

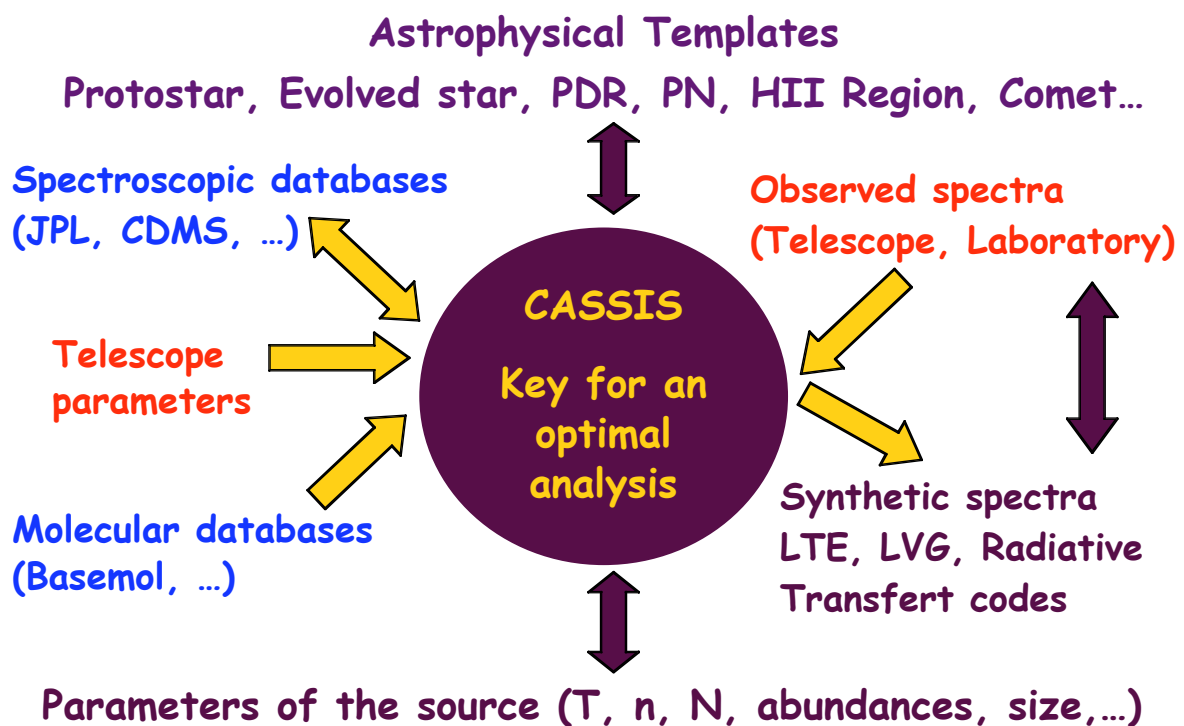
CASSIS

Centre d'Analyse Scientifique
de Spectres Infrarouges
et Submillimétriques

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CASSIS

Centre d'Analyse Scientifique de Spectres Infrarouges et Submillimétriques



CASSIS Software

Software Tool Package (Java)

- Prediction of spectra,
- Observation preparation tool (line strength, blending)
- Speeding up/simplification of the analysis of high resolution spectral data (spectral surveys)

Web Sites : http://www.cesr.fr/~walters/web_cassis/index.html
<http://pc-126.cesr.fr>

Client/Server web version under development

Current standalone distributed version : 1.3 (07/09/12)

<http://pc-126.cesr.fr/trac.cgi/wiki/InstallationCassisStandalone>

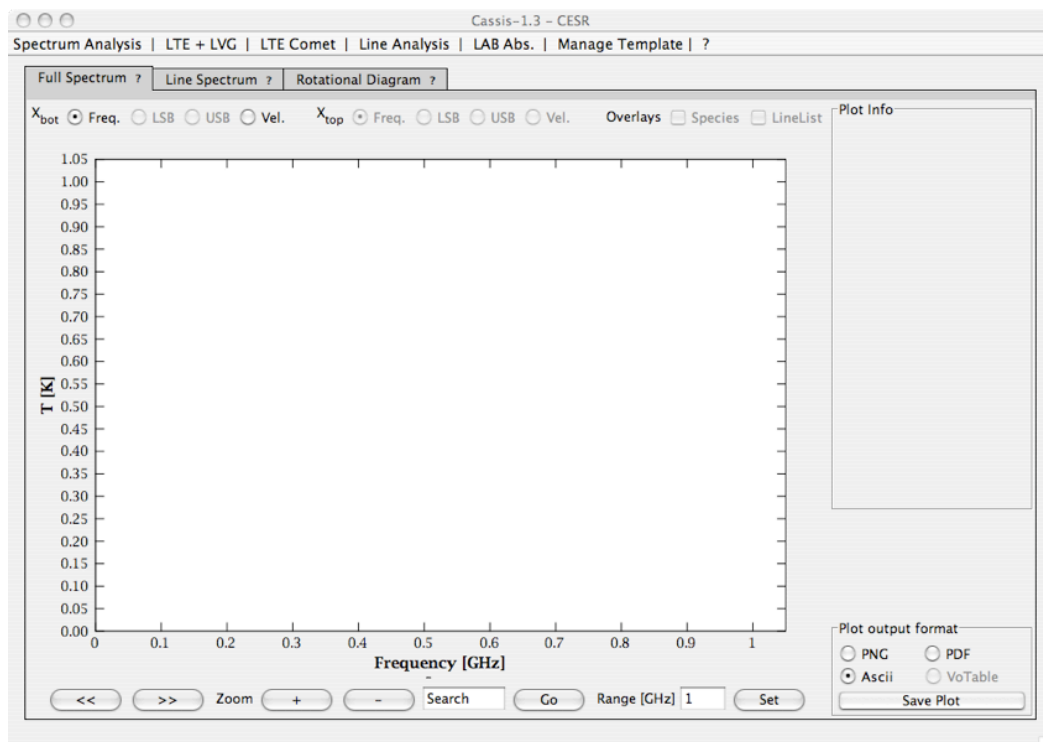
Version 1.3

- Version 1.3 more complete, more robust, less buggy, but still in development
- Supported OS :
 - Unix (Sun), Linux (Ubuntu, Suse, Redhat),
 - Mac OSX (Panther, Tiger, Leopard),
 - Windows (2000, XP, Vista)
- **Not yet compliant Java 1.6**
- Please report by email all problems using CASSIS :
[\(caux/klotz/vastel/walters\)@cesr.fr](mailto:caux/klotz/vastel/walters@cesr.fr)
Excepted blocking problems related to Mysql installation !
- A caveat document is available on the web
- Documentation framework ready, to be populated

