Observing Tool for ALMA Cycle 4

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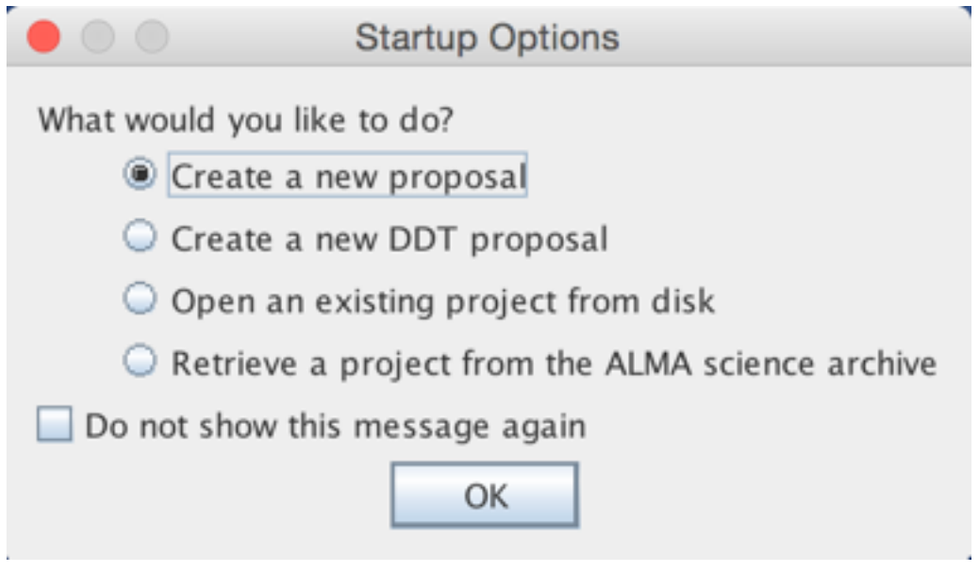
Observing Tool (OT) for ALMA Cycle 4

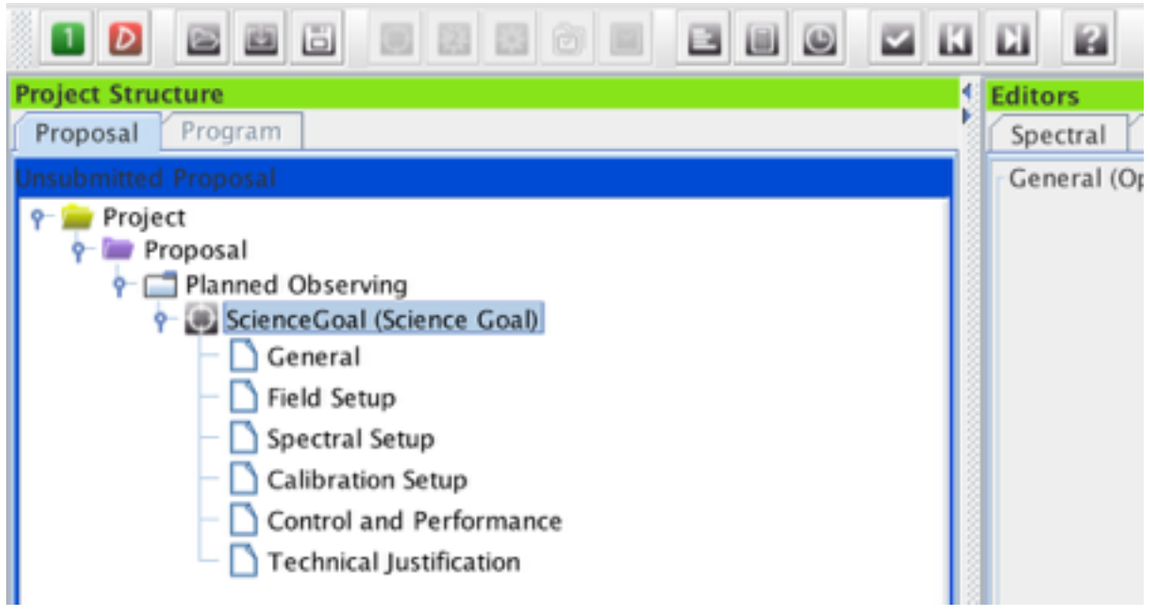
- java-based tool retrievable from almascience website
  - ✓ webstart version (always updated)
  - ✓ tarball version (offline working, might be outdated)
- the *only* way to submit your ALMA proposal
- the OT offers a visualization of spatial setting (e.g., pointings in a mosaic), spectral settings (correlator tuning), time estimator, sensitivity calculator, and messages when settings incompatible

