

CASSIS

Centre d'Analyse Scientifique
de Spectres Infrarouges
et Submillimétriques

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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://cassis.cesr.fr>

http://www.cesr.fr/~walters/web_cassis/index.html

Client/Server web version under development

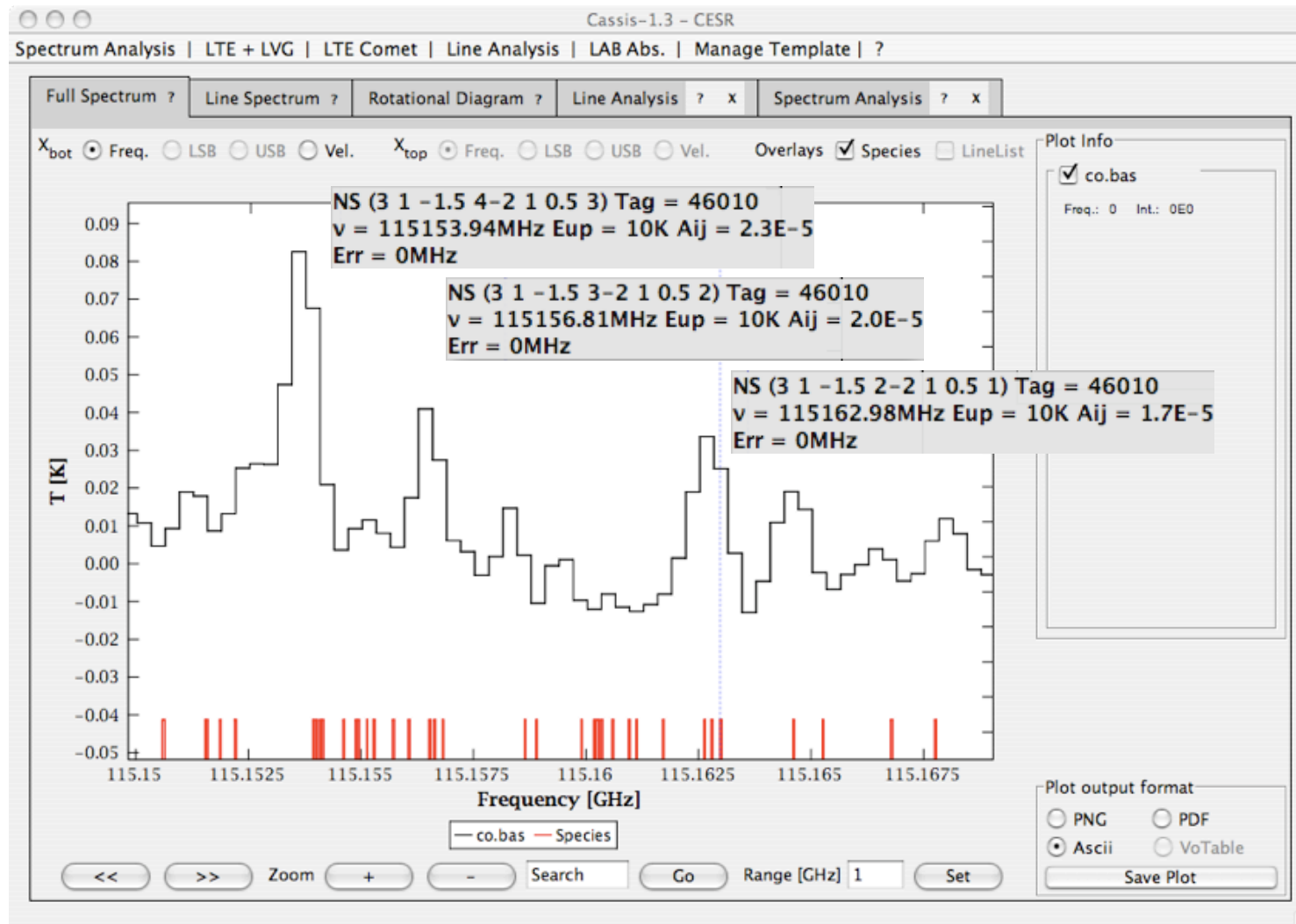
Current standalone distributed version : 1.33 (end 2007)