CASSIS Database

- The complete database is resident on the laptop (~ 900 Mb)
- Mysql Format
 - Selection of information in JPL or CDMS databases
 - Adding of other parameters used by CASSIS
 - Eup, Aij, ...
 - β for comets, γ_{self} for Lab Abs...
- Ortho-Para Separation for a few species (H₂O, H₂S...)
- Allows a quick access with various sorting
- Can be populated separately by each user
- Update via the Web : one unix command (~ 1/2 hour...)

CASSIS : Main Window



IRAS16293 molecular content

NH ₂		¹³ CO	5x10 ¹⁶	H ₂ C ¹⁸ O	5x10 ¹²	CS	1x10 ¹⁴	C ₂ H	2x10 ¹³
CH ₂ D ⁺		HCO ⁺	4x10 ¹³	D ₂ CO	1x10 ¹⁵	SiO	1.3x10 ¹³	³³ SO	6x10 ¹⁴
OH	7x10 ¹⁴	HCO	4x10 ¹³	¹³ CH ₃ OH	2x10 ¹⁴	CH ₃ CHO-a		³⁴ SO	5x10 ¹³
CH ₃ D		N ₂ H ⁺		H ₂ S	2x10 ¹⁵	N ₂ O		S ¹⁸ O	4x10 ¹⁴
NH ₂ D	3x10 ¹⁴	C ¹⁷ O	2x10 ¹⁵	H ₂ O ₂	1x10 ¹⁴	CH ₃ CHO-e	1.5x10 ¹⁴	HC ₃ N	
H ₂ O	1x10 ¹⁶	D ¹³ CN	3x10 ¹¹	HDS	4x10 ¹³	H ¹⁵ NCO	2x10 ¹³	HC ¹³ CCN	
HDO	1x10 ¹⁵	C ¹⁸ O	8x10 ¹⁵	C ₂ H	1x10 ¹²	HN ¹³ CO	6x10 ¹³	HC ¹³ CN	
H ₂ ¹⁸ O	2x10 ¹⁴	H ¹³ CO ⁺	6x10 ¹²	c-C ₃ H	3x10 ¹²	¹³ CS	3.5x10 ¹³	DC ₃ N	
CCH	2x10 ¹⁵	HC ¹⁷ O ⁺	2x10 ¹²	c-C ₃ H ₂	1.5x10 ¹³	²⁹ SiO	2.5x10 ¹²	C ₂ H ₃ CN	
CN	5x10 ¹³	DCO ⁺	4x10 ¹²	l-C ₃ H ₂	6x10 ¹¹	NH ₂ CHO		C ₂ H ₃ CN	
CCD		p-H ₂ CO	3x10 ¹⁵	C ₃ D		HCS ⁺		C ₂ S	
¹³ CCH	2x10 ¹⁴	o-H ₂ CO	6x10 ¹⁵	c-CC ¹³ CH		C ³³ S	2.5x10 ¹³	OCS	2x10 ¹⁶
C ¹³ CH	3x10 ¹³	C ¹³ H ₂ NH		c-C ₃ D		C ³⁴ S	1x10 ¹³	CH ₃ OCHO-a	1x10 ¹⁵
HCN	5x10 ¹³	NO	8x10 ¹⁴	c-C ₃ HD		³⁰ SiO	5x10 ¹¹	CH ₃ OCHO-e	1x10 ¹⁵
HNC	1.5x10 ¹³	N ₂ D ⁺	2x10 ¹²	CH ₃ CCH	2x10 ¹⁴	H ₂ CS	4x10 ¹⁵ ?	O ¹³ CS	3x10 ¹⁴
¹³ CN		HC ¹⁷ O ⁺		C ₂ O		C ₂ H ₃ OH		OC ³⁴ S	2x10 ¹⁵
CO	4x10 ¹⁸	¹³ C ¹⁷ O		CH ₃ CN	3x10 ¹⁵	c-HCOOH	3x10 ¹³	¹⁸ OCS	2x10 ¹⁴
H ¹³ CN	7x10 ¹²	HNO	4x10 ¹³	CH ₃ CCD	6x10 ¹³	CH ₃ OCH ₃	2x10 ¹⁶	SO ₂	1x10 ¹⁶
HC ¹⁵ N	2x10 ¹²	HC ¹⁸ O ⁺	5x10 ¹¹	CH ₂ DCCH	3x10 ¹³	NS	4.5x10 ¹²	³⁴ SO ₂	4x10 ¹⁴
DCN	5x10 ¹²	HDCO	1x10 ¹⁴	CH ₃ C ¹⁵ N	8x10 ¹¹	t-HCOOH		C ₂ S	
HN ¹³ C	7x10 ¹²	H ₂ ¹³ CO	1x10 ¹³	CH ₂ CO	2x10 ¹³ ?	H ₂ ¹³ CS	4x10 ¹⁴	HC ₃ N	
H ¹⁵ NC	9x10 ¹¹	¹³ C ¹⁸ O	1x10 ¹⁵	NH ₂ CN		HDCS	1x10 ¹⁵ ?	HCCCC ¹³ CN	
DNC	3x10 ¹²	H ₂ COH ⁺	2x10 ¹³	¹³ CH ₃ CN		SO	2x10 ¹⁶	HCCC ¹³ CCN	
HCNH ⁺		D ¹³ CO ⁺	2x10 ¹¹	CH ₃ ¹³ CN		H ₂ C ³⁴ S		HCC ¹³ CCCN	
CO ⁺	8x10 ¹²	CH ₃ OH	1x10 ¹⁶	CH ₂ DCN		N ³⁴ S		HC ¹³ CCCCN	
CH ₂ NH	2x10 ¹³	DC ¹⁸ O ⁺	1x10 ¹¹	HNCO	2x10 ¹³ ?	SO ⁺	2x10 ¹³	H ¹³ CCCCN	