Starting up the OT



- PI/CoI have to registered on almascience website
- select proposal type (regular, VLBI, ToO, large program)
- select scientific category
- if resubmission of previous Cycle, enter the project ID
- if resubmitting an already submitted Cycle 4 project, make sure that you it contains the project ID on the Project Tab to avoid duplication

Science Goals



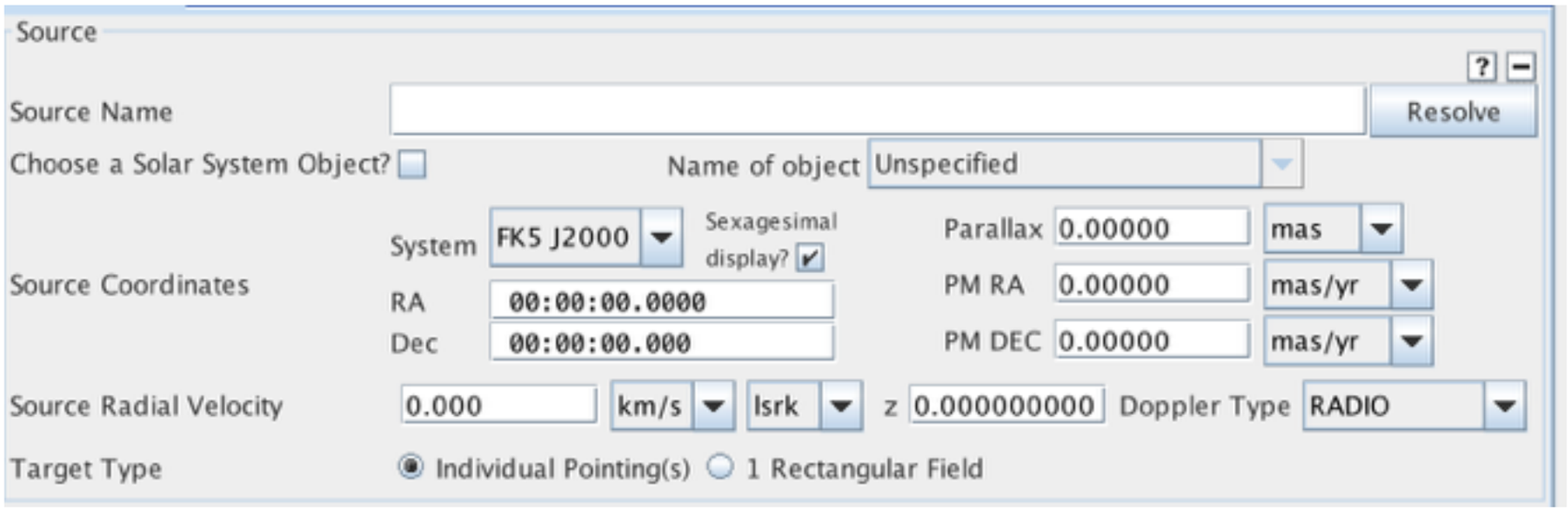
NEW

- Science Goals have *no more restrictions* based on source separation.
- Max 150 sources per SG, allowing small frequency adjustments for different LSR velocities of the sources
- Max 5 tunings per source within one ALMA band (spectral scan)
- Spectral settings: within one ALMA band
- Field settings: rectangular field OR individual pointing, not a mix

Field setup

- Resolve by Source Name (NED, Simbad)
- SSO incl. Sun (tick box, select object, *Sun, Ephemeris: upload ephemeris file*)
- upload Sources from file (see help for file format)

