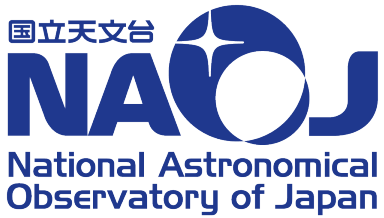
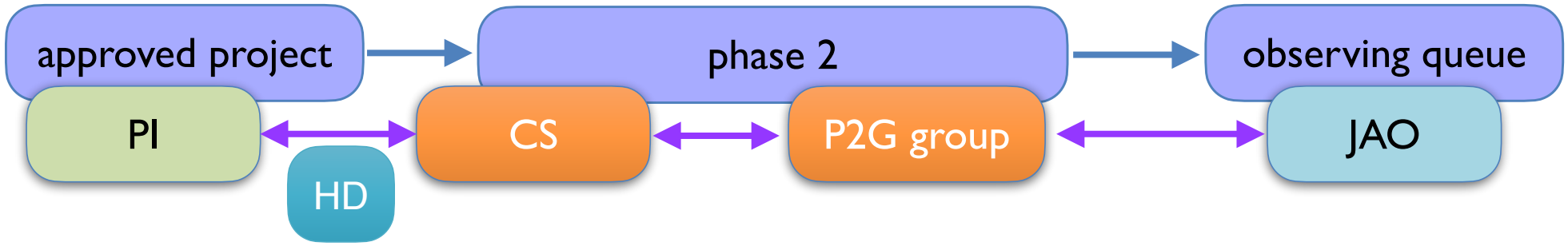
From scheduling and Phase 2 generation viewpoints

Yu-Ting Wu (EA ARC)
and Phase 2 Generation Group in EA



What is Phase 2?

- Once a project has been approved for scheduling, it passes to Phase 2.



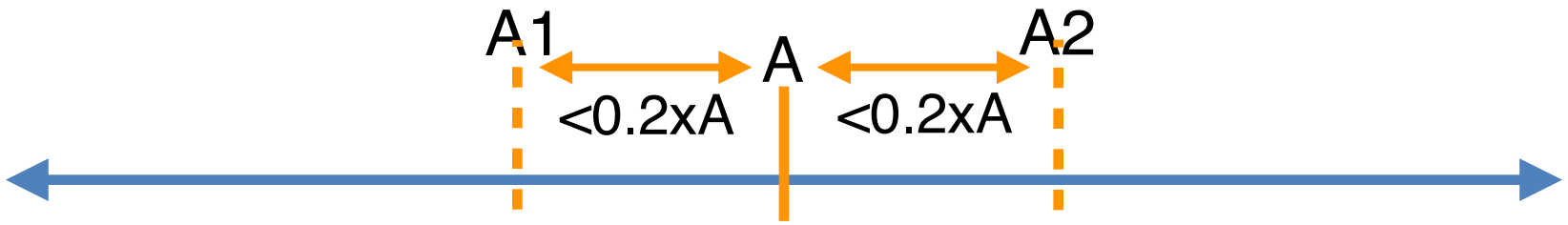
- Each approved project will be assigned an ALMA Contact Scientist (CS).
- A project Helpdesk (HD) ticket will be opened on behalf of the PI for communication with the CS and others.
- ALMA staff will generate the Scheduling Blocks and, in case of problems, will contact the CS and the PI. If no problems are found, the project will be submitted to the ALMA observing queue to await execution at the telescope.

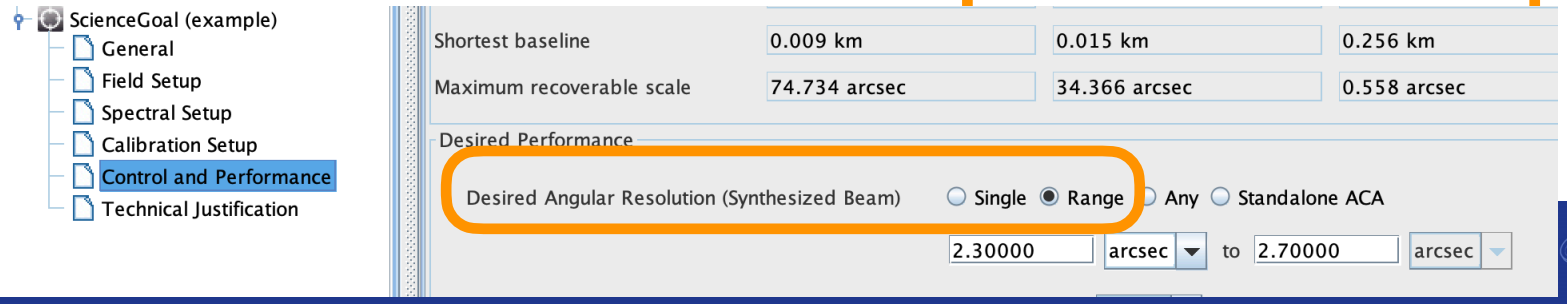
Why we care about scheduling and Phase 2 generation?

- Various aspects of a proposed observation such as weather conditions or requested angular resolution and Largest Angular Structure (LAS) are important when an observation is scheduled.
- Let's plan observations to maximize project completion to achieve our scientific goals!

1. Angular resolution

- Observations are scheduled based on the angular resolution
- For scheduling feasibility and Quality Assurance (QA) purposes, if the PI selects a single value for the Desired Angular Resolution or a range narrower than 20% around its center value, a range of +/-20% around the single or center value specified will be enforced (Section 4.3.2 of the PG).





