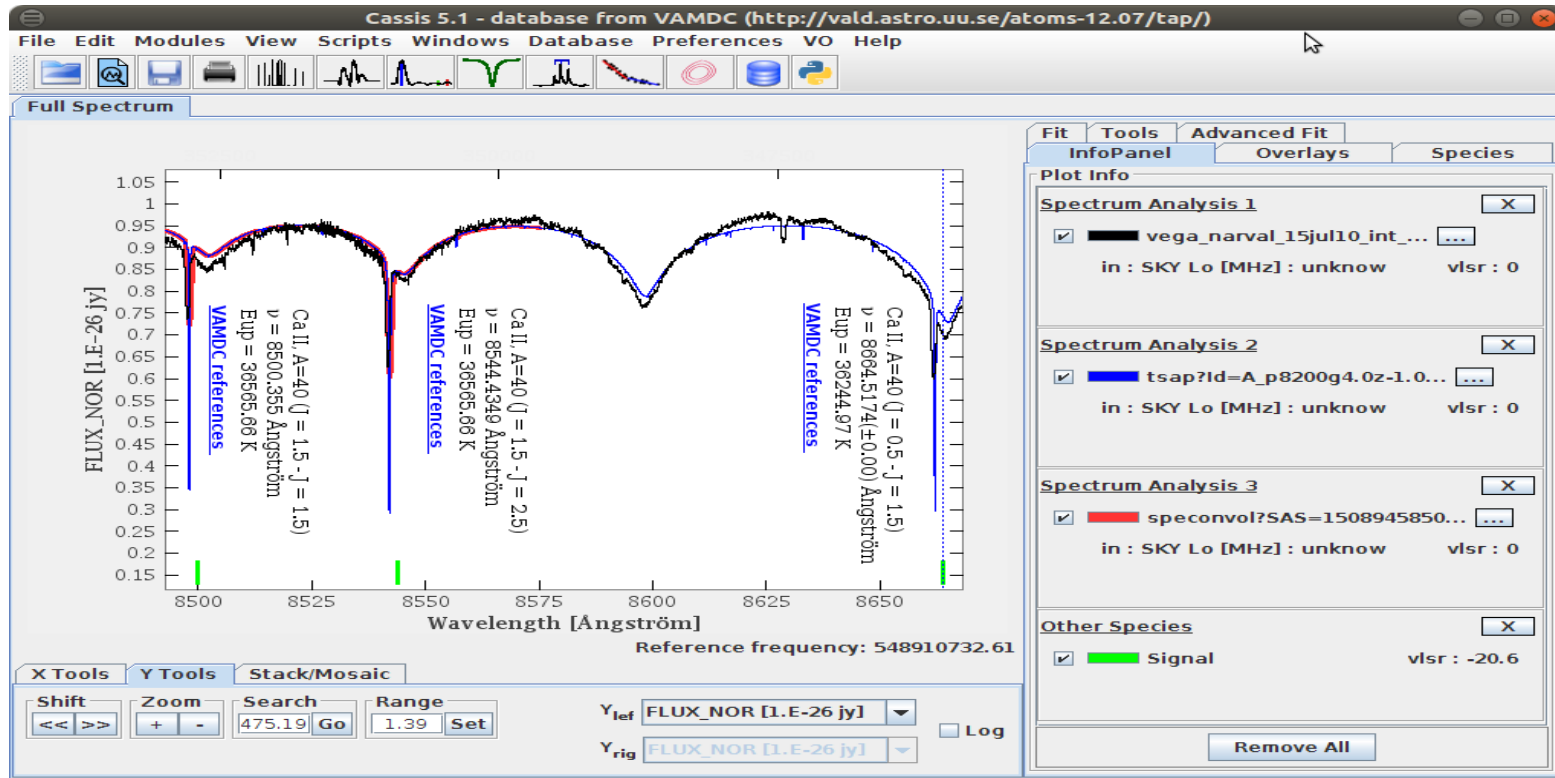
The screenshot shows the Cassis Online interface. The main window displays a spectrum plot titled "Full Spectrum" with the x-axis labeled "Wavelength [Angström]" ranging from 8500 to 8550. The y-axis shows intensity values from 0.9 to 1.1. A prominent absorption line is visible at approximately 8542 Angström. The plot is overlaid with a blue line representing a fit. Below the plot, there are two panels: "Cassis Metadata" and "More Info". The "Cassis Metadata" panel has a "Datalink" tab selected, showing fields for "speconvol", "Access URL", "resourceIdentifier", "link", "V_MACRO", "V_ROT", "FWHM", "FWHM_UNIT", "LAMBDA_C", "LAMBDA_WIDTH", "V_RAD", "InputFileFormat", and "OutputFileFormat". The "More Info" panel shows "Spectrum Analysis 1" and "Spectrum Analysis 2" with checkboxes and "in" fields. A red box highlights the "Datalink" tab, and another red box highlights the "Send" button. A red arrow points from the "Send" button to the spectrum plot.

- Click to see the DataLink and to run the convolution

DataLink to process a spectrum 6/6



- The convolved spectrum fits better the observed data



- Interrogate the atomic VALD database with the VAMDC protocol
- Interrogate the query store of VAMDC to have the DOI and the references of the lines

- Development of an **ObsTAP access** module
- Development of a **UWS access** module
 - To launch spectral models
- Development of a **SIMDAL access** module
 - Collaboration with Franck Le Petit to interrogate the ISM database
- Processing and modeling a set of spectra from a data cube
- Read more types of files containing spectra
- Interface with new chemical species databases

And may be

- Have a simpler and lighter software version of CASSIS ?
- Have a CASSIS lite on your web browser ?
 - As Aladin Lite
- Some modules of CASSIS in python ?

Links

- CASSIS
<http://cassis.irap.omp.eu>
- OVGSO-DC
<https://ov-gso.irap.omp.eu/>
- POLLUX
<http://pollux.oreme.org>
- AppLauncher
<http://www.jmmc.fr/applauncher>
- IVOA
<http://www.ivoa.net>
- VAMDC
<http://portal.vamdc.org>
- Tutorials
 - <http://rcsed.sai.msu.ru/article/tutorial-discover-rare-galaxies-rcsed-catalog-data/>
 - http://www.euro-vo.org/sites/default/files/images/specflow_tutorial.pdf