➥important: expected source properties



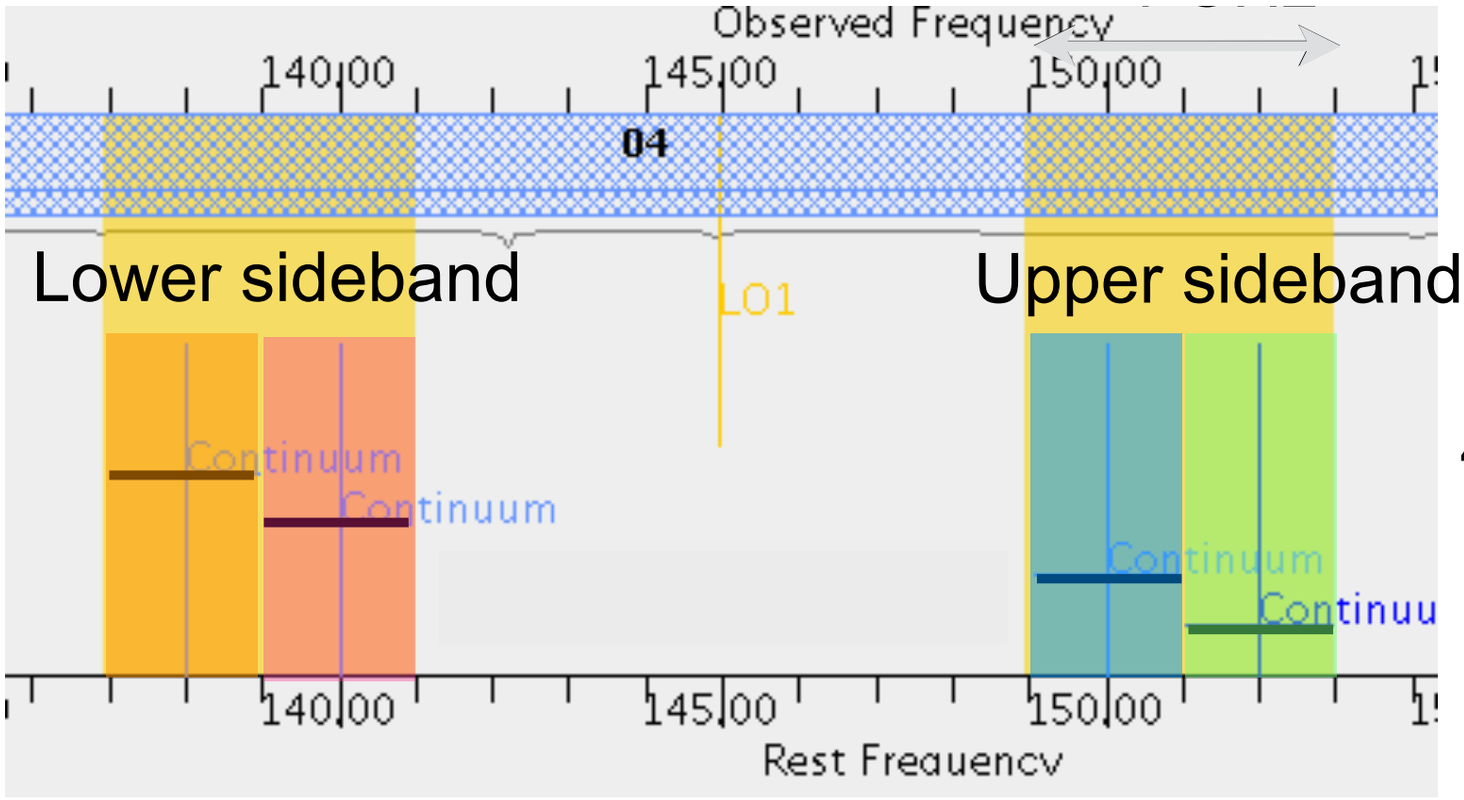
- Individual pointings (can have more than one offset)
- Rectangular fields (mosaics)
- *to use the spatial tab we need first to define the FOV, which depends on the frequency setting in the spectral setup*

Spectral setup

Continuum (single, dual, full pol)

Spectral scan (single, dual pol)