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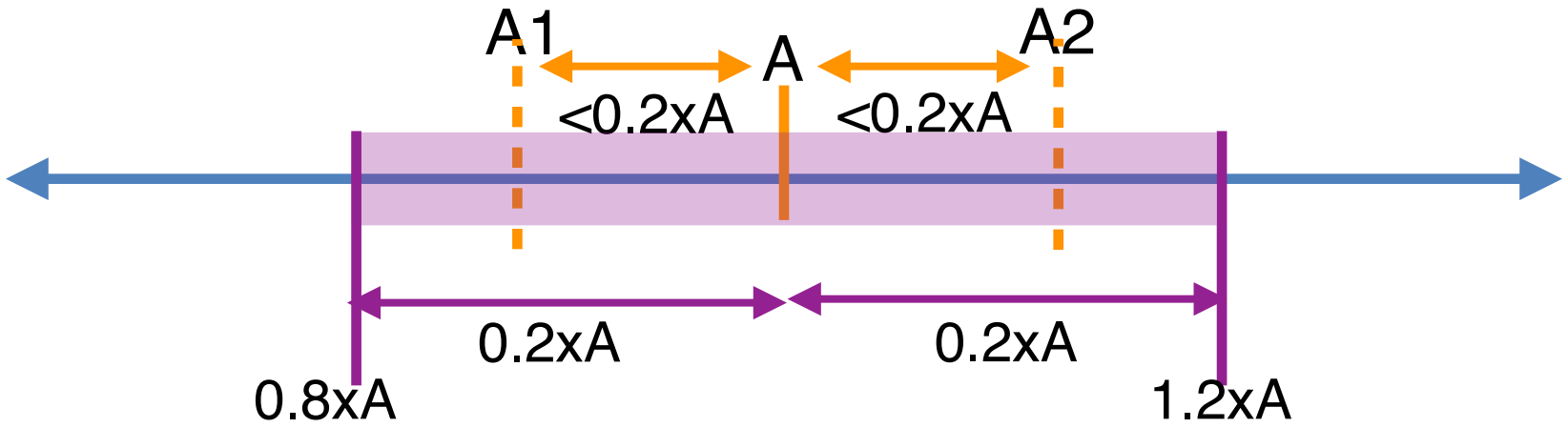

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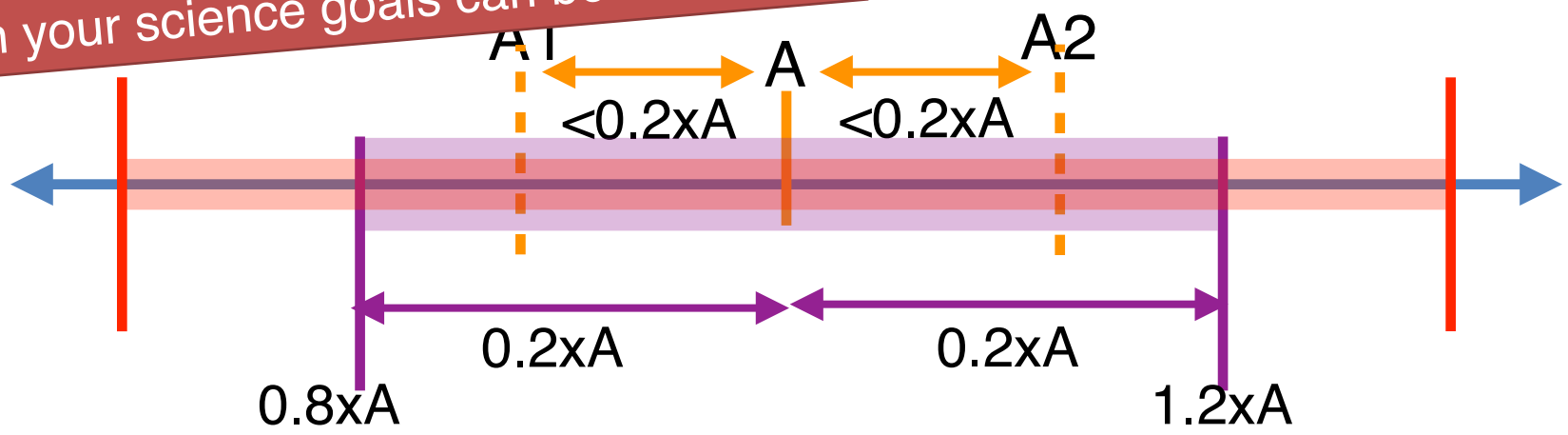
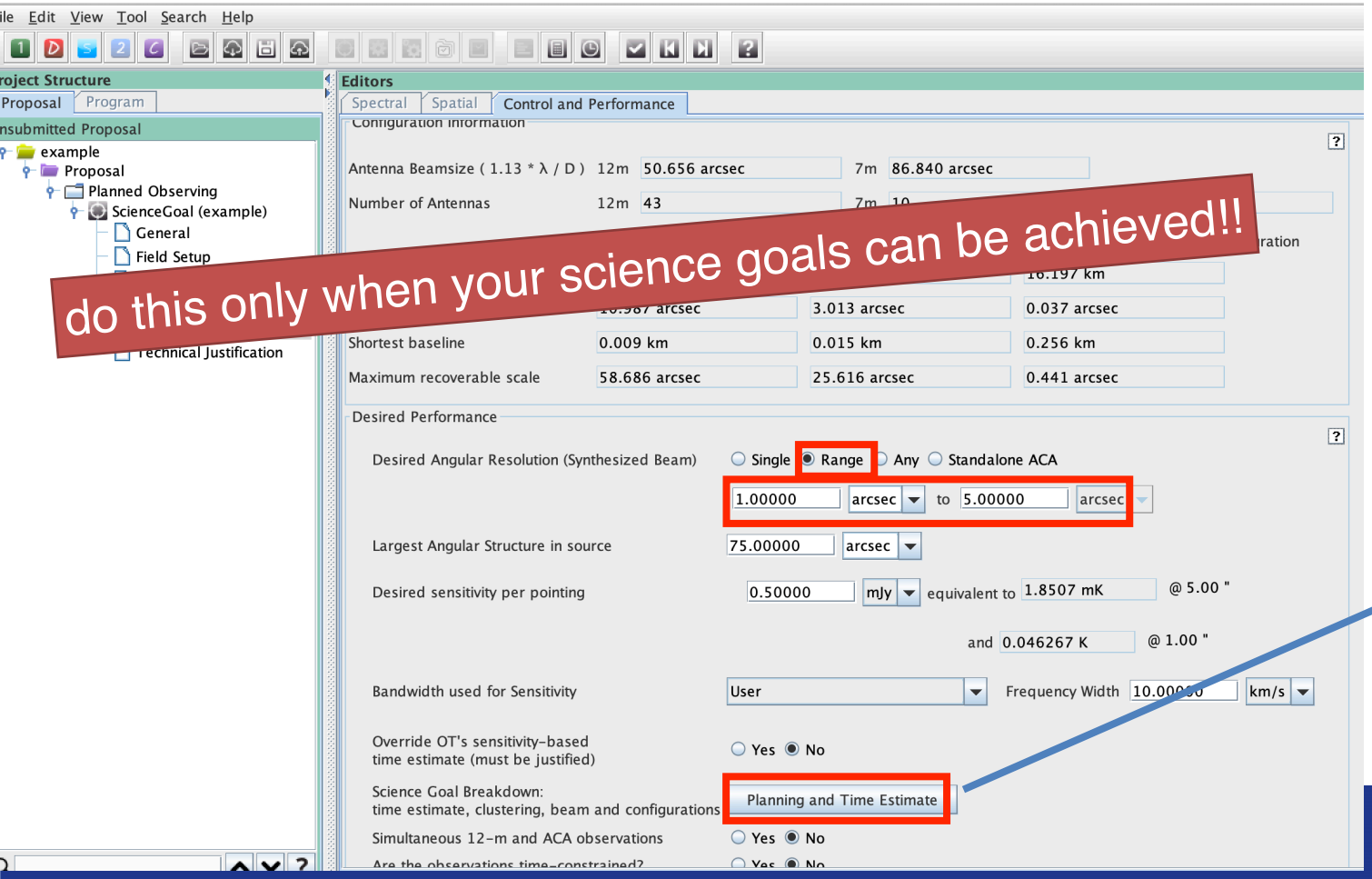
- Whenever a range of angular resolution is acceptable for the science goals, PIs are encouraged to enter a range of Desired Angular Resolution broader than 20% around its center value.

