



CASSIS



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on behalf of the CASSIS team

_____ Outline: _____

- OV-GSO and CASSIS in a nutshell
- Interoperability in CASSIS



OV-GSO

<http://ov-gso.irap.omp.eu>

Observatoire Virtuel du Grand Sud-Ouest (Bordeaux-Toulouse-Montpellier) : regional center for astrophysical data.

Services:

- CDPP (Centre de Données de Physique des Plasmas) : French national data center for natural plasmas of the solar system
- Bass2000-CDAB : solar data from ground-based french observatories
- Polar-Base : stellar data from the spectropolarimeters Espadons (CFHT) and Narval (TBL)
- Pollux : high-resolution synthetic stellar spectra and SEDs
- KIDA (Kinetic Database for Astrochemistry)
- CASSIS

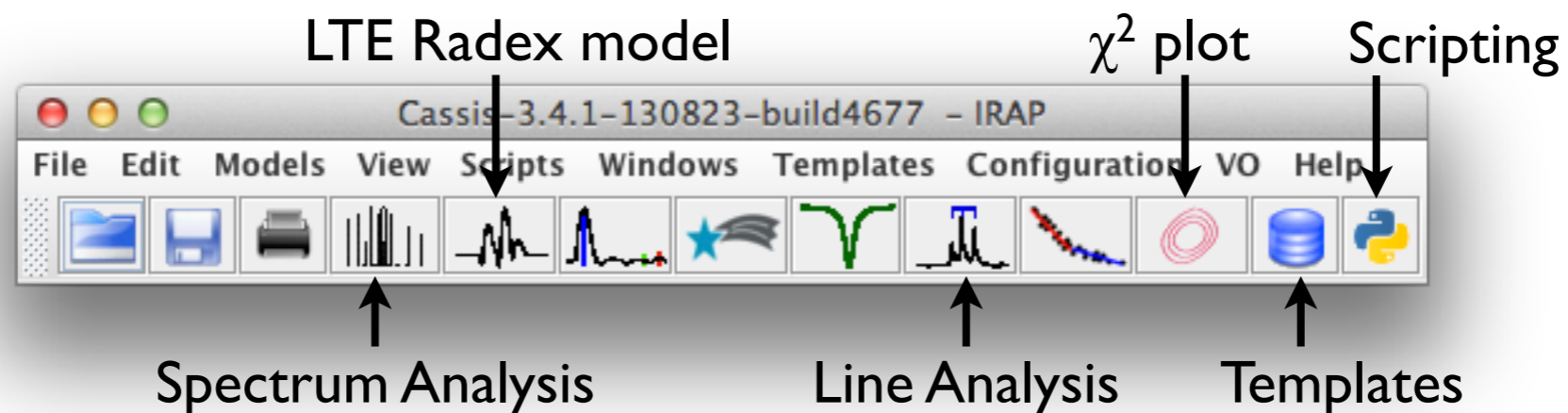


CASSIS

Centre d'Analyse Scientifique de Spectres Infrarouges et Sub-millimétriques

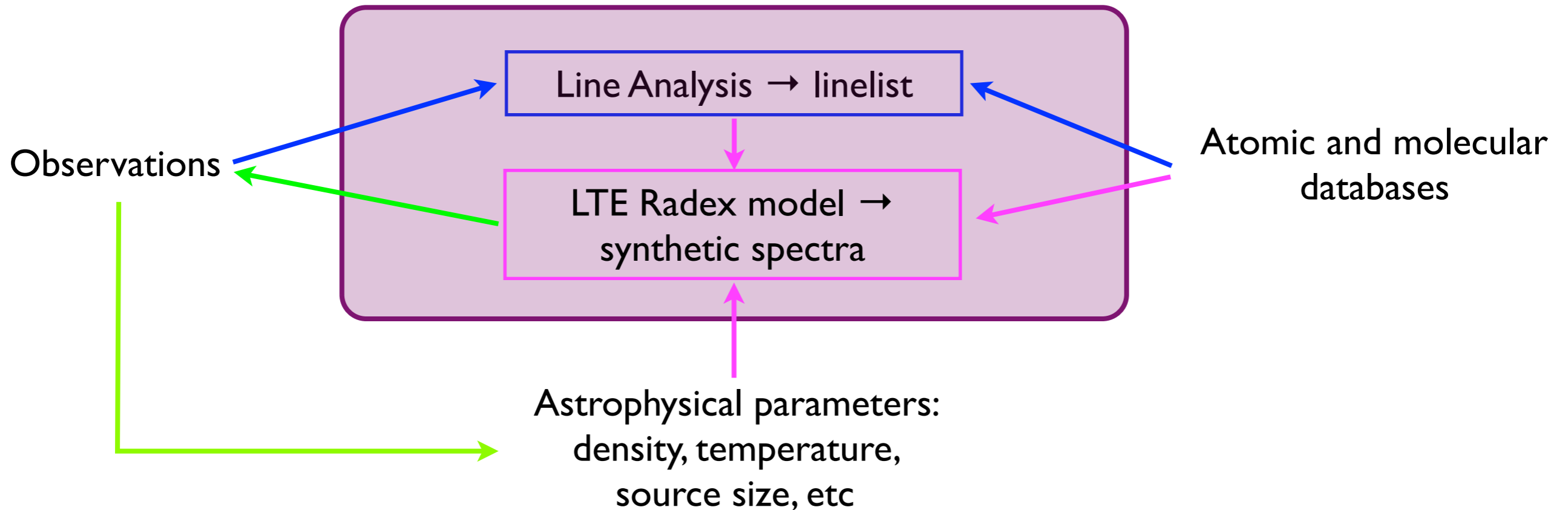
<http://cassis.irap.omp.eu>

- Free spectrum analyzer developed at IRAP since 2005
- Projects scientists: E. Caux (PI), S. Bottinelli, C. Vastel
- Developers: J.-M. Glorian (Project manager), M. Boiziot, D. Rabois
- Full java
- Features: line identification (large datasets), synthetic spectra, scripting (jython)
- Interoperability: HIPE (Herschel software) plug-in, SAMP