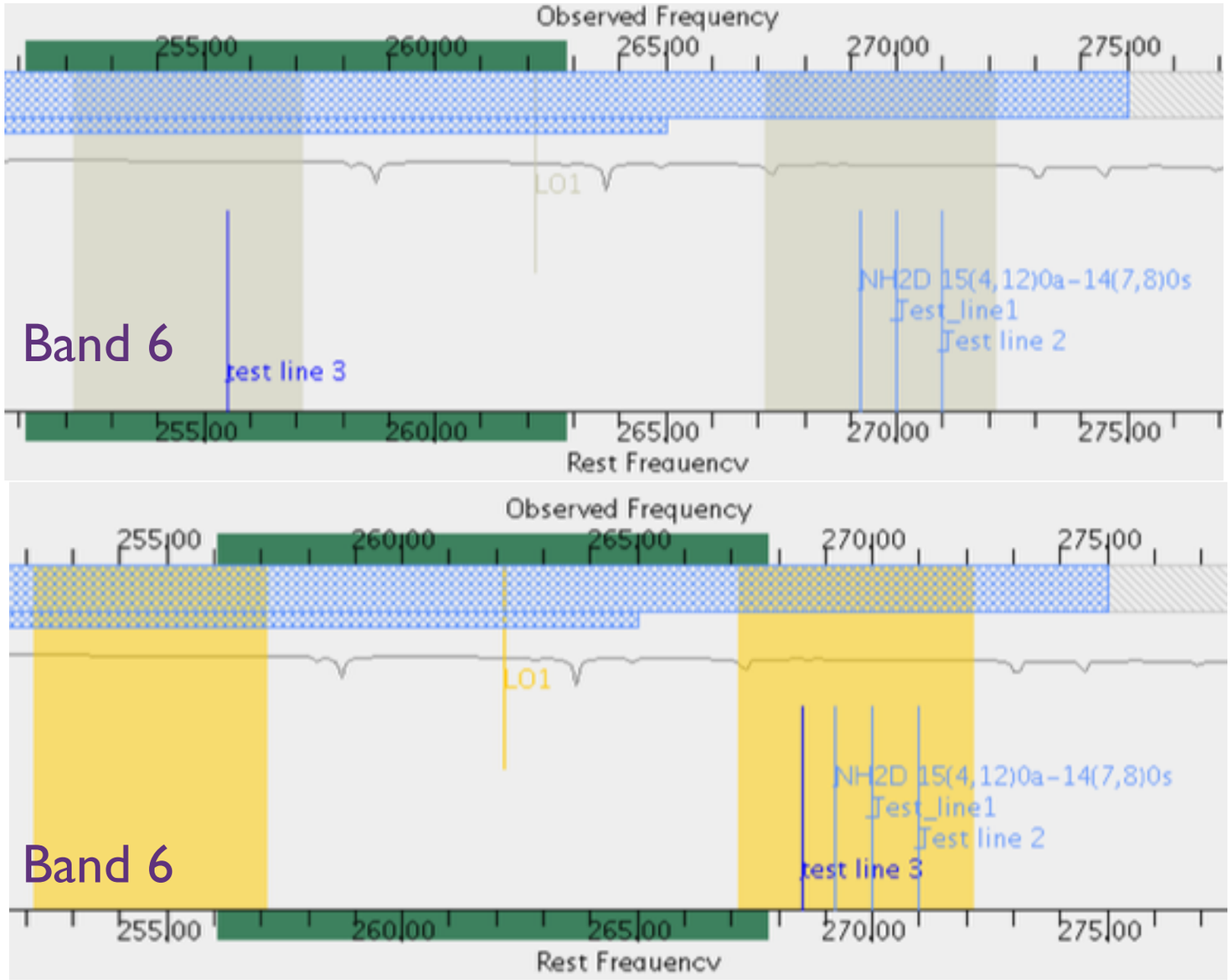
Spectral line (single, dual, full pol)



- 4 basebands (BBs), each max 2GHz, to be placed in two sidebands
- widths sideband different per band (band 3,4,7,8: 4GHz; band 6: 5GHz; band 9,10: 8 GHz)
- *carefully select the representative spw: will be used for all frequency/spectral resolution dependent calculations, such as FOV, MRS, angular resolution, atmospheric opacity*

Baseband limitations

- 2SB receivers (bands 3,4,6,7,8) cannot have 3 BBs in one sideband and 1BB in the other
- DSB receivers (bands 9,10) have no BB/sideband restrictions