do this only when your science goals can be achieved!!



1. Angular resolution

- Whenever a range of angular resolution is acceptable for the science goals, PIs are encouraged to enter a range covering more than one configuration.



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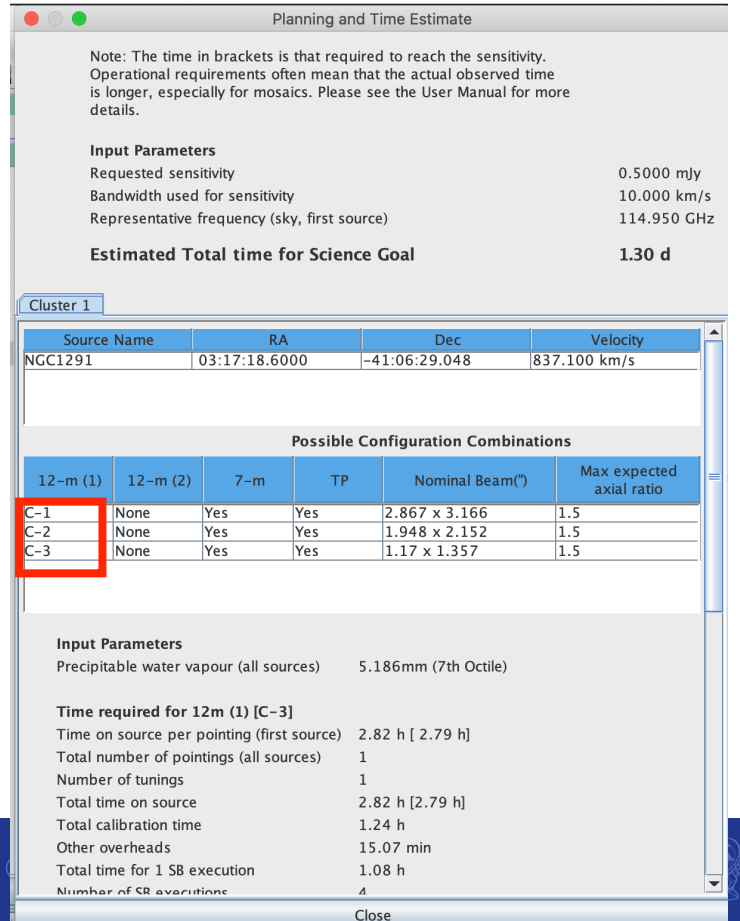
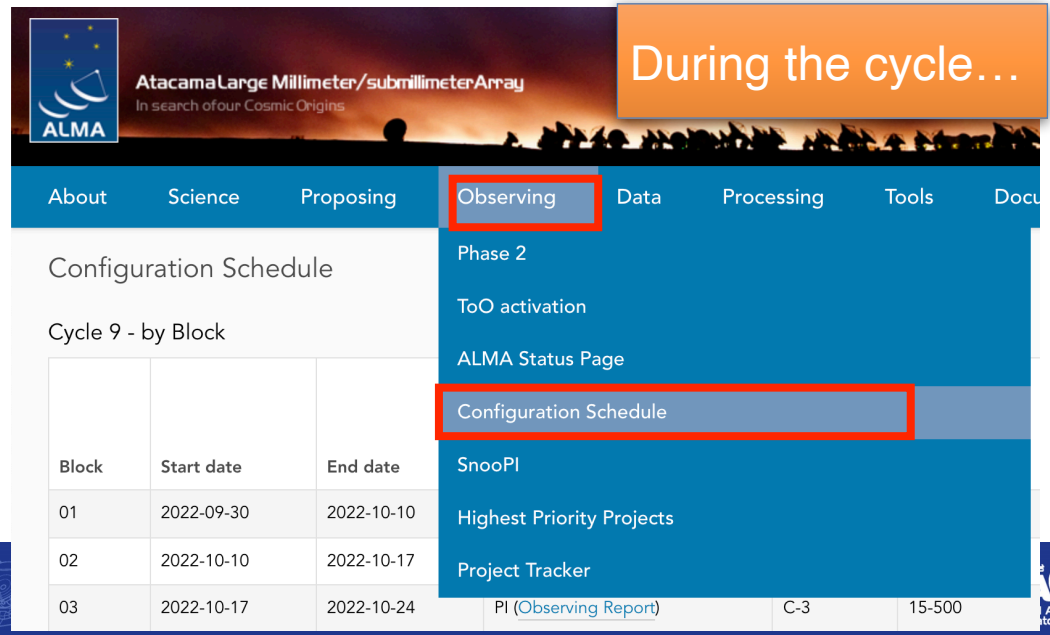