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LTE + LVG - Range mode

The screenshot shows the Cassis-1.3 software interface in 'LTE + LVG' mode. The main window displays a table of species and their parameters. The table has columns for Species, Tag, Database, Collision, Compute, N(Sp) (/c...), Abunda..., Tex (K), TKin (K), FWHM [k...], and Size (°). The 'Full LTE' option is selected, and the 'Component 1' is active. The table lists various species such as CO-17, NS, CH3OCH3, NH2D, S-33-O, C-13-O, OC-13-S, HNC-13-O, HN-15-CO, CH3CHO-e, CH3CHO-a, HNCO, CH3CN v8=..., c-C3H2, and c-C3H.

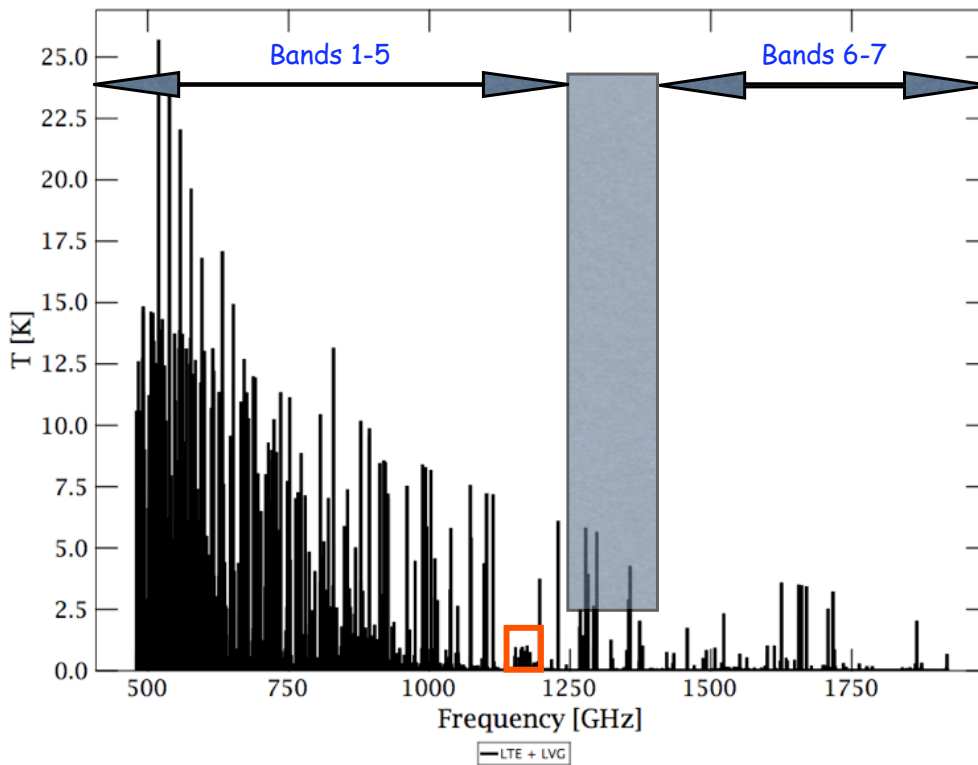
Species	Tag	Database	Collision	Compute	N(Sp) (/c...)	Abunda...	Tex (K)	TKin (K)	FWHM [k...]	Size (°)
CO-17	29,503	CDMS	-none-	✓	2.00E15	9.33E-9	25.0	10.0	3.0	333.0
NS	46,010	JPL	-none-	✓	4.00E12	9.33E-9	25.0	10.0	3.0	333.0
CH3OCH3	46,008	JPL	-none-	✓	2.00E16	9.33E-9	25.0	10.0	3.0	333.0
NH2D	18,501	CDMS	-none-	✓	3.00E14	9.33E-9	25.0	10.0	3.0	333.0
S-33-O	49,501	CDMS	-none-	✓	6.00E14	9.33E-9	25.0	10.0	3.0	333.0
C-13-O	29,501	CDMS	-auto-	✓	5.00E16	9.33E-9	25.0	10.0	3.0	333.0
OC-13-S	61,502	CDMS	-auto-	✓	3.00E14	9.33E-9	25.0	10.0	3.0	333.0
HNC-13-O	44,008	JPL	-none-	✓	6.00E13	9.33E-9	25.0	10.0	3.0	333.0
HN-15-CO	44,007	JPL	-none-	✓	2.00E13	9.33E-9	25.0	10.0	3.0	333.0
CH3CHO-e	44,005	JPL	-none-	✓	5.00E15	9.33E-9	25.0	10.0	3.0	333.0
CH3CHO-a	44,003	JPL	-none-	✓	5.00E16	9.33E-9	25.0	10.0	3.0	333.0
HNCO	43,002	JPL	-none-	✓	2.00E13	9.33E-9	25.0	10.0	3.0	333.0
CH3CN v8=...	41,001	JPL	-none-	✓	3.00E15	9.33E-9	25.0	10.0	3.0	333.0
c-C3H2	38,007	JPL	-none-	✓	3.00E13	9.33E-9	25.0	10.0	3.0	333.0
c-C3H	37,003	JPL	-none-	✓	3.00E12	1.33E-11	25.0	10.0	3.0	333.0