Bad spectral configuration

BBs stay gray in *spectral viewer*

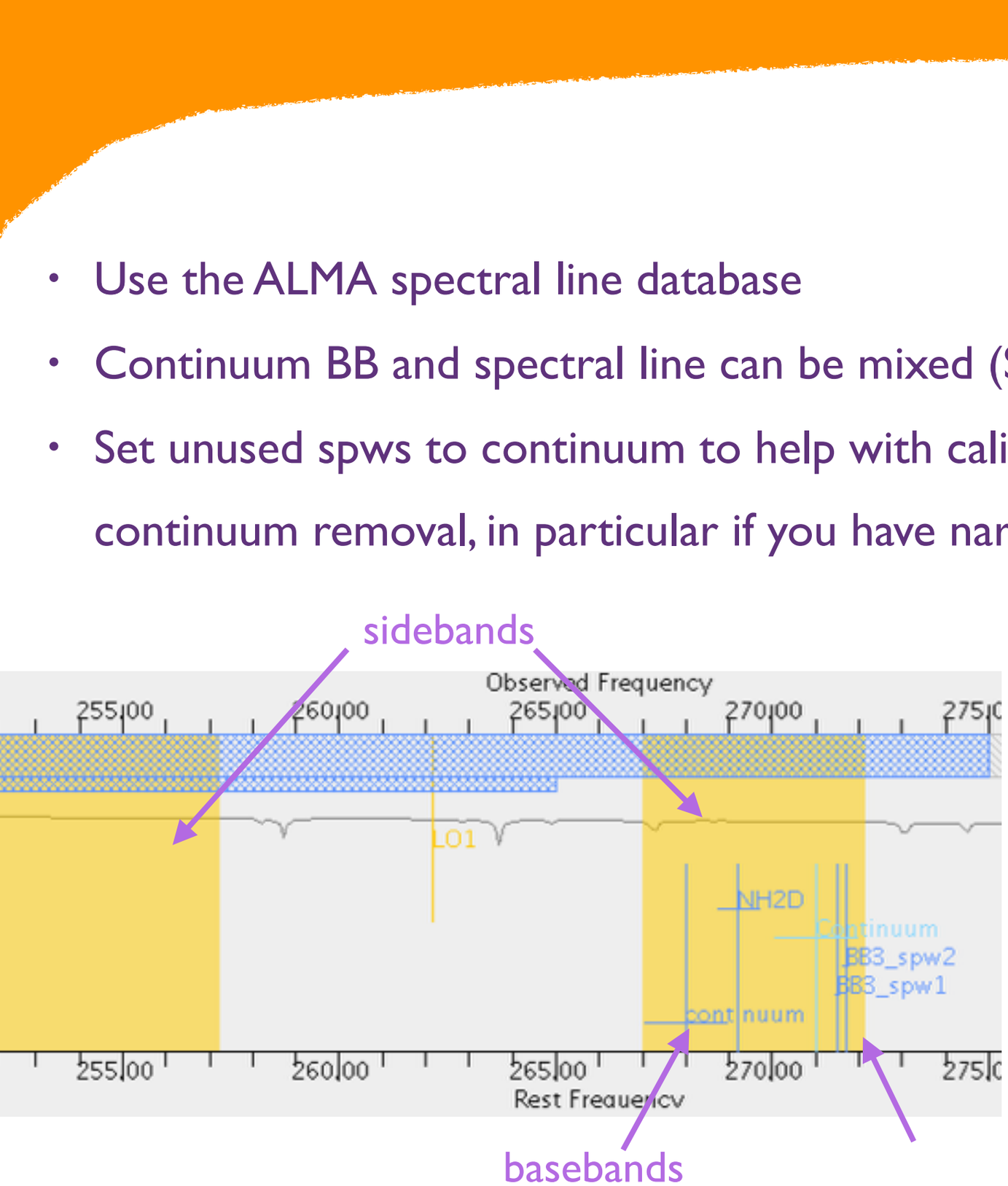
Bad spectral configuration gives error messages in red