2. Weather

- Section 4.3 of the ALMA Cycle 10 Proposer's Guide
  - Band 9 and 10 observations will be scheduled during the LST ranges given in the fourth column.
  - Bands 7 and 8 observations outside of those LST ranges are limited



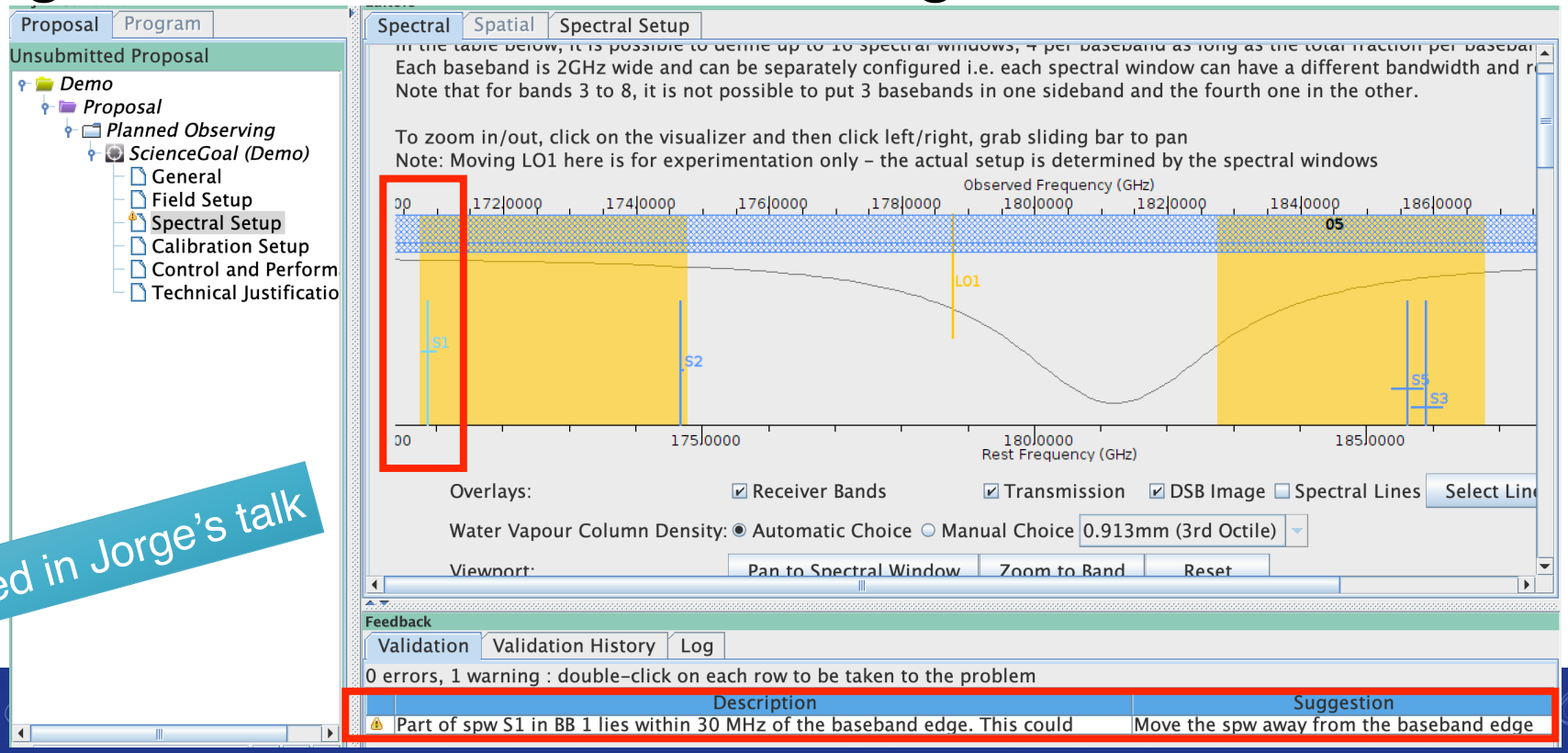
Start date	Configuration	Longest baseline	LST for best observing conditions
2023 October 1	C-8	8.5 km	~ 22—10 h
2023 October 20	C-7	3.6 km	~ 23—11 h
2023 November 10	C-6	2.5 km	~ 1—13 h
2023 December 1	C-5	1.4 km	~ 2—14 h
2023 December 20	C-4	0.78 km	~ 4—15 h
2024 January 10	C-3	0.50 km	~ 5—17 h
2024 February 1	*No observations due to maintenance*		
2024 March 1	C-1	0.16 km	~ 8—21 h
2024 March 26	C-2	0.31 km	~ 9—23 h
2024 April 20	C-3	0.50 km	~ 11—0 h
2024 May 10	C-4	0.78 km	~ 12—2 h
2024 May 31	C-5	1.4 km	~ 13—4 h
2024 June 23	C-6	2.5 km	~ 15—6 h
2024 July 28	C-5	1.4 km	~ 17—7 h
2024 August 18	C-4	0.78 km	~ 19—8 h
2024 September 10	C-3	0.50 km	~ 20—9 h

Table 3: Planned 12-m Array Configuration Schedule for Cycle 10. Configuration properties are given in Section A.2.