Next version (2.0) delivery in the coming days/weeks

CASSIS Database

- The complete database is resident on the laptop (~ 1 Gb)
- **Mysql Format**
 - Selection of information in JPL, CDMS and NIST databases
 - Adding of other parameters used by CASSIS
 - E_{up} , A_{ij} , ...
 - β for comets, γ_{self} for Lab Abs...
- Ortho-Para Separation for a few species (H_2O , H_2S ...)
- **Allows a quick access with various sorting**
- **Update via the Web : one unix command (~ 1/2 hour...)**
- **Can be populated separately by each user**

Spectrum Analysis



Spectra Prediction

Cassis-1.3 - CESR

Spectrum Analysis | LTE + LVG | LTE Comet | Line Analysis | LAB Abs. | Manage Template | ?

Full Spectrum ? | Line Spectrum ? | Rotational Diagram ? | **LTE + LVG ? x**

Tuning
 Range [GHz] min : 480 max : 1920 Line [GHz] 0.0 DSB LO freq. [GHz] : 0

Telescope
 Tmb->Ta conv Bandwidth [GHz] : 4 dv [MHz] : 1

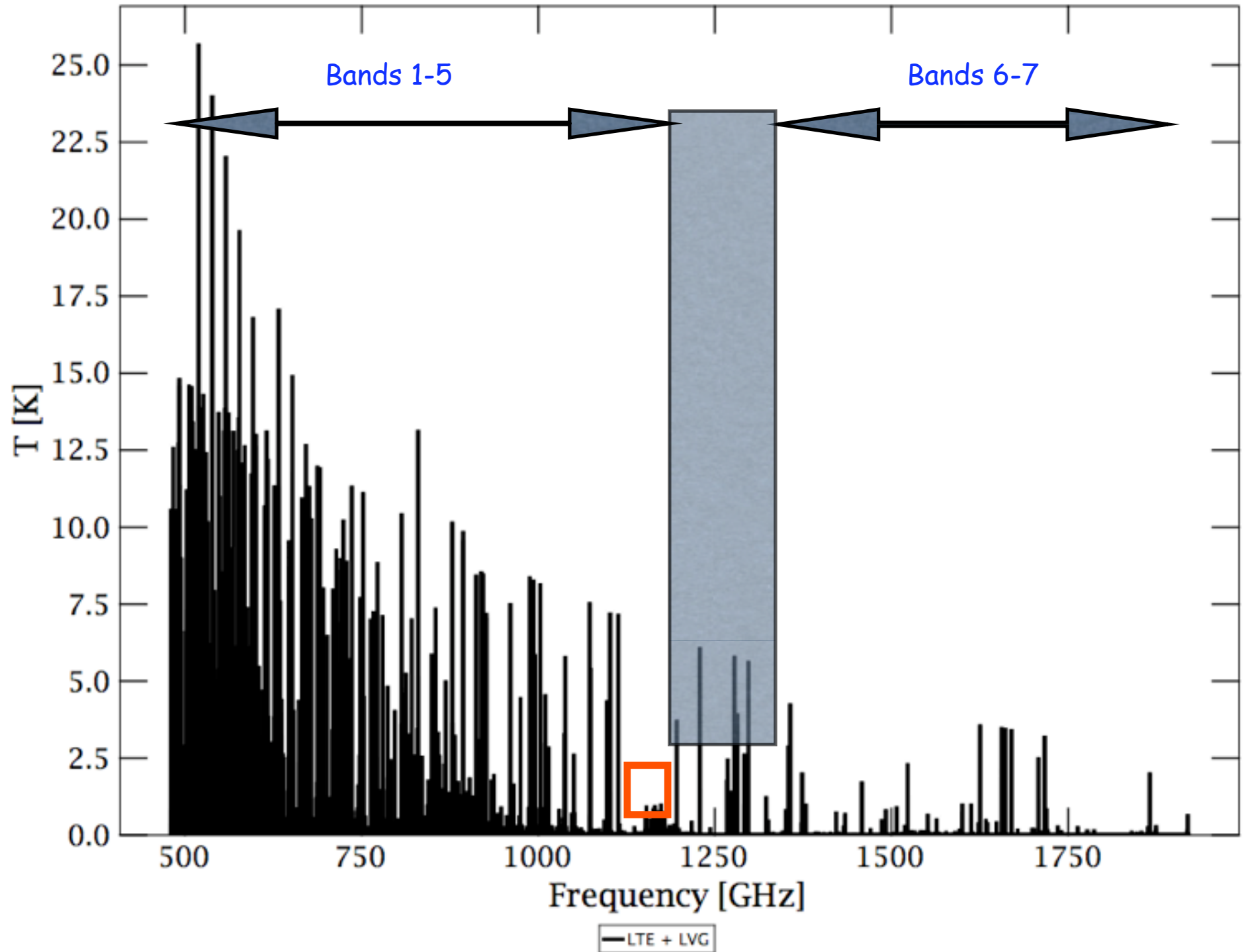
Threshold
Eup [K] min : 0.0 max : 1500 $A_{ij} > A_{ijMax} * 0$ Imin [mK] : 0.0 **Noise** rms [mK] : 0.0 **Continuum**