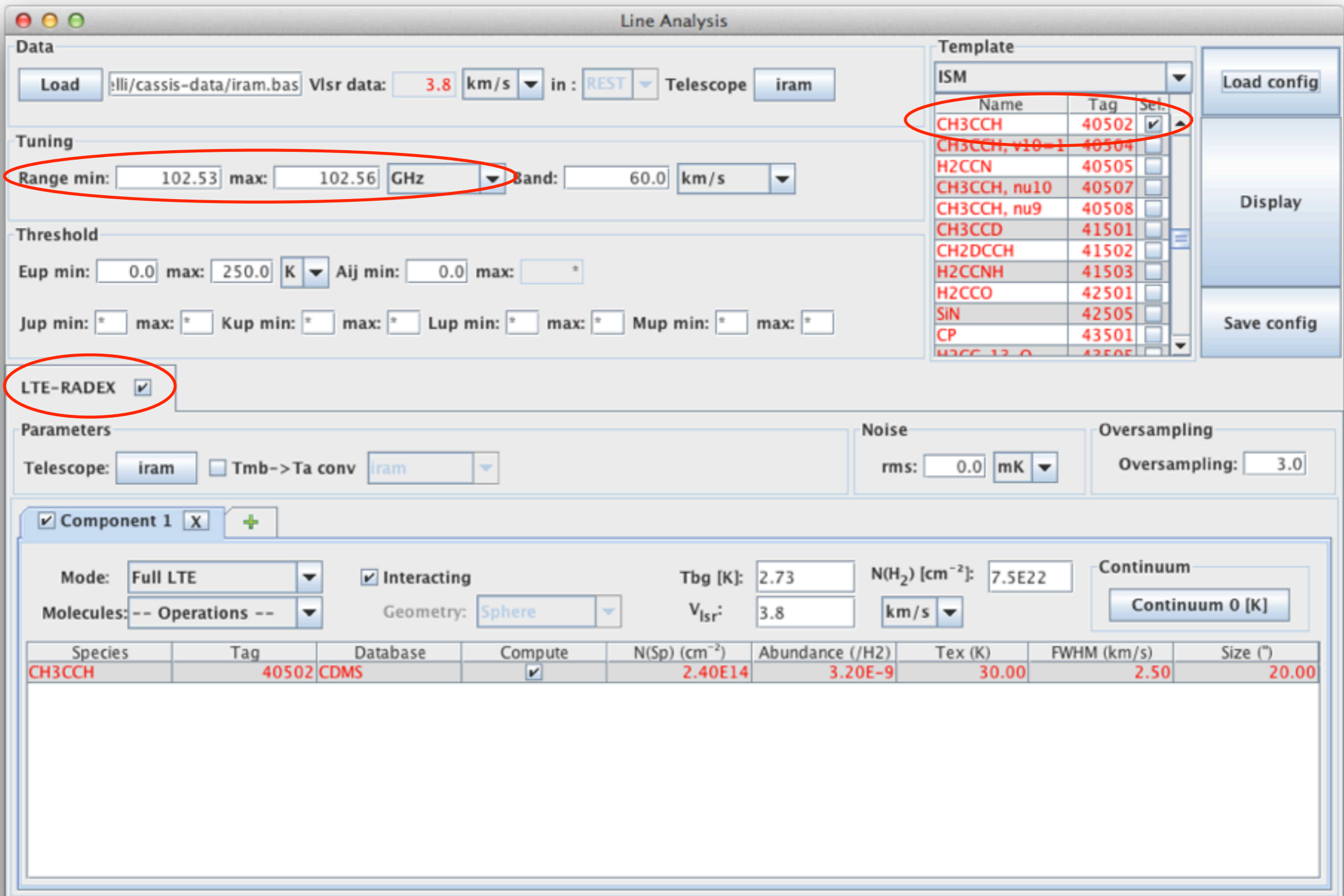


CASSIS



- Key point : CASSIS needs a spectroscopic database.
- Stand-alone CASSIS : sqlite database (downloaded with CASSIS and stored locally) gathering data from on-line