mentioned in Nagai-san's talk

3. Spectral setup

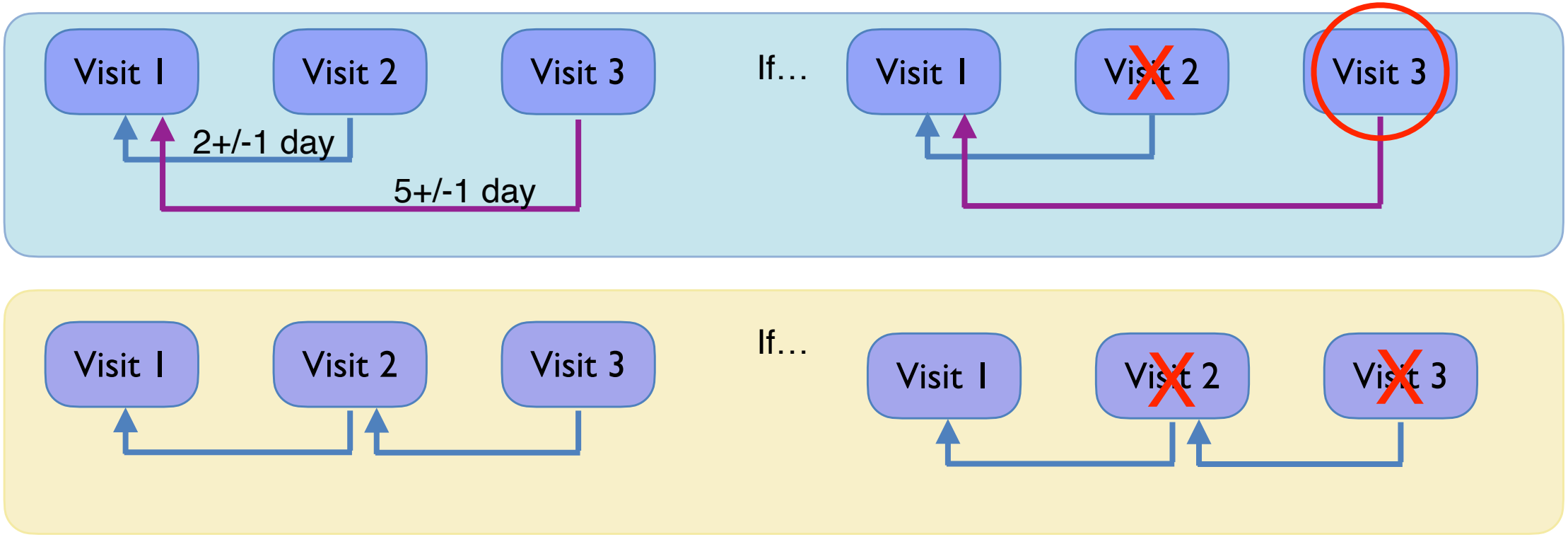
- Avoid placing spectral windows (spw) close to the baseband edge
- Any spw located within 30 MHz of the baseband edge could result in compromised flux calibration and might cause problems for finding the tuning solution for Local Oscillator signals as well.



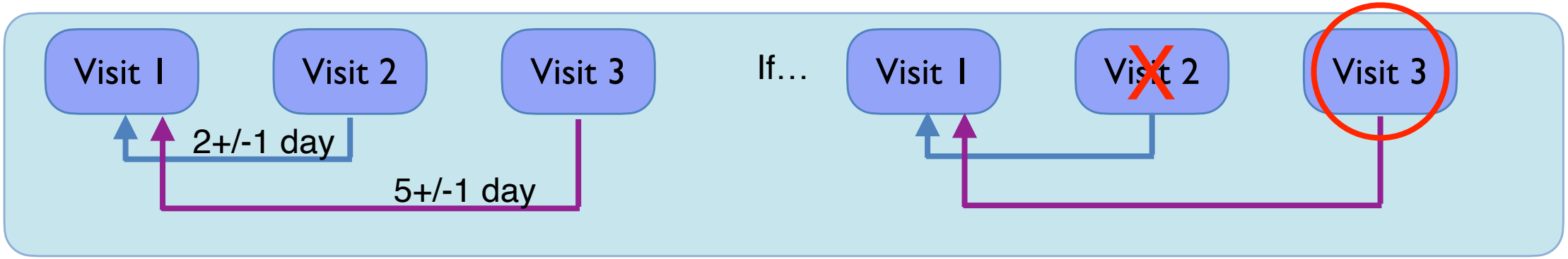
mentioned in Jorge's talk

4. Multiple-visit observation

- Two possible strategies



4. Multiple-visit observation



Please specify the arrangement of visits for your observation.

Visits can either be for a specific date or relative to a previous visit.

The first visit can be defined as having an arbitrary start date/time

Visits specified : 3

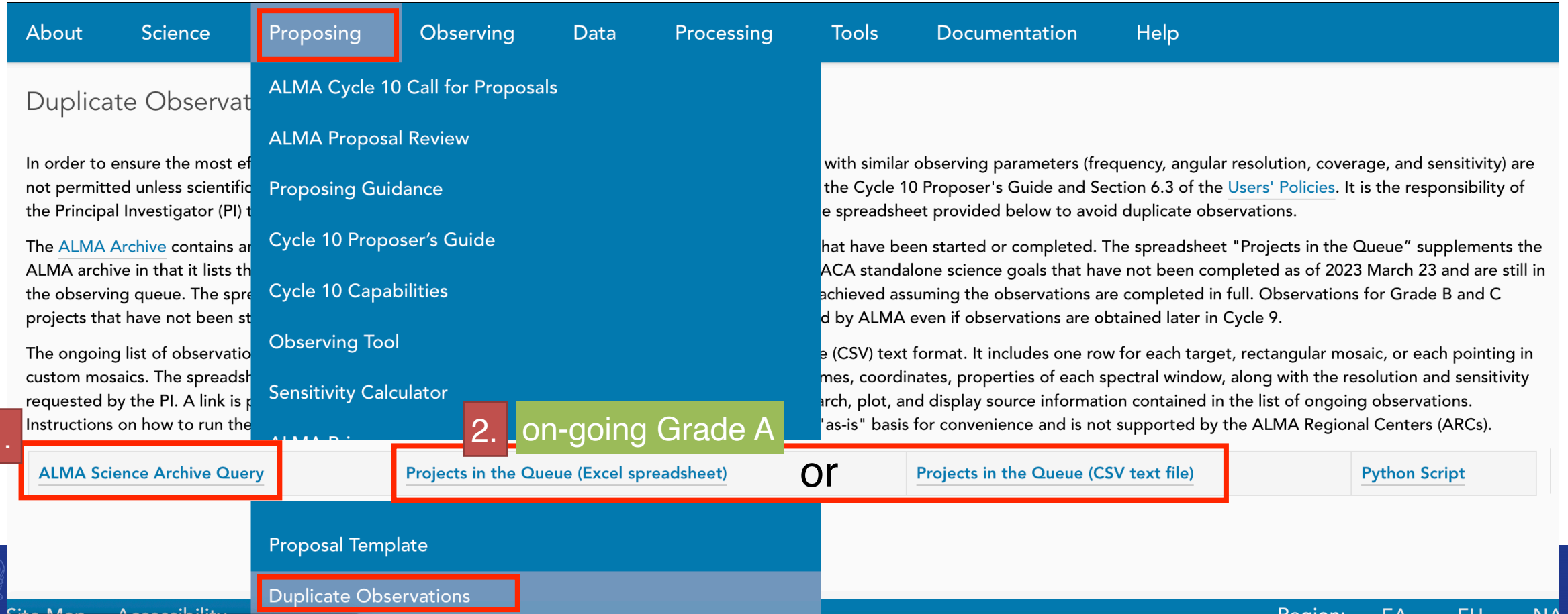
Visit Constraints (UTC)
Visit 1 : Arbitrary start
Visit 2 : To be scheduled 2.0 d after visit 1 with a margin of ± 1.0 d
Visit 3 : To be scheduled 5.0 d after visit 1 with a margin of ± 1.0 d