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LTE + LVG - Range mode

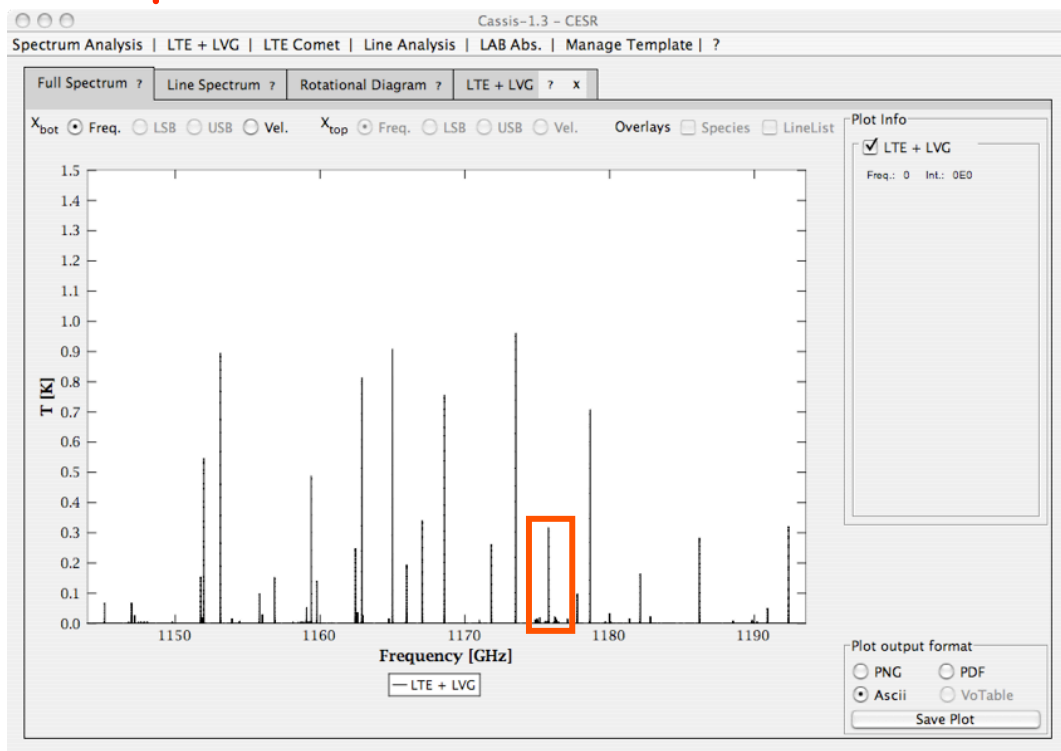


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Spectra Prediction - zoom1

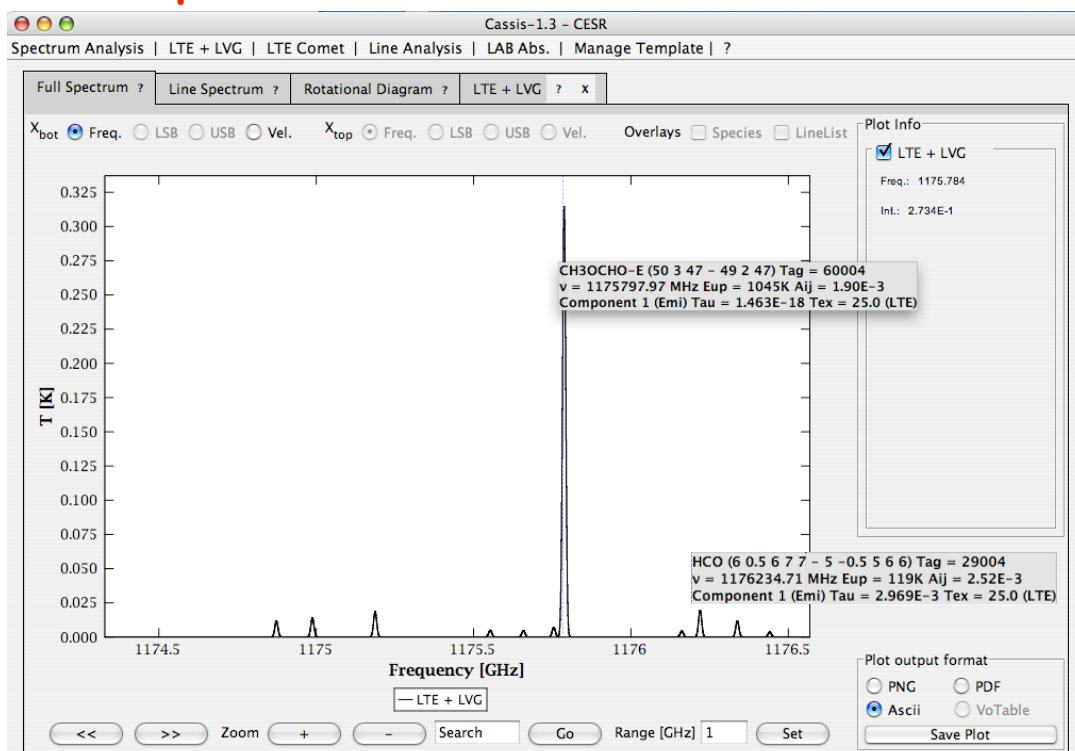


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Spectra Prediction - zoom2



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Lab-Abs

Full Spectrum ? Line Spectrum ? Rotational Diagram ? LAB Abs. ? x

Tuning

Range [GHz] min : 460.93 max : 461.15 Line [GHz] 461.0408 DSB LSB LO freq. [GHz] : 467.0408 Load Config