Spectral configuration OK

BBs become yellow

Spectral line setups

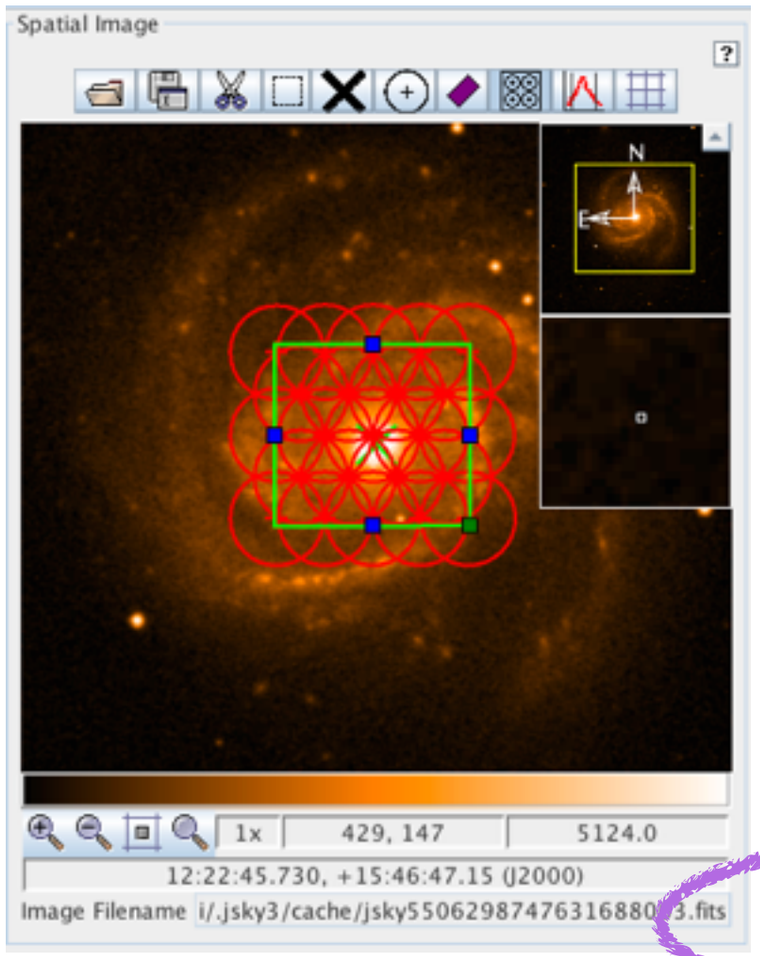
- Use the ALMA spectral line database
- Continuum BB and spectral line can be mixed (Spectral line mode)
- Set unused spws to continuum to help with calibration and continuum removal, in particular if you have narrowband spw

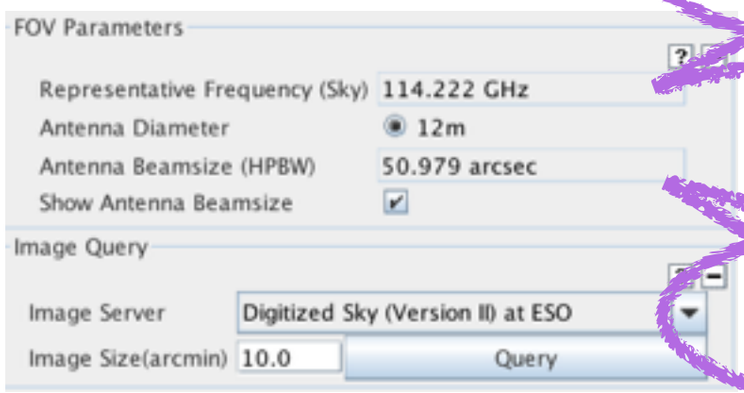


- in each BB can contain up to 4 spectral windows (spw)
- all spws in one BB should have the *same resolution*
- better higher spectral resolution, but *keep data rate < 40MB/s*

Spatial setup, once the spectral setup is done

Rectangular field (mosaic)