5. TP only observation

- Section A.3 of the ALMA Cycle 10 Proposer's Guide
  - The TP Array cannot be requested in a standalone mode using the OT. However, if a user has existing 7-m Array data through their own program or through archival data, but now realizes that TP Array data are needed to obtain short spacings, they can submit a proposal requesting both the 7-m Array and TP Array.
  - The proposal should indicate that only the TP Array is needed and that the 7-m Array should be descoped if the proposal is accepted. This option is available only if the 7-m Array data have already been obtained.

6. Checking for duplications

- Duplicate observations of the similar location on the sky with similar observing parameters (frequency, angular resolution, coverage, and sensitivity) are not permitted unless scientifically justified (Section 4.4.1)

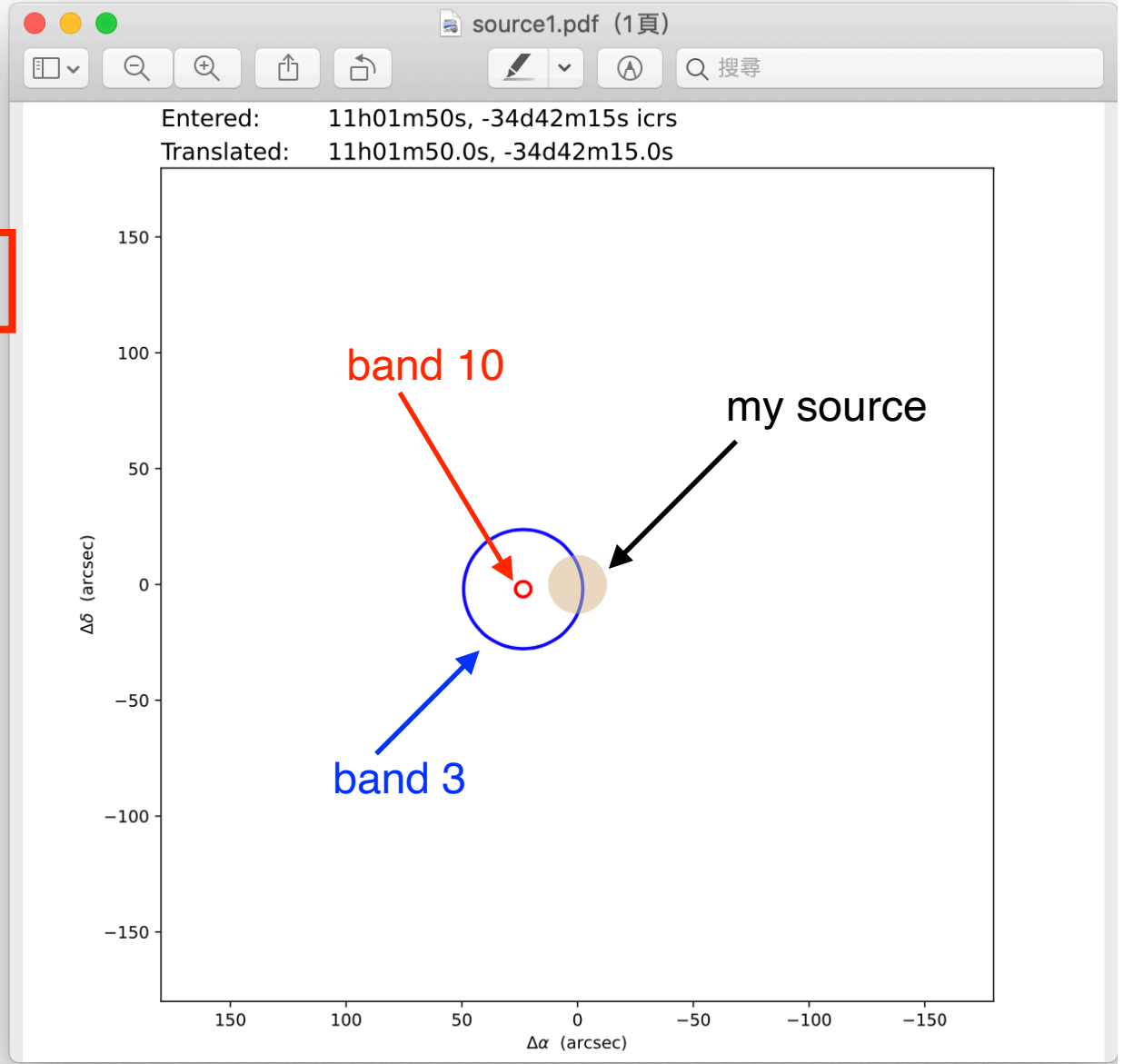


```
(base) ytwu:Cycle10_duplication ytwu$ ls
dup_input_cycle10.csv plotobs_cycle10.py
(base) ytwu:Cycle10_duplication ytwu$ ipython --pylab
Python 3.9.4 | packaged by conda-forge | (default, May 10 2021, 22:13:15)
Type 'copyright', 'credits' or 'license' for more information
IPython 7.23.1 -- An enhanced Interactive Python. Type '?' for help.
Using matplotlib backend: MacOSX

In [1]: import plotobs_cycle10 as po

In [2]: po.plot('11h01m50s', '-34d42m15s', plotsize=360, freq=230, frame='icrs')
Reading observations
Using csv file...
   ... read 1363 rows in dup_input_cycle10.csv
   ... correcting centroid RA/DEC in mosaics for offsets
   ... computing redshifts
   ... correcting rest frequencies to sky frequencies
   ... computing area of rectangular mosaics
   ... computing mosaic area of 1 mosaics
   ... correcting ACA mosaic spacings
   ... checking names for ephemeris sources
   ... done
Running checks on data
   ... checking keywords in data structure
   ... checking right ascensions
   ... checking declinations
   ... checking mosaic parameters are present for rectangular mosaics
   ... checking values of requested sensitivity are non-zero
   ... checking values of reference bandwidth are non-zero
   ... checking spectral scan frequencies and bandwidths
   ... checking values of frequencies and bandwidths
   ... done
   ... converting RA/DEC to astropy sky coordinates
NOTE: This script only checks on-going observations.
      Completed observations are listed in the ALMA archive.

Summary information for 360 x 360 arcsec region around 11h01m50s, -34d42m15s icrs
    N  Excel  Project code   Target name                    RA          Dec  Sky Freq  Ang.Res.    L.A.S.   Polar- MosArea  7m? TPA? Spec.
         row                                            J2000        J2000     (GHz)  (arcsec)  (arcsec)  ization  amin^2                Scan?
    1   1175  2022.1.00840.S TW_Hya                 11h01m51.9s -34d42m17.0s     113.1      0.30       8.0   double       -    -    -     -
    2   1390  2022.1.01553.S TW_Hya                 11h01m51.9s -34d42m17.0s     872.2      0.03       1.1   double       -    -    -     -
   Plot saved to source1.pdf
```