Emission **Absorption**

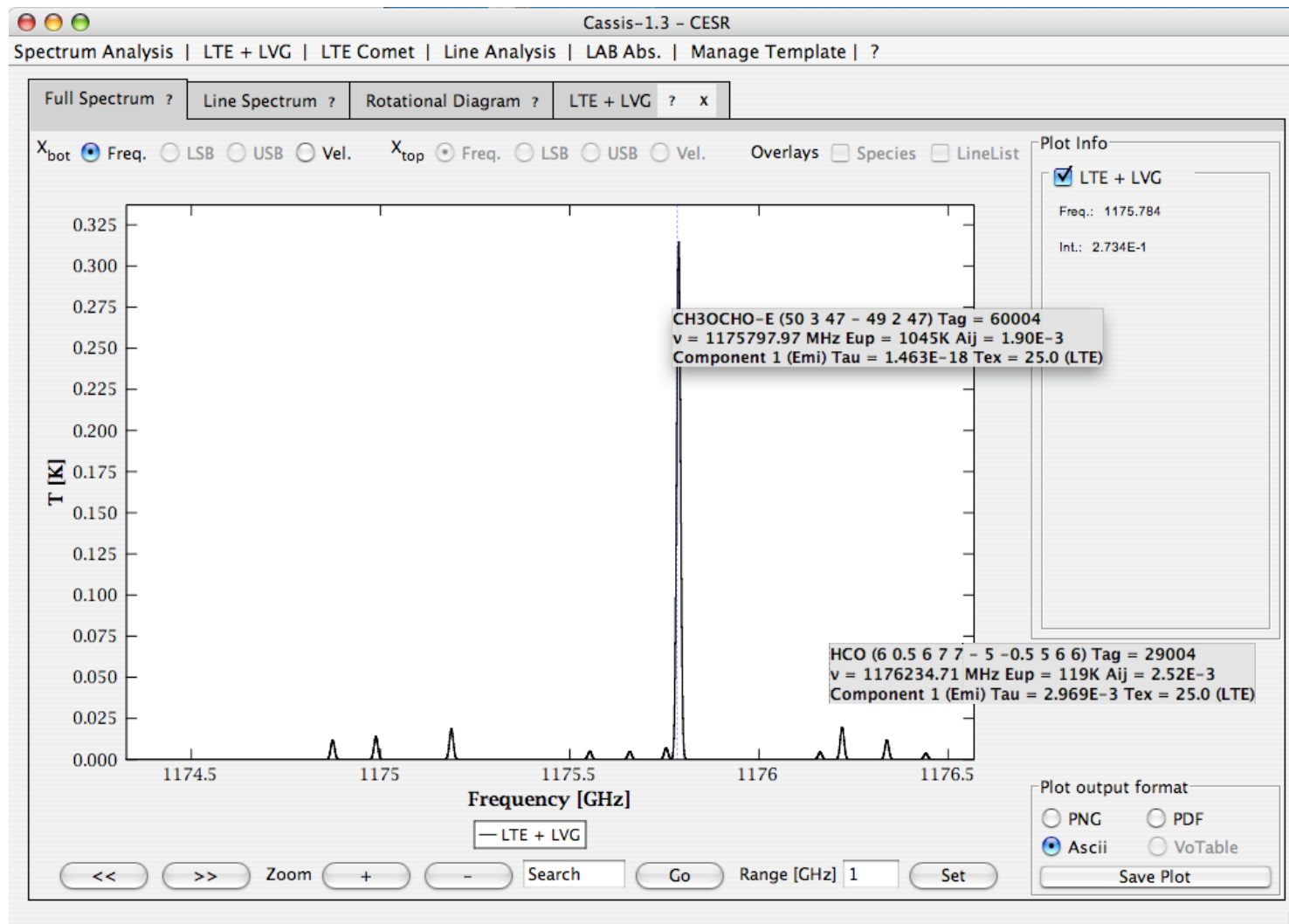
Full LTE LTE + LVG Full LVG Load Add $N(H_2)$ [cm⁻²] : 7.5E22 V_{lsr} [km/s] : 3.8
 $n(H_2)$ [cm⁻³] : 750000 (o/p)-H₂ [%] : 0.0
X [He] : 0.2 Geometry: sphere slab