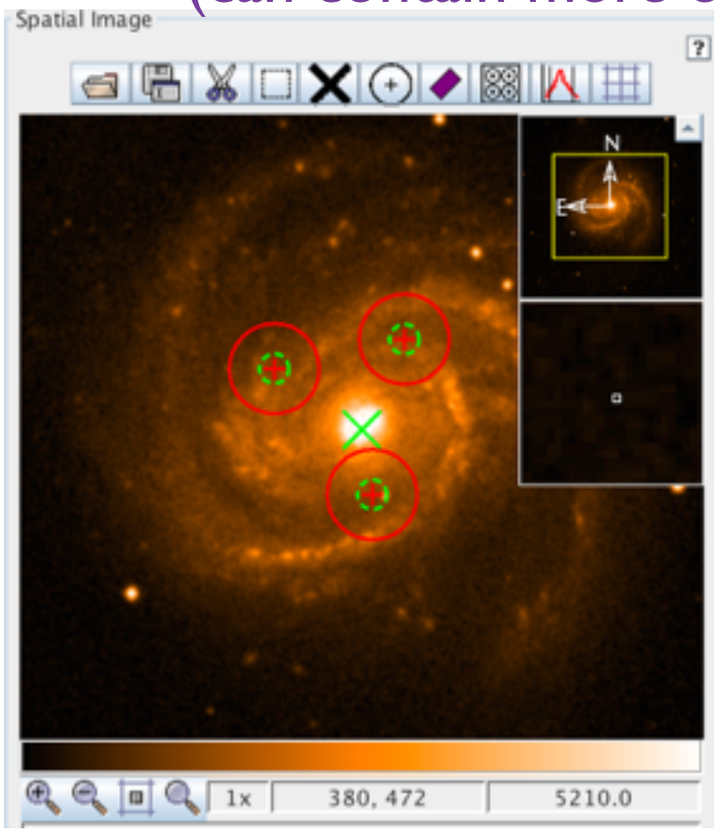




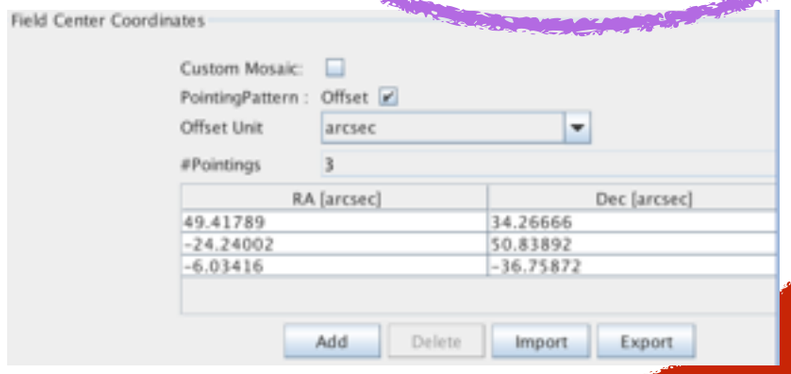
Repr. freq from spectral setup

Primary beam or FOV ~ λ/D

Individual pointing (can contain more offset pointings)



pointing positions table



Control and performance

OT calculates the angular resolution/maximum recoverable scale (MRS) for the most extended and most compact 12m Array, and the ACA 7m array based on the frequency and the source declination

Enter the desired performance, **angular resolution, MRS, sensitivity** and the **bandwidth for sensitivity**

Based on the user selected resolution and MRS the **OT will choose the most suitable array (incl. ACA stand alone)**

OT Time estimation uses the sensitivity calculator to derive **the total time for the SG incl. calibration**. It will divide sources with large separations in clusters that have their own calibrators, and show the number of tunings per cluster.

Technical Justification

Justify your chosen sensitivity and bandwidth for sensitivity

Justify your angular resolution and MRS

Justify your spectral resolution and data rate

Numbers to be double checked trigger a message in blue

Figures/Tables required for Technical Justification have to be present in Scientific Justification