N	Excel row	Project code	Target name	RA J2000	Dec J2000	Sky Freq (GHz)	Ang.Res. (arcsec)	L.A.S. (arcsec)	Polar- ization	MosArea amin^2	7m?	TPA?	Spec. Scan?
1	1175	2022.1.00840.S	TW_Hya	11h01m51.9s	-34d42m17.0s	113.1	0.30	8.0	double	-	-	-	-
2	1390	2022.1.01553.S	TW_Hya	11h01m51.9s	-34d42m17.0s	872.2	0.03	1.1	double	-	-	-	-

Plot saved to source1.pdf

```
In [4]: po.row(1175)
```

Source information for spreadsheet line 1175 (project = 2022.1.00840.S)

Target name	TW_Hya	
Right ascension	11:01:51.91	hms
Declination	-34:42:17.03	dms

Observing parameters

Band	3	
12m primary beam size	51.5	arcsec
Angular resolution	0.300	arcsec
Largest angular scale	8.0	arcsec

Observing modes

Polarization	double
Use 7m array	False
Use Total Power Array?	False
Is spectral scan?	False

Mosaic information

Is mosaic?	False

Estimated continuum sensitivity

Aggregate bandwidth	1875	MHz
Continuum RMS	0.008	mJy
Continuum RMS	8.2	mK

Correlator setup

Win	Sky Freq	Usable Bandwidth		Spectral resolution		RMS/bandwidth		RMS/resolution	
	(GHz)	(MHz)	(km/s)	(MHz)	(km/s)	mJy	mK	mJy	K
1	112.995	1875.0	4974.6	0.977	2.591	0.008	8.228	0.340	0.361
4	113.125	58.6	155.3	0.031	0.081	0.044	46.542	1.922	2.039
3	113.185	58.6	155.2	0.031	0.081	0.044	46.542	1.922	2.039
2	113.500	58.6	154.8	0.031	0.081	0.044	46.542	1.922	2.039

6. Checking for duplications

- Criteria

ALMA Users' Policies

Appendix A Definition of a Duplicate Observation

A proposed observation is considered a duplicate of another observation if *all* of the following conditions are met:

Target field location

- For single-field interferometry, the proposed position coincides within the half-power beam width of the other observation. Moving objects (e.g., Solar System objects) will be identified by name.
- For mosaic observations, more than 50% of the proposed pointings are within the half power beam width area covered by the other observation.

Angular Resolution

- The proposed angular resolution differs by a factor of ≤2 from the other observation.