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

Spectra Prediction



Spectra Prediction - zoom



Line Analysis

Cassis-1.3 - CESR

Spectrum Analysis | LTE + LVG | LTE Comet | Line Analysis | LAB Abs. | Manage Template | ?

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

Plotting

Select datafile /Users/caux/OK6/co.bas

Band : Signal Image Sorting : Frequency

Threshold

Freq [GHz] min : 0 max : 0

Eup [K] min : 0 max : 150

Bandwidth [km/s] : 60 Aij > Aijmax * : 0

Species

Template : Full Database

Name	Tag	Database
HN-15	28,005	JPL
HN-15-C	28,006	JPL
DNC	28,007	JPL
HCNH+	28,008	JPL
CO+	28,009	JPL
HC-13-N, v=0	28,501	CDMS
H2CN	28,502	CDMS
CO, v=0	28,503	CDMS
HCNH+	28,504	CDMS
C-13-N-15	28,505	CDMS
HCN-15	28,506	CDMS

Load Config

Display

Save Config

Emission Source

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

Absorption Source

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

Model (LTE)

Telescope : iram Tmb -> Ta conv iram Oversampling : 3

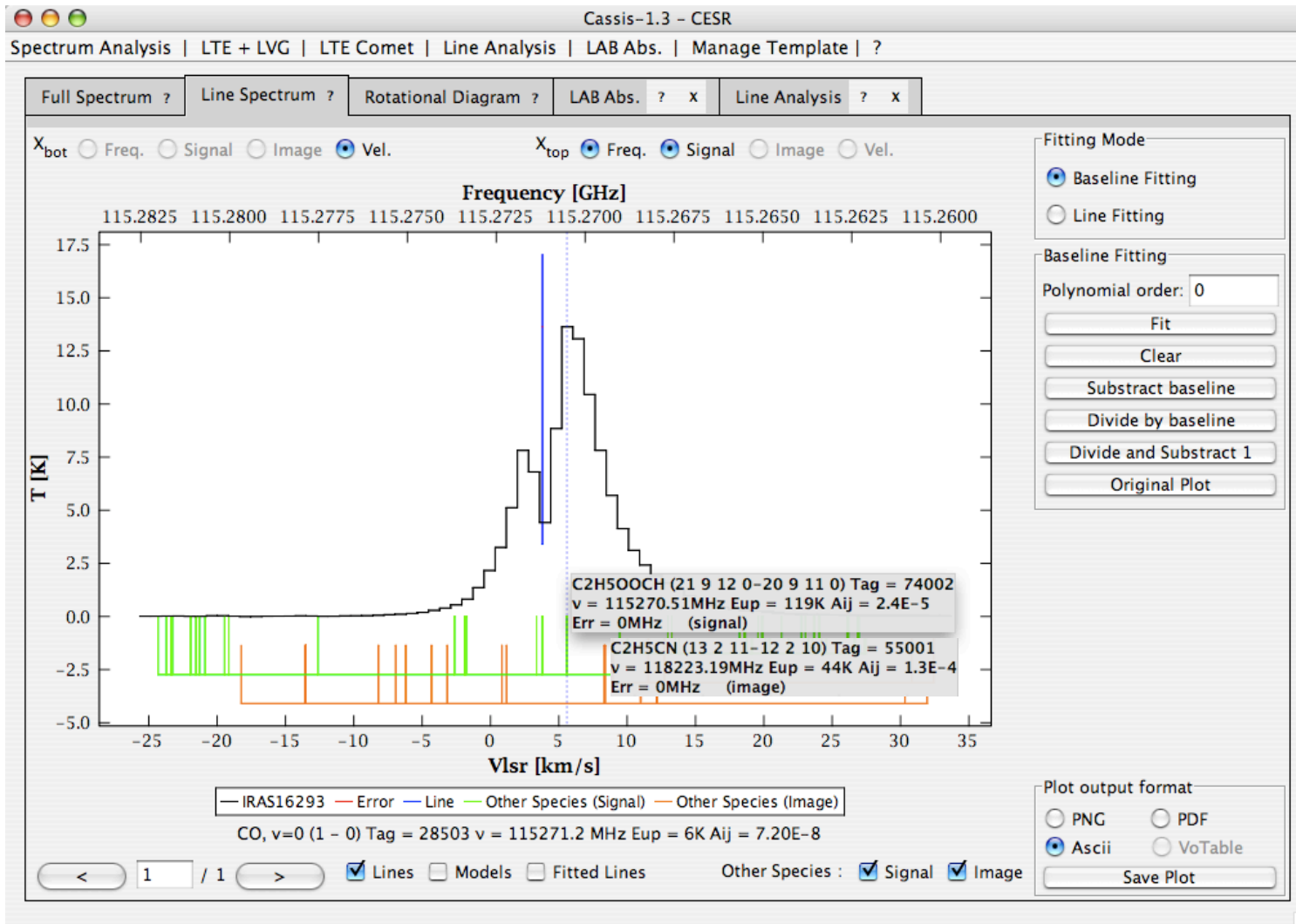
Continuum

Continuum 0 [K]