Only spectral dynamic range < 1000 (B3,4,6) /500 (B7,8,9,10) allowed

OT C4: work in progress

Only spectral dynamic range < 1000 (B3,4,6) /500 (B7,8,9,10) allowed

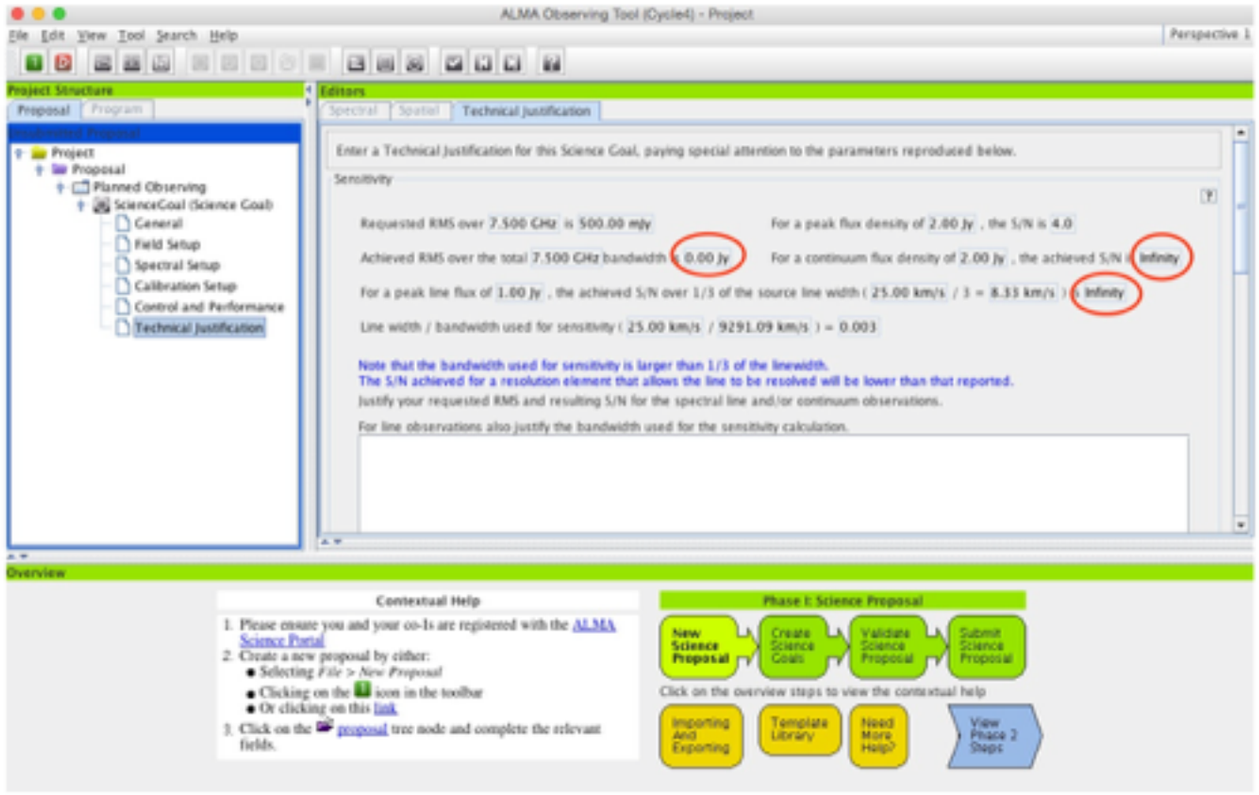
Check the knowledgebase if you encounter problems or contact us!

Knowledgebase

Why does the Cycle 4 OT report an achieved RMS of 0.00 Jy?

25 March 2016 02:58 PM

The Cycle 4 Observing Tool (version 201603-CYCLE4-OFF-B) contains a bug in the Technical Justification section of a Science Goal that reports an achieved RMS of 0.00 Jy (S/N of infinity). This error does not affect proposal validation or time estimates. We recommend that users ignore these incorrect values in the Technical Justification and proceed with the normal proposal submission process.



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Limitations for Solar and VLBI proposals

Solar observations: continuum mode (single or dual pol) in a predefined spectral range of band 3 and 6.

VLBI observations: continuum mode (full pol) in a predefined spectral range of band 3 and 6, and *require a separate proposal to the GMVA or EHT*

PI does not ask for a sensitivity, but directly for observing time in limited time slots:

(1) Planned Start Date	(2) Configuration (planned campaigns)	(3) Longest baseline	(4) LST with best observing conditions	(5) LST with unstable observing conditions	(6) PI Observing Time (days)
23 December 2016	C40-3 (Solar)	0.46 km	~3h - 15h	~15h-3h	11
19 January 2017	C40-2 (Solar)	0.27 km	~4h - 17h	~17h-4h	9
1 February 2017	*February maintenance period*				
16 March 2017	C40-1 (Solar/VLBI)	0.15 km	~8h - 22h	22h-8h	17
6 April 2017	C40-3 (Solar/VLBI)	0.46 km	~9h - 23h	~23h-9h	11

Completing the proposal

1. Validate your proposal

This brings up any problem, such missing Scientific Justification, or badly set spectral settings.

Only validated proposal can be submitted!

Validation errors are given in the Feedback window

2. Display project time summary

Gives an overview of observing time of all proposal and the data rate plus expected data size

3. Make a pdf overview and save the .aot file on your disk

OT documentation and Help

OT contains the ALMA template library of aot files for Cycle 4

OT Help includes the User manual and reference guide

ALMA website contains the OT quickstart guide, manual and reference guide, Cycle 4 proposers guide, and OT video tutorials

Submit questions to the ALMA Helpdesk or your ARC!