databases (CDMS, JPL, NIST, etc) and from contributed databases

CASSIS: Line Analysis+LTE

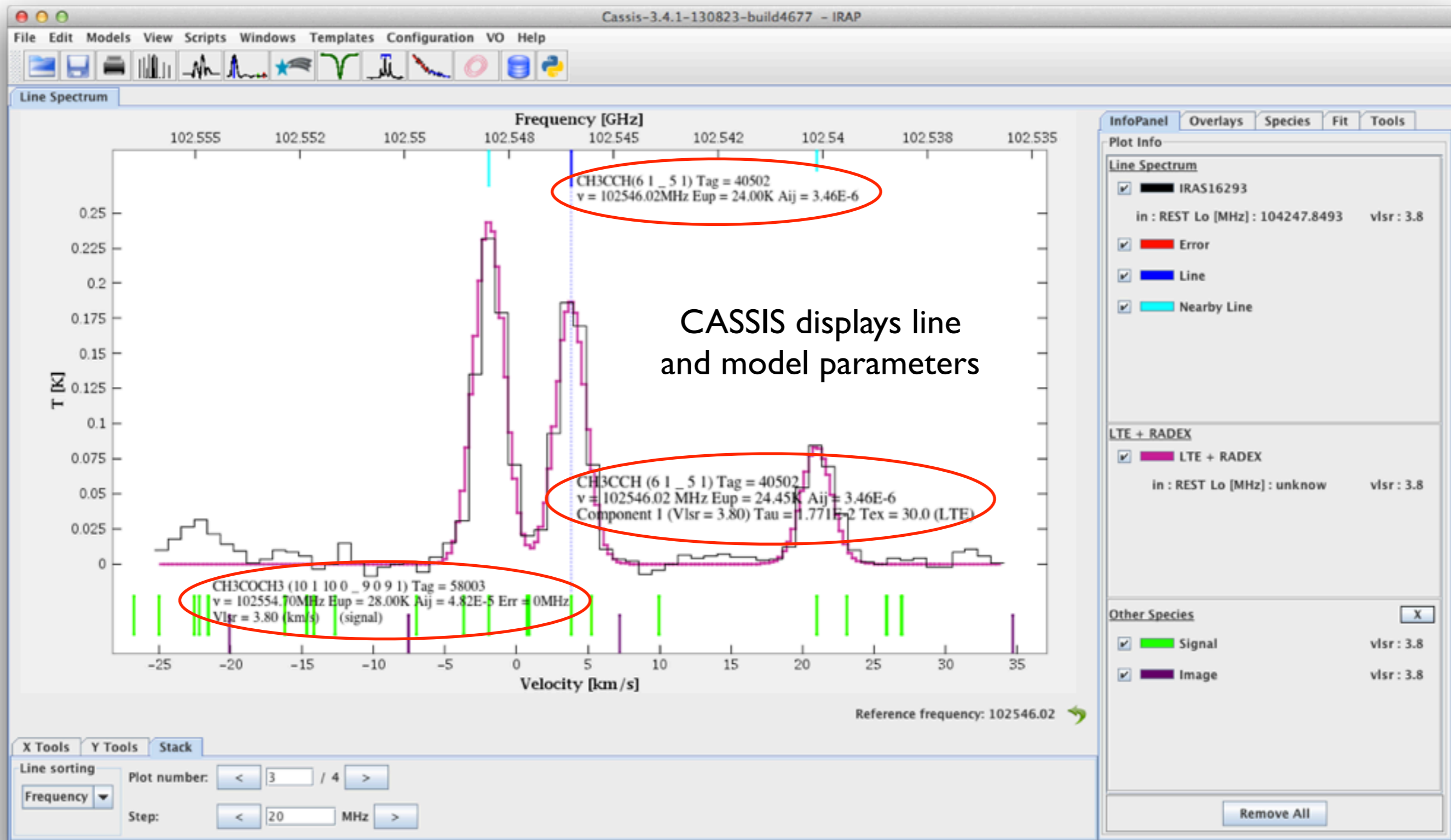


The screenshot shows the 'Line Analysis' software interface. Key features include:

- Data:** Load button, file path (elli/cassis-data/iram.bas), Vlsr data (3.8 km/s), in (REST), Telescope (iram).
- Tuning:** Range min (102.53) max (102.56) GHz, Band (60.0 km/s).
- Threshold:** Eup min (0.0) max (250.0) K, Aij min (0.0) max (*).
- LTE-RADEX:** Checked checkbox.
- Parameters:** Telescope (iram), Tmb->Ta conv (iram), Noise rms (0.0 mK), Oversampling (3.0).
- Component 1:** Mode (Full LTE), Interacting checked, Molecules (-- Operations --), Geometry (Sphere), Tbg [K] (2.73), N(H₂) [cm⁻²] (7.5E22), V_{lsr} (3.8 km/s), Continuum (Continuum 0 [K]).
- Table:** A table with columns: Species, Tag, Database, Compute, N(Sp) (cm⁻²), Abundance (/H₂), Tex (K), FWHM (km/s), Size (").

Species	Tag	Database	Compute	N(Sp) (cm ⁻²)	Abundance (/H ₂)	Tex (K)	FWHM (km/s)	Size (")
CH3CCH	40502	CDMS	<input checked="" type="checkbox"/>	2.40E14	3.20E-9	30.00	2.50	20.00

CASSIS: Line Analysis+LTE



CASSIS displays line and model parameters

CASSIS: Templates

Manage Templates

Templates of CASSIS

- Full VASTEL
- Full JPL
- Full NIST
- Full FORCOM
- Full IRAP
- Full CDMS
- Full HFS
- Full Database
- ISM
- mytemplate
- HCI
- IRAS16293
- test
- HCI2
- 16293-abs
- C_rich_AGB1
- C_rich_AGB2
- D-16293
- ALMA-HIFI-Band9
- CO-isotopes-1
- 12CO
- ALMA2
- Highmass_SFR
- deuterated_water
- com2
- C_rich_star_IRC10216a
- com1
- hydrides
- CH3OCHO
- CH3OH-istopes
- PACSPIRE
- PSC-10K
- molalma
- formeth
- Massive star formina region

Species of the selected templates

Species	Tag	DB	Coll	C-Dens	Abun	Beta	Tex	TKin	Fwhm	Size	V _{exp}	Selected
H2O v...	18005	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
13CH3D	18006	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
HO-18	19001	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
HDO	19002	JPL	hdo.d...	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>
H2O-17	19003	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
H3O+	19004	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
H3O+...	19005	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
D2O	20001	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
HF	20002	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
H2O-18	20003	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
HDO-18	21001	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
DF	21002	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>
CFM	25001	JPL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input type="checkbox"/>