Instrument

hifi Bandwidth [GHz] : 0.25 dv [MHz] : 0.125

Parameters

L [cm] : 102.54 P [mBar] : 3.3 T [K] : 296.0

OverLay Datafile

Select Display

Threshold

Eup [K] min : 0 max : 150 Aij > AijMax * 0.1 Imin [%] : 0

Noise

rms [mK] : 0

Continuum

Continuum 1 [K] Save Config

Species

Template: CO CDMS Load Add

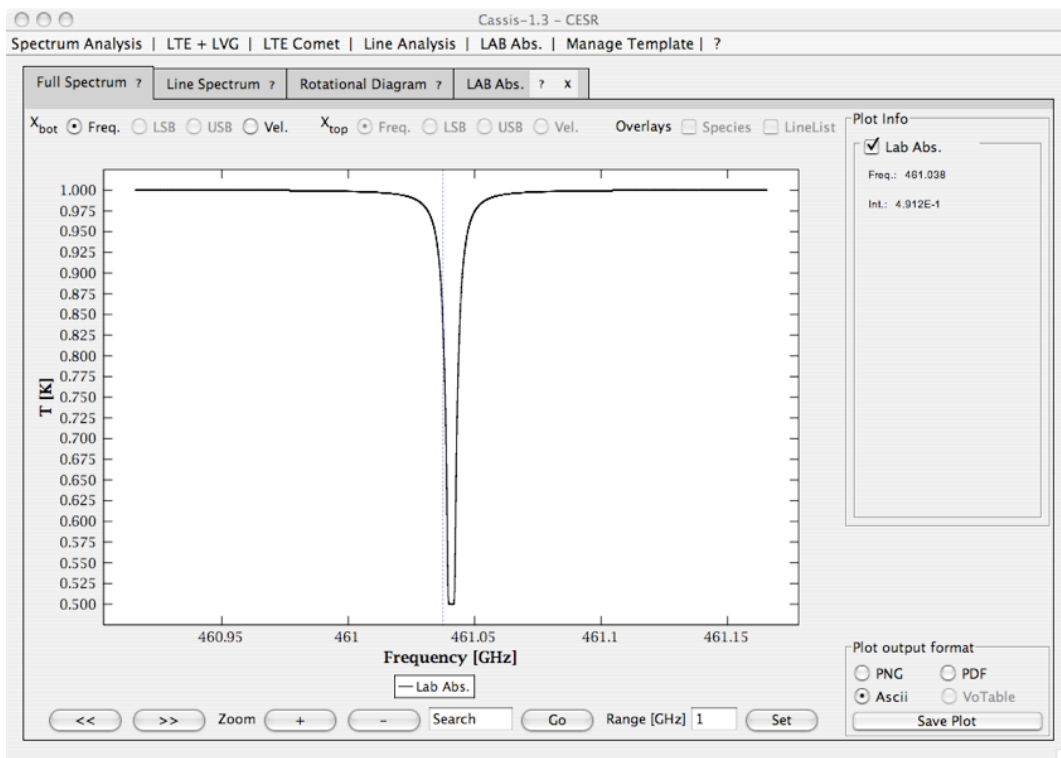
Species	Tag	Database	Compute	Gamma self mean	Molecular mass
CO, v=0	28,503	CDMS	<input checked="" type="checkbox"/>	0.04	27.99491