Spectral windows

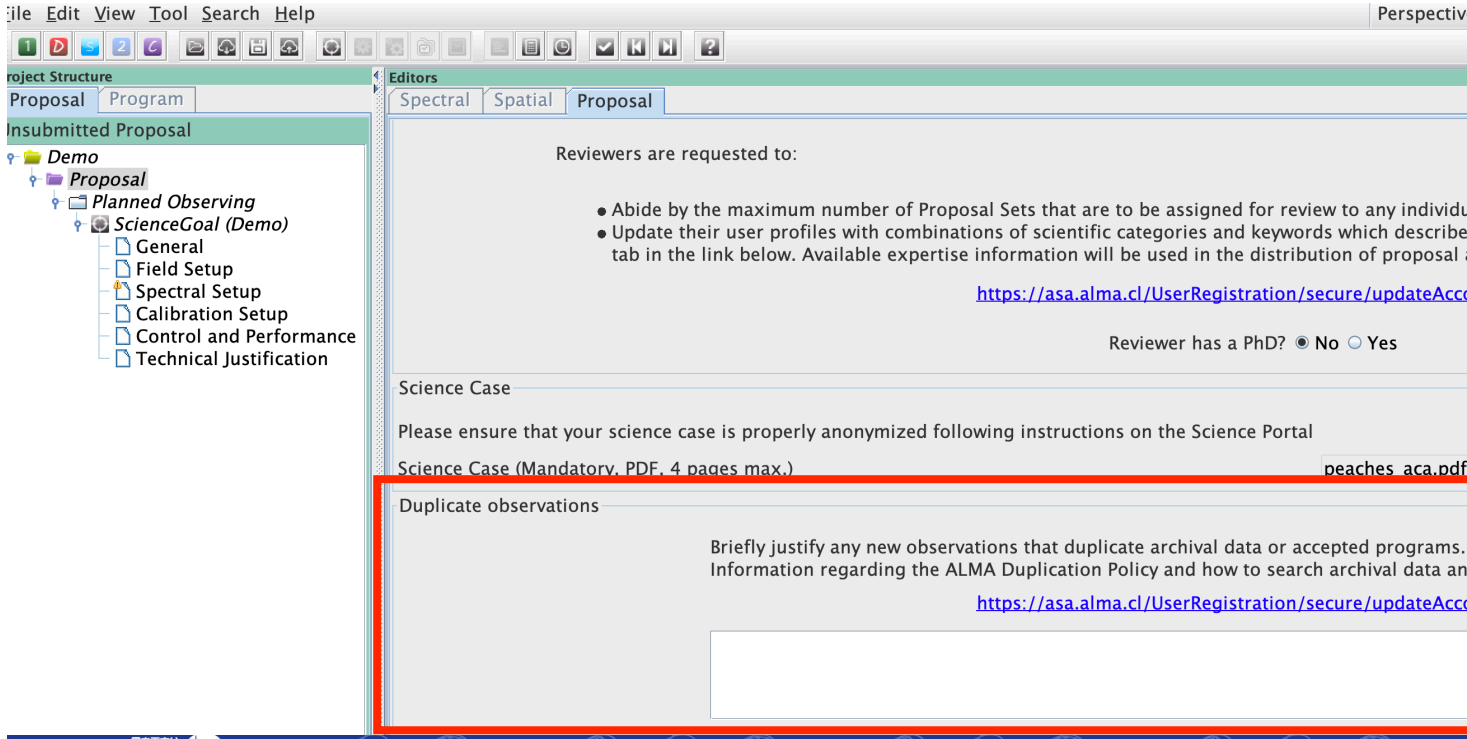
- Continuum: The requested sensitivity (rms) for the aggregate bandwidth is better by a factor of ≤ 2 from the other observation and the requested frequency is within a factor of 1.3.

  – or –

- Spectral line: If the central frequency in any requested correlator window observed in Frequency Division Mode (FDM) mode is encompassed by the other observation observed in FDM mode and the sensitivity per spectral channel, after smoothing to the same spectral resolution, is better by a factor of ≤ 2.

To be considered a "continuum" observation, the proposed correlator setup must contain 2 or more windows with a bandwidth > 1.8 GHz.

Solar observations will not be checked for duplications.



7. Resubmission of an unfinished proposal

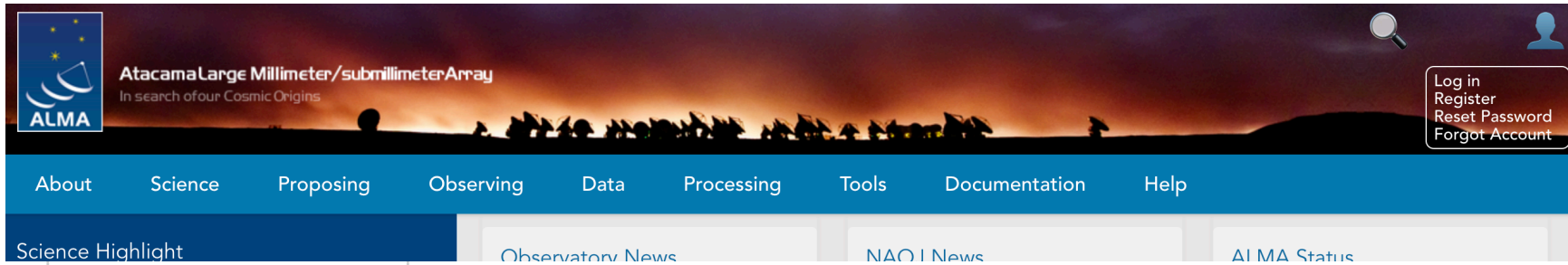
- Proposal teams that submit a Cycle 10 proposal to observe some or all the SGs of an unfinished project will have the relevant SGs identified as a "resubmission".
- Criteria: Appendix A of the Users' Policies
- Policies (Section 4.4.2 of the ALMA Cycle 10 Proposer's Guide):
  For such resubmissions, the relevant portion of the Cycle 10 proposal will be canceled if the observations are successfully completed in Cycle 9. Observations started in a previous cycle and accepted as a resubmission in Cycle 10 will continue to be observed with the setup of the previous cycle.

8. Change requests (Section 8 of the ALMA Users' Policies)

- Triple-check all setups before the proposal submission deadline!!
- After the PIs have been notified of the results of the proposal review process, PIs of scheduled proposals may request necessary changes to their project via the ALMA Helpdesk.
- Major changes (defined in Appendix B of the ALMA Users' Policies) are allowed only if the change is essential for the science goals of the project. Any major change request by a PI must be made by submitting a Helpdesk ticket and will only be implemented after the approval of the change request.

8. Change requests (Section 8 of the ALMA Users' Policies)

- Major change requests may be motivated by the following considerations
  - New information received since the original proposal submission
    - e.g. new observations including interim observational results of a project, other new information on planned observing targets, or externally-imposed changes to the scheduling of time-coordinated observations at other observatories
  - Technical considerations for implementation during Phase 2 (that are initiated by the PI, e.g. to optimize the scientific yield of the observations)
  - Mistakes made by the PI
- Please read Section 8 and Appendix B of the ALMA Users' Policies carefully before requesting any changes!



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(Fields marked with a red dot are mandatory

First name

Middle initials

Surname

Gender

E-mail

Receive optional emails

Notify me of changes I make

Account name

Password

Re-type password

Institution

Choose country...

Choose Institution...

Please keep the affiliation and email up to date during the whole cycle so that you can get adequate support from the corresponding ARC.

In case of problems with the registration, please use this Web form to contact us
You may find a solution to your problem in the Support Center/Knowledgebase

Please don’t hesitate to contact us through the Helpdesk!

https://help.almascience.org/