Add selected species to the new template

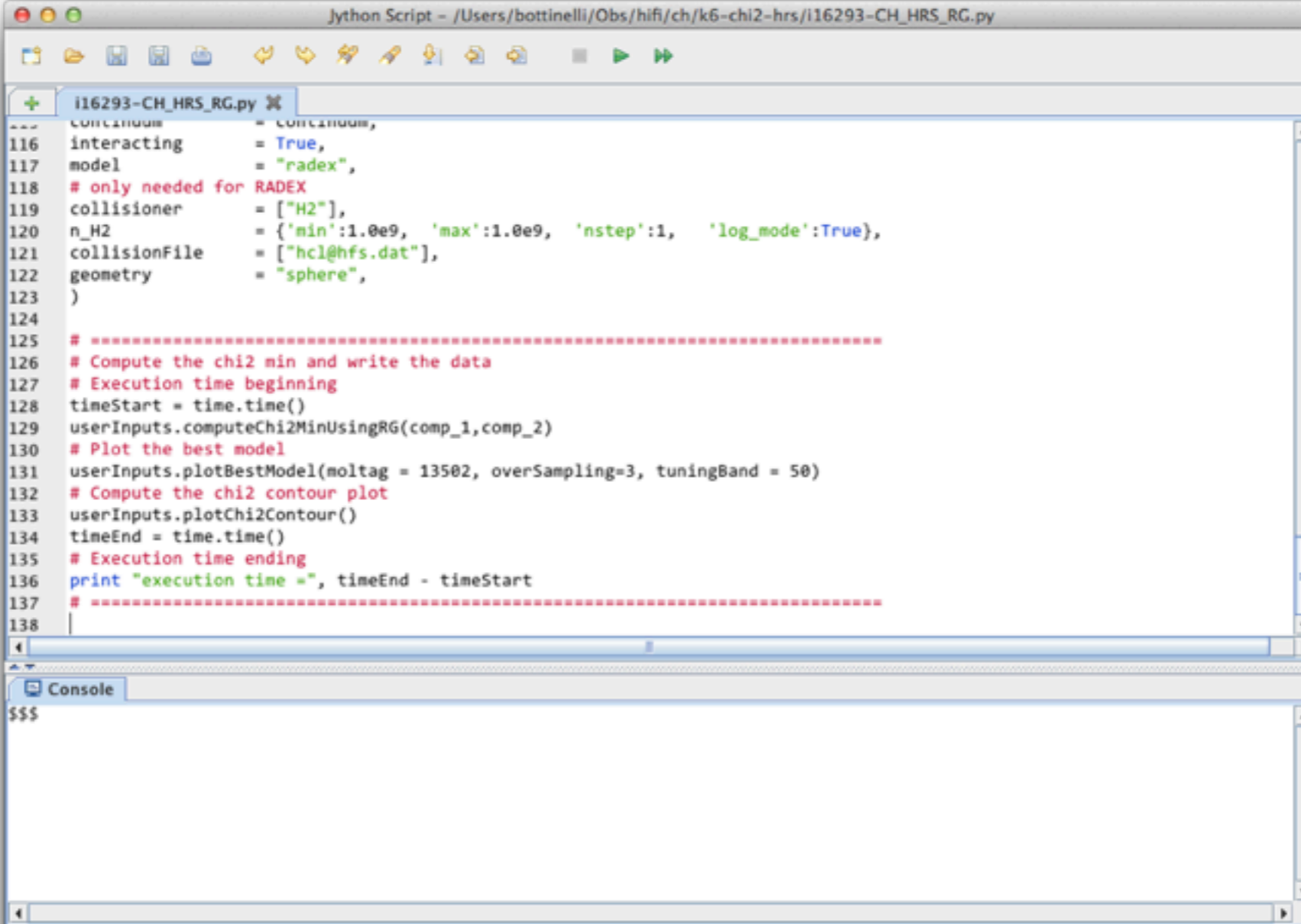
Species of the new template

N(H₂) [cm⁻²]:

Species	Tag	DB	Coll	C-Dens	Abun	Beta	Tex	TKin	Fwhm	Size	V _{exp}	Selected
p-H2O	18083	VASTEL	p-h2o...	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>
o-H2O	18093	VASTEL	o-h2o...	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>
p-D2O	20081	VASTEL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>
o-D2O	20091	VASTEL	-no-	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>
HDO	19002	JPL	hdo.da...	7.00E14	1.00E-8	2.00E-5	100.00	10.00	1.00	3.00	0.00E0	<input checked="" type="checkbox"/>

Add Clear the new template Save as

CASSIS: jython script



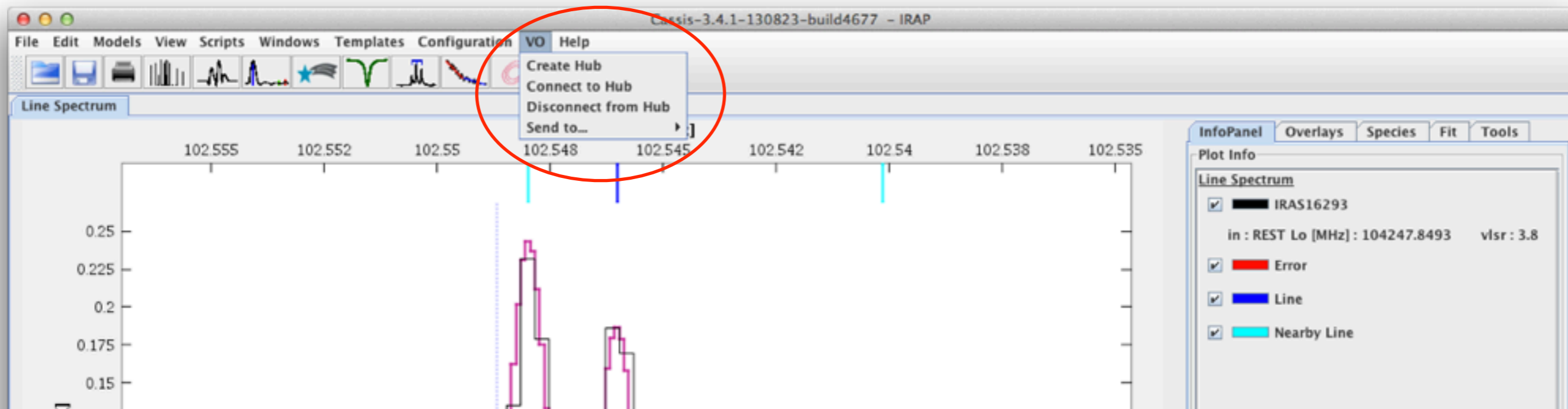
```
Jython Script - /Users/bottinelli/Obs/hifi/ch/k6-chi2-hrs/i16293-CH_HRS_RG.py
i16293-CH_HRS_RG.py
---
continuum = continuum,
116 interacting = True,
117 model = "radex",
118 # only needed for RADEX
119 collisioner = ["H2"],
120 n_H2 = {'min':1.0e9, 'max':1.0e9, 'nstep':1, 'log_mode':True},
121 collisionFile = ["hcl@hfs.dat"],
122 geometry = "sphere",
123 )
124
125 # =====
126 # Compute the chi2 min and write the data
127 # Execution time beginning
128 timeStart = time.time()
129 userInputs.computeChi2MinUsingRG(comp_1,comp_2)
130 # Plot the best model
131 userInputs.plotBestModel(moltag = 13502, overSampling=3, tuningBand = 50)
132 # Compute the chi2 contour plot
133 userInputs.plotChi2Contour()
134 timeEnd = time.time()
135 # Execution time ending
136 print "execution time =", timeEnd - timeStart
137 # =====
138
```