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Lab-Abs

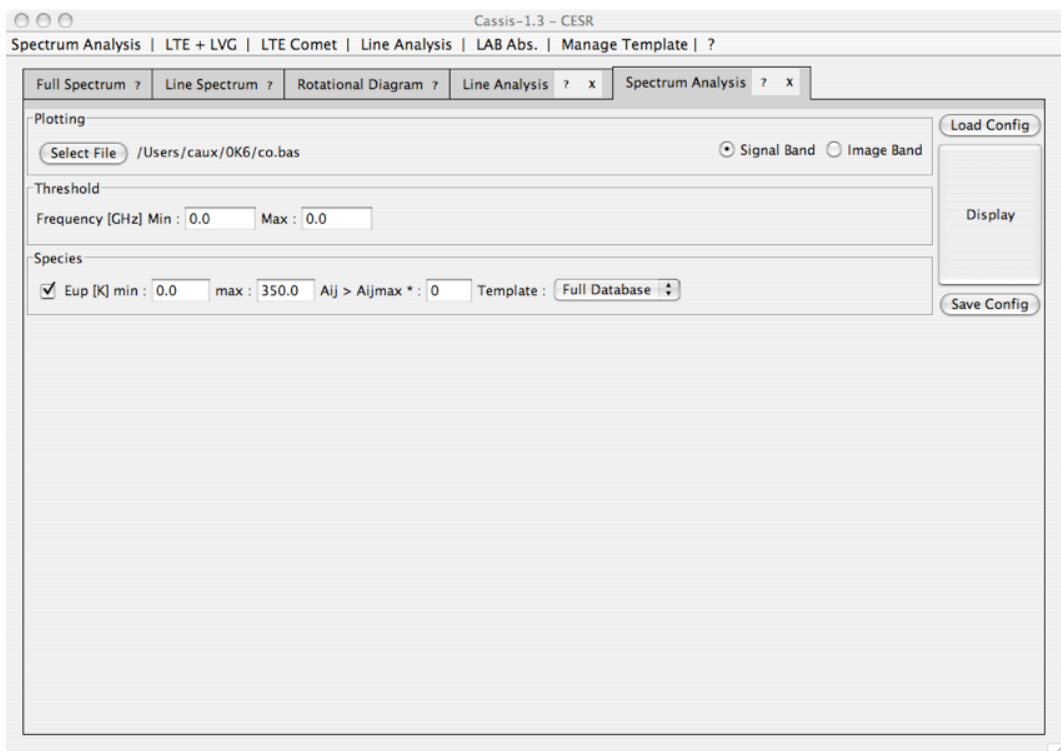


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Spectrum Analysis

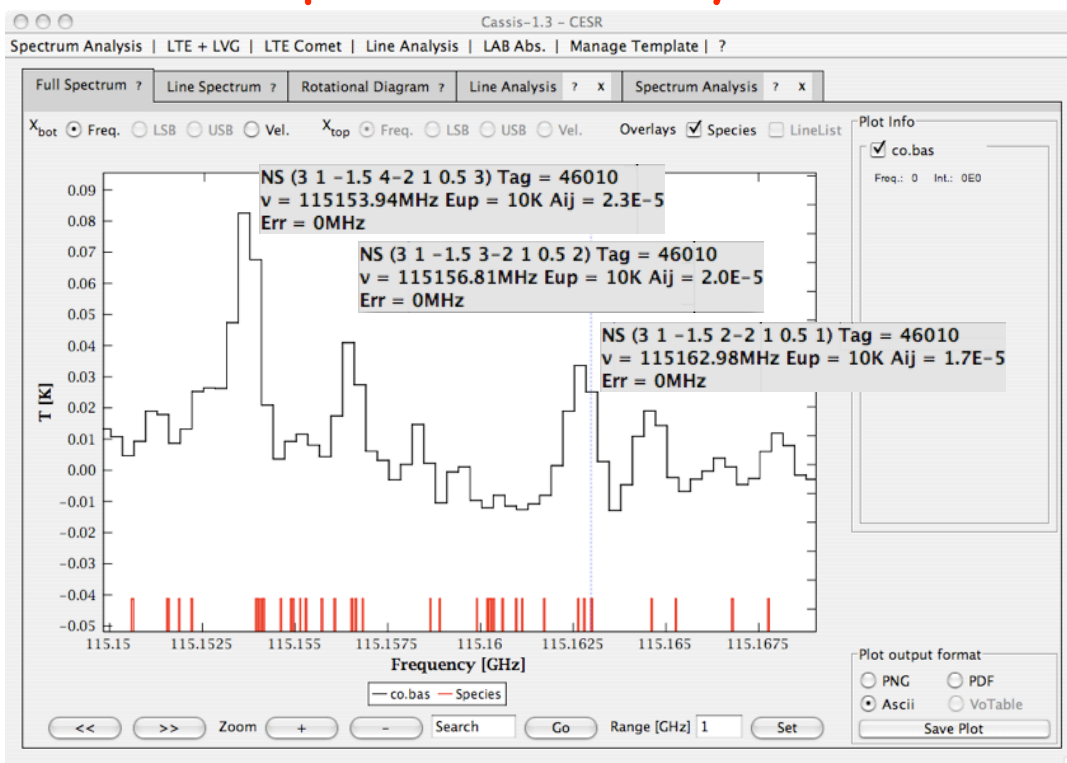


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Spectrum Analysis



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Line Analysis

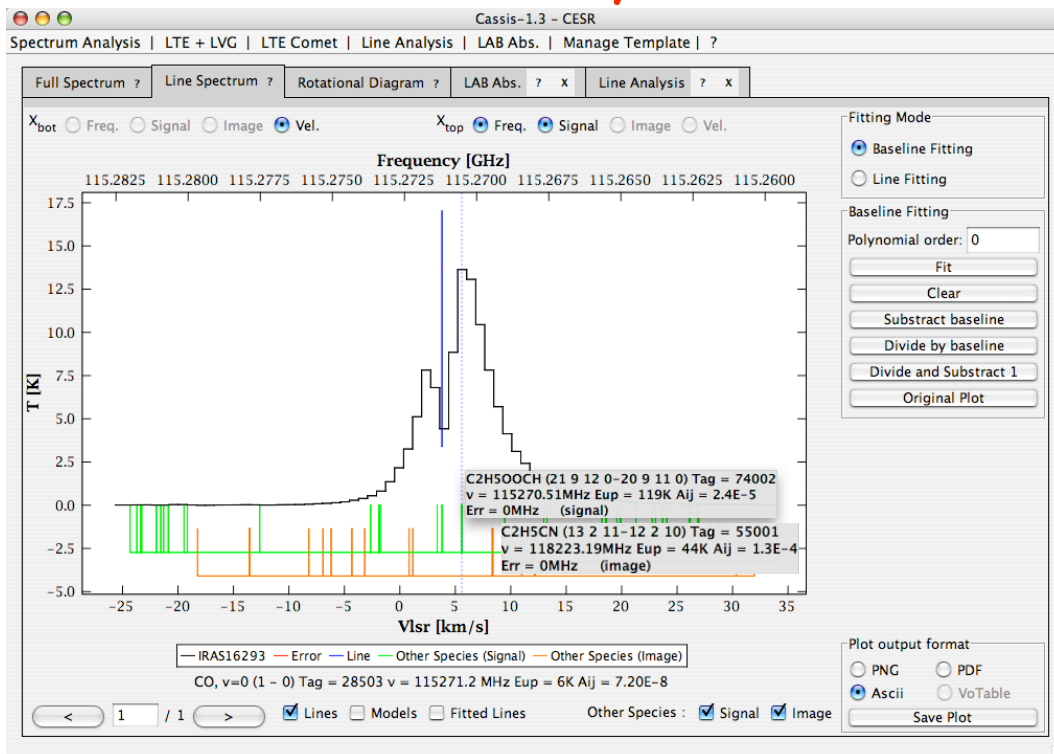
Species	Compute	N(Sp)/cm2	Tex (K)	FWHM (km/s)	Visr (km/s)	Size (*)
CO, v=0	<input checked="" type="checkbox"/>	7.00E14	100.0	1.0	Visr File	3.0
CO, v=0	<input type="checkbox"/>	7.00E14	100.0	1.0	0	3.0
CO, v=0	<input type="checkbox"/>	7.00E14	100.0	1.0	0	3.0