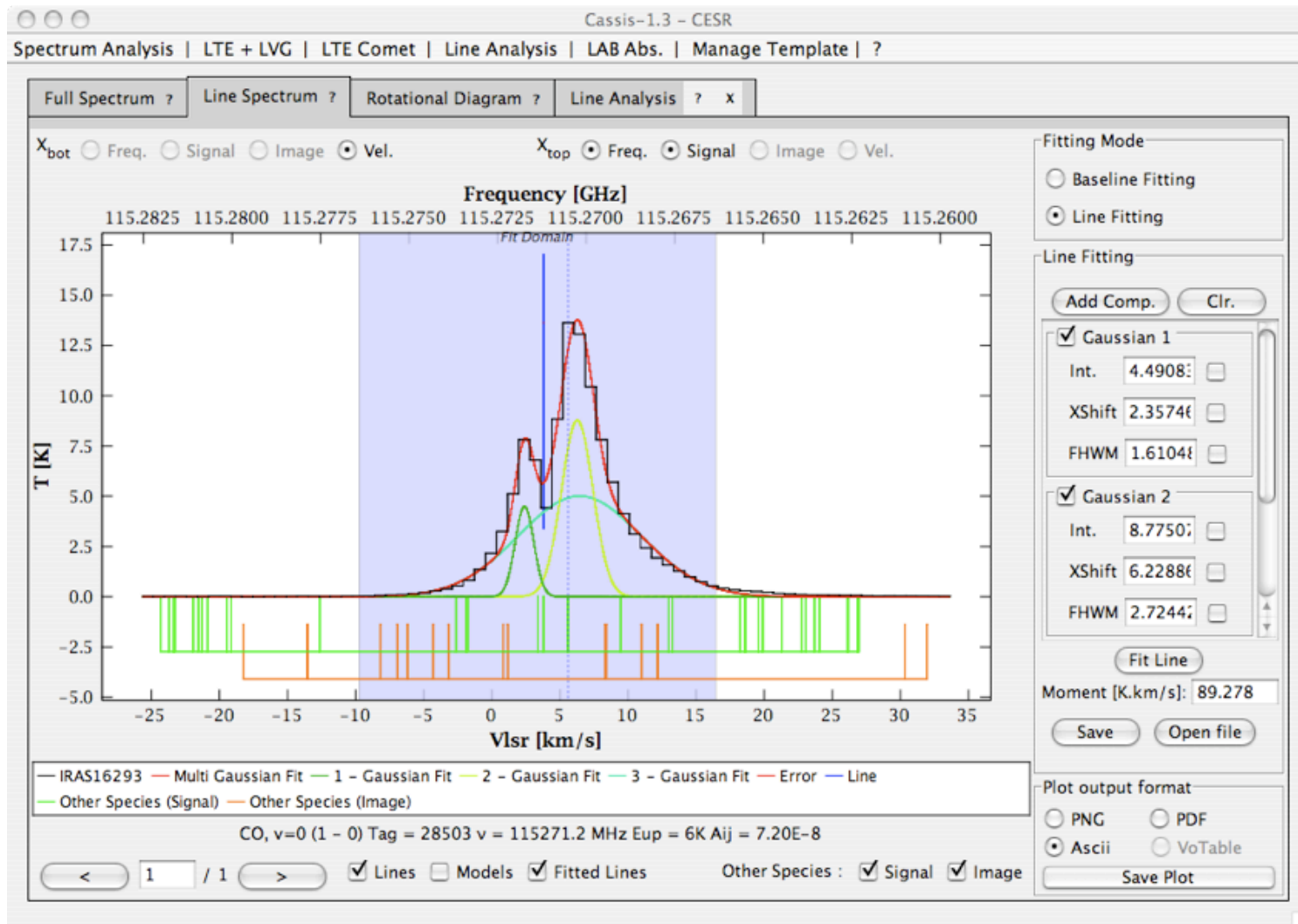
Other Species

Eup [K] min : 0 max : 150 Aij > Aijmax * : 0 Template : Full Database

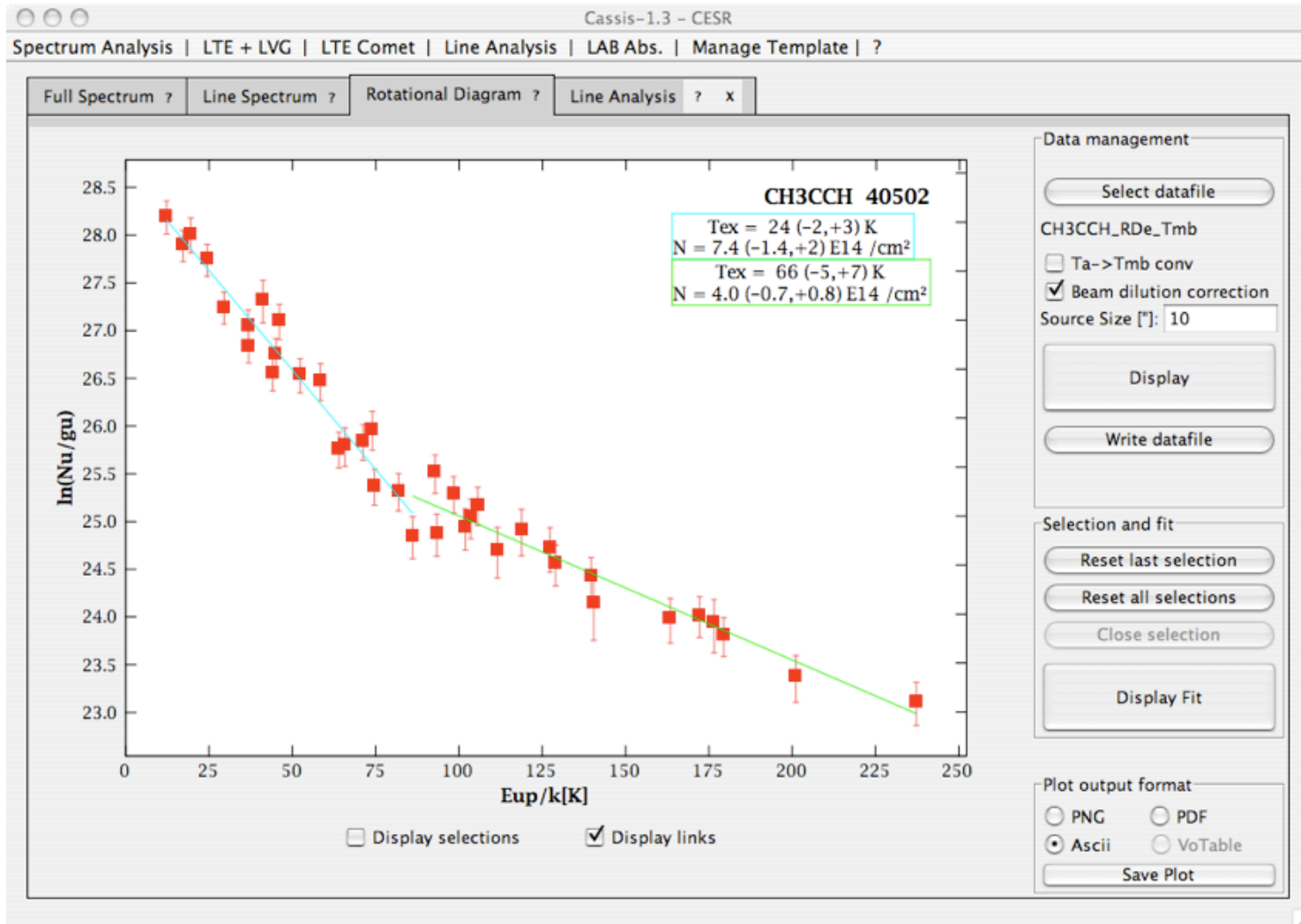
Line Analysis



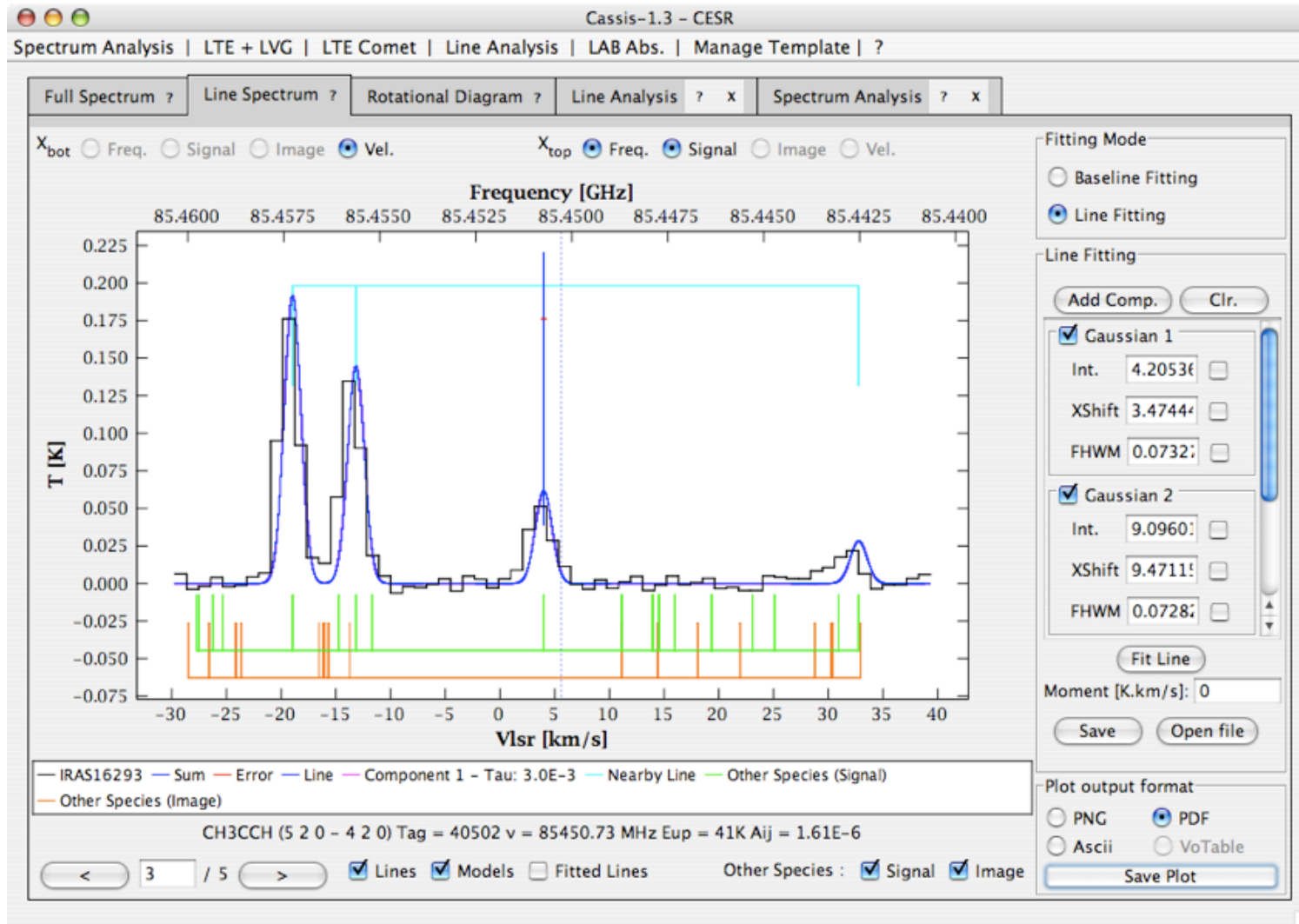
Line and Baseline Fitting



Rotational Diagram



Line Modeling



Work plan

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

AVO Compatibility

- Reading / Writing VO Tables & FITS files (via Topcat)
- External tool called via Plastic or SAMP (HSO +...)
- Link with VAMDC ?
- What to do with the Database ?
- What about keeping the full power of CASSIS ?
 - Save CASSIS Objects
 - Save CASSIS Templates
 - Build and maintain a Database of CASSIS Objects and Templates
 - What to do with unidentified lines : -> VAMDC ?