Console

```
$$$
```

- Goal: deliver jython editor as a stand-alone module

CASSIS: interoperability



- CASSIS includes SAMP
 - test link CASSIS-CASA (ALMA software) as soon as SAMP is in CASA
 - QuickViz (Aladin plug-in) : can communicate with CASSIS (not public yet)



CASSIS: interoperability

Short-term goal (available in the coming weeks): have CASSIS Demo (Java Web Start / JNLP) ready

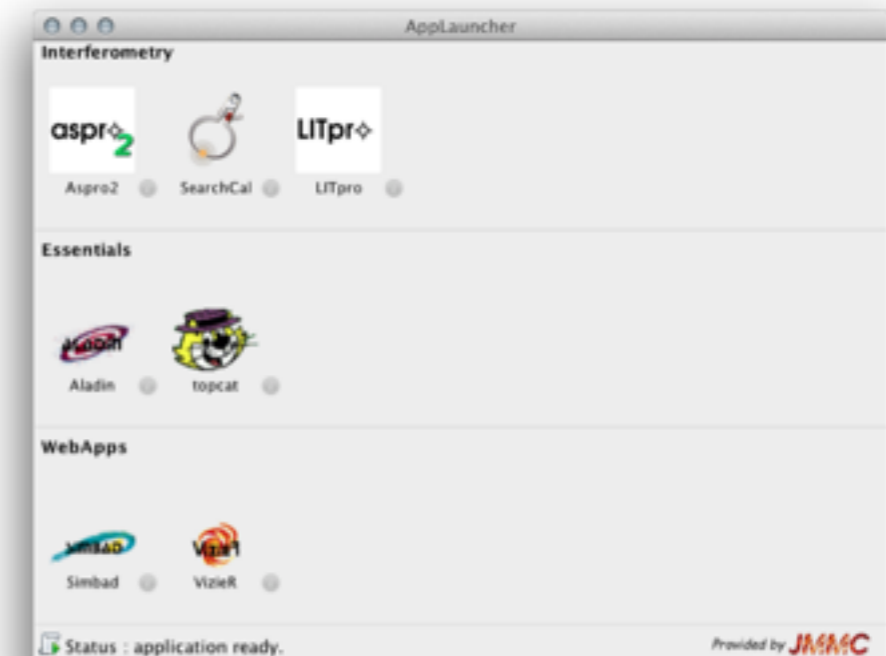
- Database queries : → interface with VAMDC (atomic and molecular database with collisional coefficients)



- or mini-database (cache),
- or both?

- Implications :

- be part of applications available in AppLauncher (provided by JMMC ; ensures communication between SAMP tools, even if not yet running)
- be part of applications/tools available in VOspecflow (transform synthetic spectra into simulated observations)