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Line Analysis

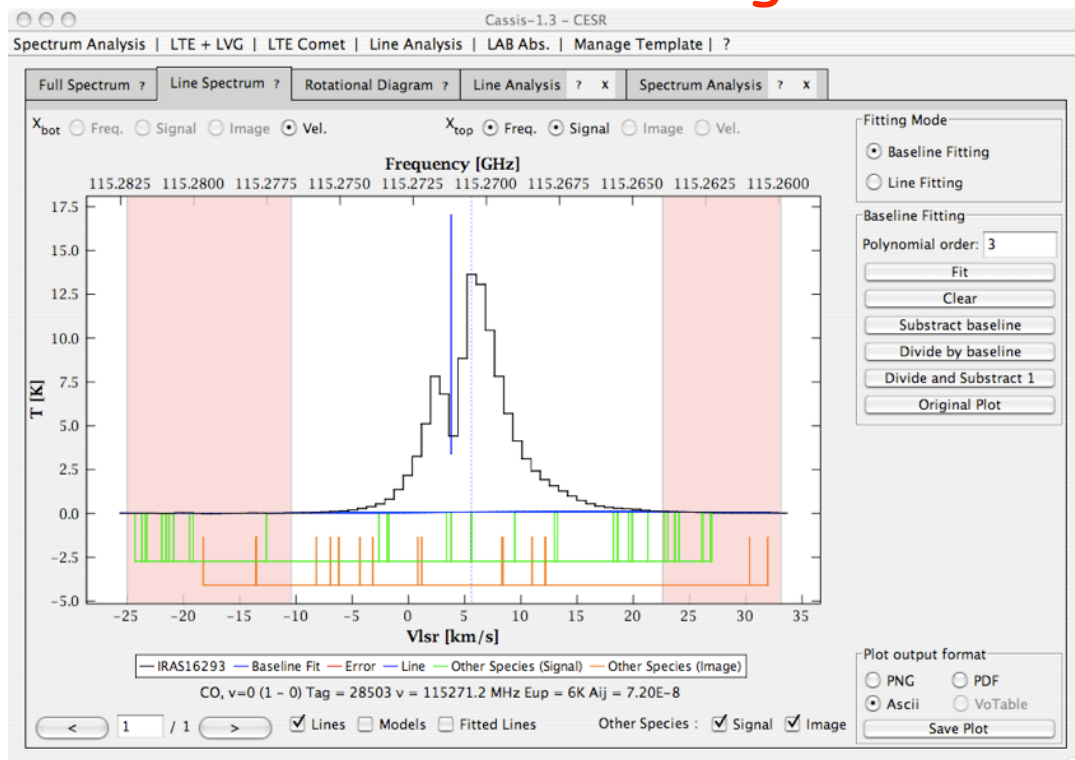


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Baseline Fitting

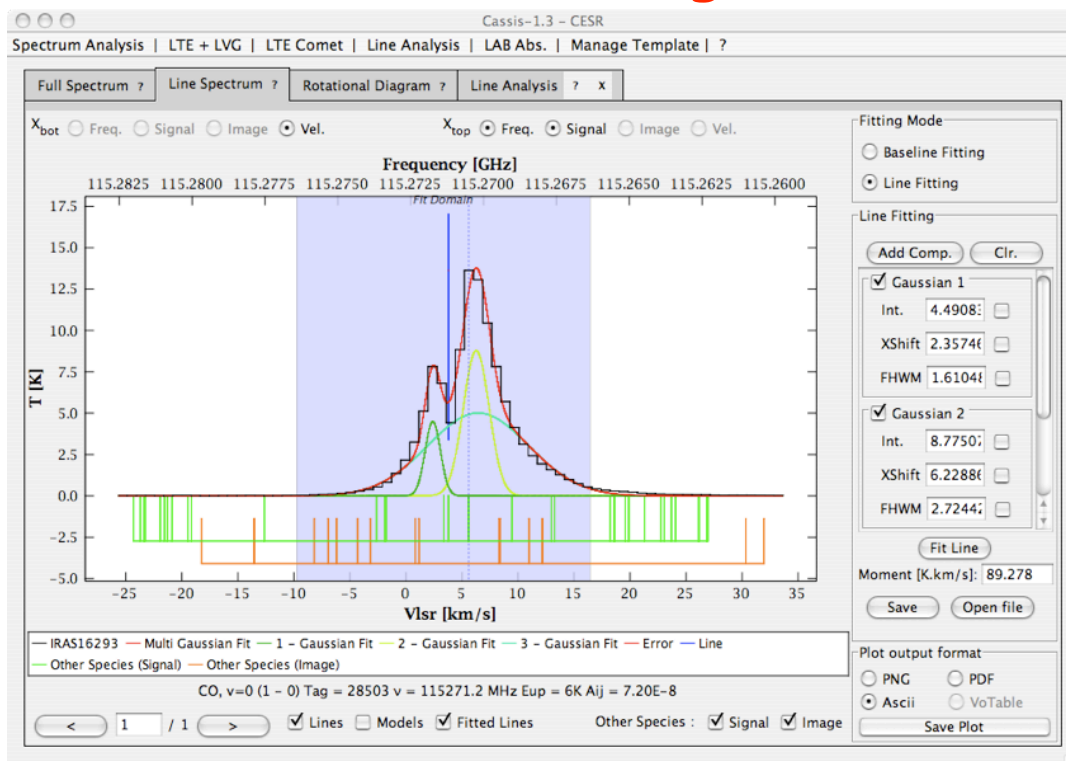


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Line Fitting

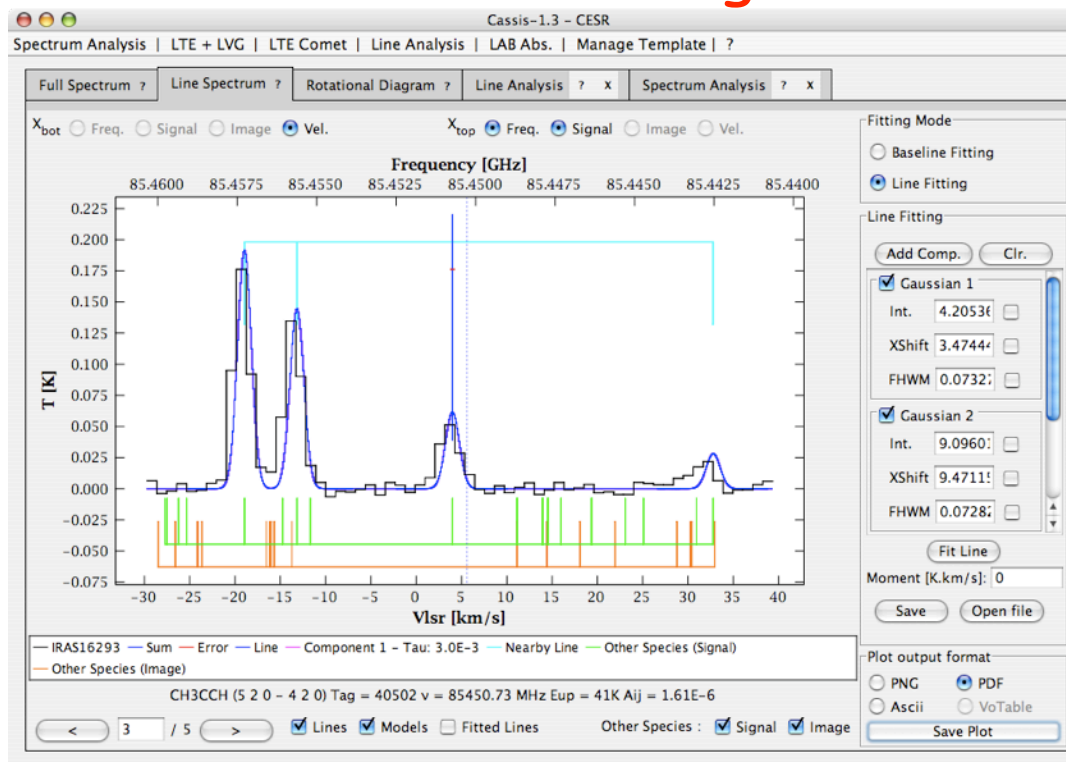


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Line Modeling

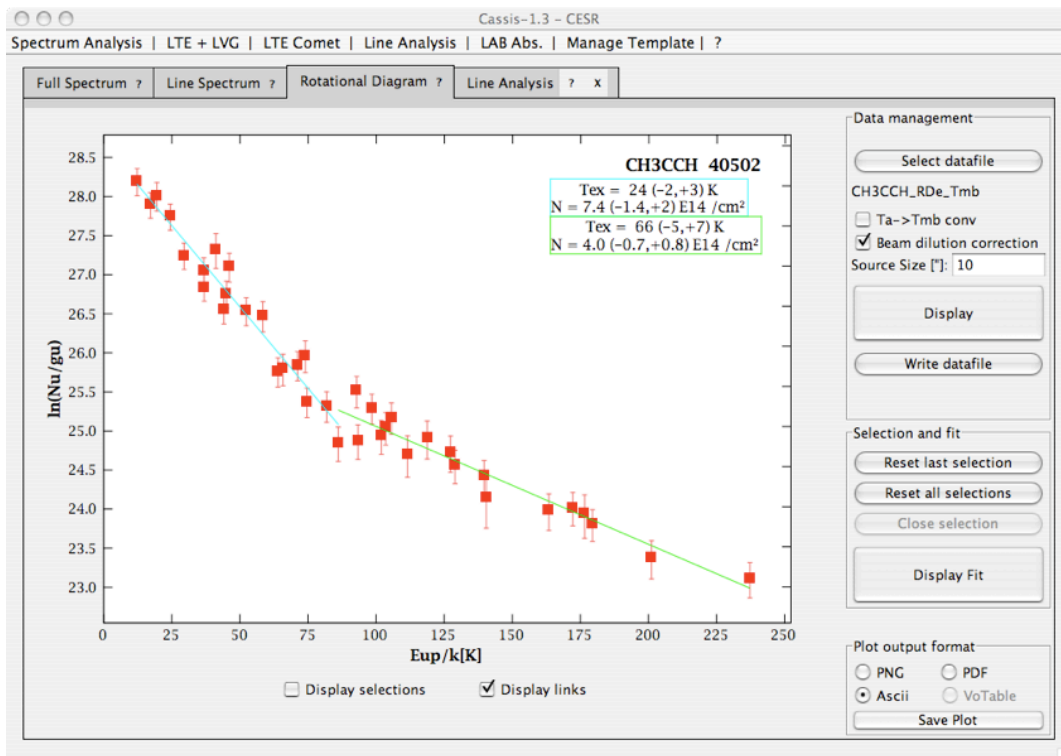


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Rotational Diagram



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Work plan in the coming months

- "Cleaning" and optimization of the code
- Optimization of the Client/Server version on the WEB
- Making Installers
- Plotting engine for a PDR model (others TBD)
- Full integration of the Radex model (others TBD)
 - Production of synthetic spectra
 - Link with collisional databases (Basecol...)
 - Data analysis tools
- Use of instrumental profiles
- What to do with unidentified lines ?
- AVO compatibility ??
- ...

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AVO Compatibility

- Reading / Writing VO Tables
- What to do with the Database ?
- What to do to be linked with Basecol ?
- What about keeping the full power of CASSIS ?
 - Save CASSIS Objects ?
 - Save CASSIS Templates
 - Maintain a Database of CASSIS Objects and Templates ??