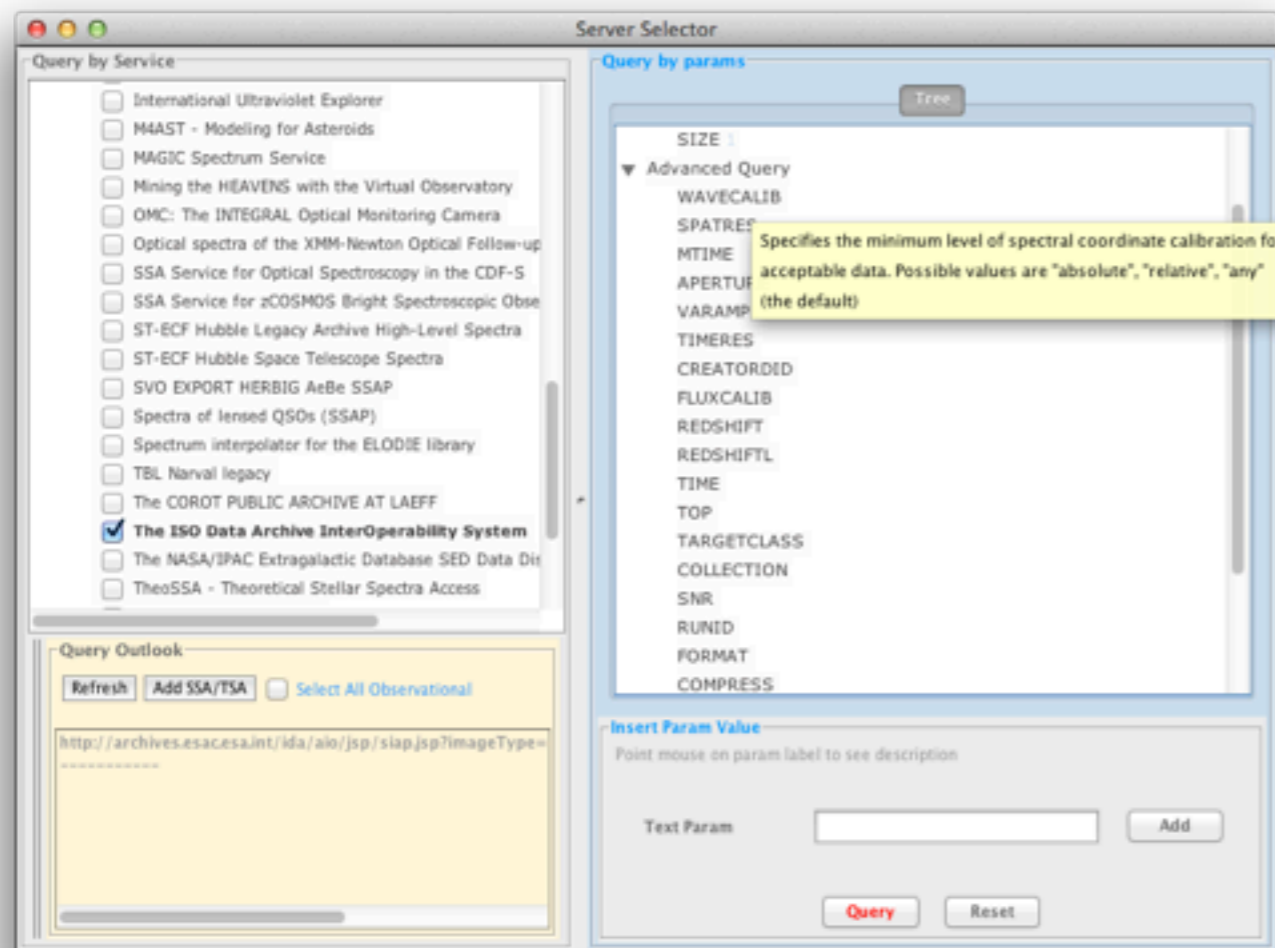




CASSIS: interoperability

Mid-term goal

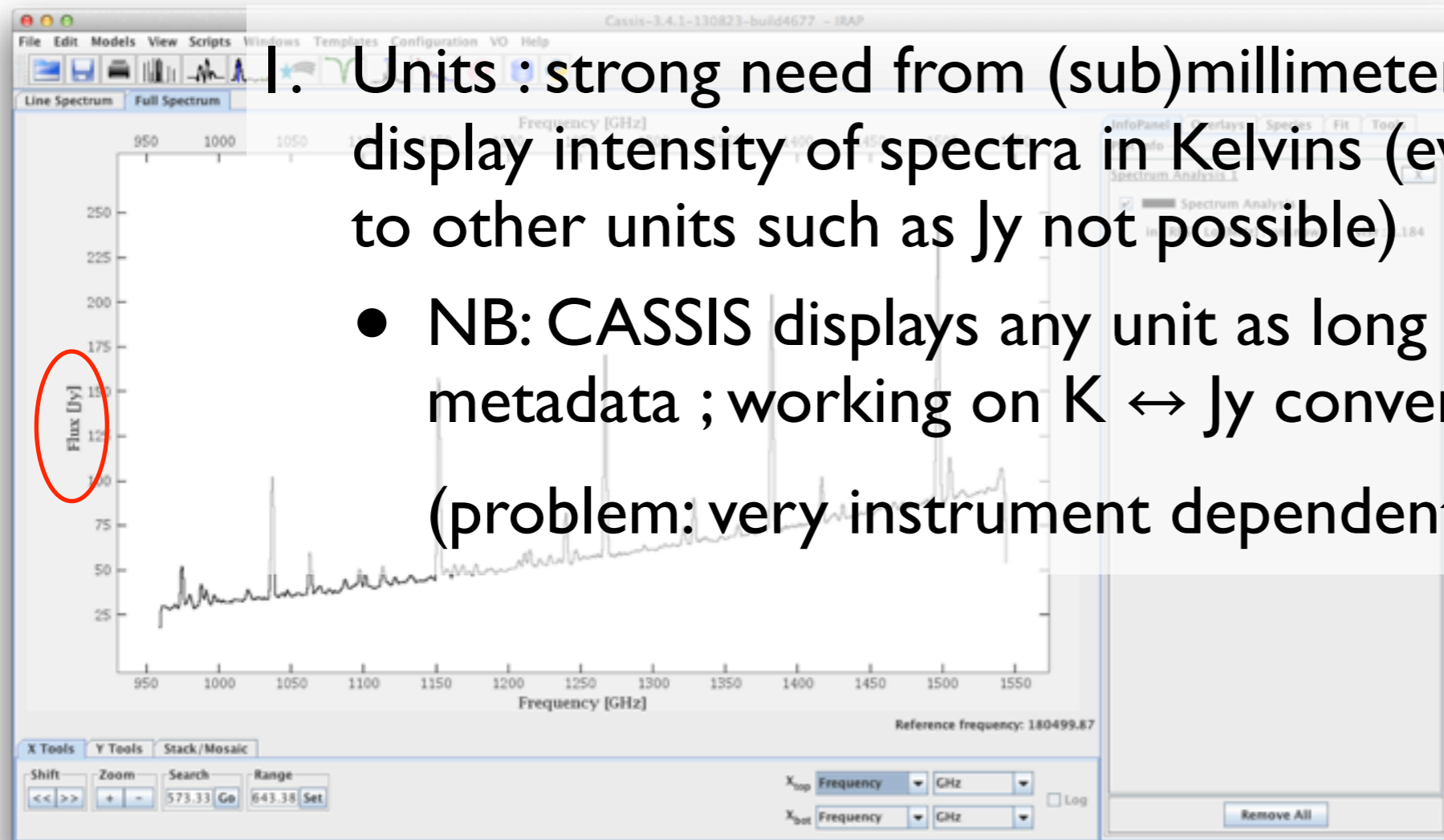
- Graphic interface (independent module) to query services using SSAP/TSAP (cf tools in vospec, specview, topcat, splat)



- ▶ Astronomers' request to query ***all*** services based on, e.g., source name

Questions: implications for used resources? could it be done by a common service?

Questions / Issues



1. Units : strong need from (sub)millimeter community to display intensity of spectra in Kelvins (even if conversion to other units such as Jy not possible)
 - NB: CASSIS displays any unit as long as specified in metadata ; working on $K \leftrightarrow Jy$ conversion tool (problem: very instrument dependent)
2. Line access: should we use SLAP/SSLDM protocol and data model of IVOA? (or that of VAMDC?)



Conclusions

- CASSIS useful to astronomers outside FIR/submm/mm field
- Working hard on interoperability
- CASSIS Demo : query on-line database / cached database ? use SLAP/SSLDM?
- services query (SSAP/TSAP) : search all services based on source name? common service?
- need for other tools/apps to display Kelvins
- Comments, suggestions, ... : bug report page (<http://cassis.irap.omp.eu/?page=bugsreport>) or send us an email (sbottinelli@irap.omp.eu ; jean-michel.glorian@irap.omp.eu)

Links

<http://ov-gso.irap.omp.eu/doku.php?id=accueil>

<http://cdab.bagn.obs-mip.fr/>

<http://tblegacy.bagn.obs-mip.fr/>

<http://cdpp.cesr.fr>

<http://pollux.graal.univ-montp2.fr>

<http://www.oasu.u-bordeaux1.fr/index.php?pg=kida&lg=fr>

<http://www.vamdc.eu/>

http://portal.vamdc.eu/vamdc_portal/home.seam

http://www.jmmc.fr/applauncher_page

<http://bass2000.bagn.obs-mip.fr/vospecflow/>

<http://www.sciops.esa.int/index.php?project=SAT&page=vospec>

[http://lsiit-miv.u-strasbg.fr/paseo/cubevisualization.php\(QuickViz\)](http://lsiit-miv.u-strasbg.fr/paseo/cubevisualization.php(QuickViz))

<http://casa.nrao.edu/>