2020-12-16 TSO WG Meeting notes

Date

16 Dec 2020

Attendees

- Nestor Espinoza
- Brian Brooks
- Nikolay Nikolov
- Arpita Roy
- Diane Karakla
- Tony Keyes
- Sarah Kendrew

Meeting agenda:

1. News & announcements.
2. Updates on ground-testing Dark frame data & 1/f noise.
3. Activities on each instrument branch (all).
4. Closing remark

Discussion items

Time	Item	Who	Notes
	1. News & announcements	Everyone	- Sarah Kendrew kickstarted interesting discussion as to why there were more proposals than envisioned for exoplanetary science. She believes this was expected, given exoplanets is indeed one of the JWST science themes! Nestor Espinoza agrees , and believes this was just a problem of the dataset used to set expectations (HST /Spitzer). JWST is a game-changer for the field. Nikolay Nikolov also mentions the career levels where different, with more junior folks submitting JWST proposals. - Nestor Espinoza reminds everyone of the STScI Spring Symposium entitled "*Towards the Comprehensive Characterization of Exoplanets: Science at the Interface of Multiple Measurement Techniques*", which is very relevant to this TSO WG (and JWST in general). Deadline for abstract submission is February 1st!
20min	**2. Updates on ground-testing Dark frame data & 1/f noise**		
		Nestor Espinoza Arpita Roy	**NIRISS**. Nestor Espinoza reports on NIRISS status on dark frames and analyses. The NIRISS team has already made some preliminary analyses on SUBSTRIP256, but none yet on SUBSTRIP96. We already know where the dark frames are and how to get them (there was a campaign in CV3 which gathered darks with >50 groups for both subarrays) — Arpita Roy is going to be jumping on those analyses. Nestor Espinoza already reached out to Rachel Cooper at the NIRISS team who is actually doing some analyses, and get the data from here. ☐ Nestor Espinoza will get together with Arpita Roy to define how to move forward with this analysis. Nikolay Nikolov asks if the actual objective of these analyses would be to totally isolate the 1/f component or to simply check how substracting, e.g., column-by-column reduces the overall noise. Nestor Espinoza asks that it will be basically both: we want to study and isolate the 1/f component to understand the amplitude and lengthscale this has on the different JWST instruments (i.e., are the length-scales the same as the ones reported in the NIRCam paper? Does this vary with subarray?), and also want to understand if, e.g., simple column-by-column substraction would suffice or something more involved (like, e.g., spectral extraction accounting for this covariance) should be implemented on the different subarrays.

		Tony Keyes Stephan Birkmann Diane Karakla	**NIRSpec**. Stephan Birkmann pointed Diane Karakla and Tony Keyes to how to get the data. Diane Karakla summarized her search for the data on the OTIS campaign/data. This morning she got some data from the archive — she's getting more data than she was requesting to the database; so she's trying to make sense of this data. Stephan Birkmann mentions the fact that for the smallest subarrays, the correlation might be *between* columns, and in this case perhaps the 1/f noise reduction might be better on a moving-average basis rather than on a column-by-column. This is something to study as well. Nestor Espinoza asks if folks have had a look at Bernard Rauscher's et al. paper (and references therein) on 1/f noise, where they seem to have studied some of this already. Stephan Birkmann mentions that yes, but that's only applicable to the full frame — although they did some studies as well on a similar setting as what we are planning here. Nestor Espinoza mentions this is great because this provides a bit of comparison to any analyses that will get done. Nikolay Nikolov asked Stephan Birkman if row-by-row substraction (due to odd-even effect) is done before the column-by-column substraction — he is seeing in NIRCam this helps. Stephan Birkmann mentions that indeed they remove this, but they take the values from all the odd and even reference pixels, and use a median/average of them to remove the same value to even/odd rows. Nestor Espinoza suggest perhaps given Nikolay Nikolov is using the entire rows independently, it would be good to check these values are indeed compatible between even/odd rows. If they are, then use the method identified by Stephan Birkmann.
		Sarah Kendrew	**MIRI**. Sarah Kendrew reached out to Mike Reagan about this — and it appears 1/f is a smaller concern over there than for the close NIR (i.e., NIRSpec, NIRISS and NIRCam). Stephan Birkmann suggests this is because of the ASIC feature — given MIRI does not use this, then 1/f noise is not such a big issue. ☐ Sarah Kendrew will write a paragraph on this to summarize it in our technical report. Nikolay Nikolov asked if MIRI is going to produce some TSO observations. Sarah Kendrew mentions that right now it is not straightforward to include this to MIRISim — however, there is a student in France (*exonoodle*; see below) that kind of does this. Sarah Kendrew will take a look at this in order to understand how this does work in practice. Nikolay Nikolov asks if there was a TSO-like ground-testing campaign for MIRI; something like the NIRSpec one — Sarah Kendrew mentions there was indeed a JPL TSO-like test; this was with an LED, whose voltage was modulated slightly. Those data are not pipeline compatible though — so it does require some "manual" handling/processing. Stability of the source was not really good as well. This is an "imaging" test (i.e., no spectra), so might be tougher to analyze than the NIRSpec experiment. She will dig some of those reports for everyone to read. ☐ Regarding *exonoodle*, Sarah Kendrew will reach out to the lead author to see if she can give either a Science Coffee talk on the tool, a small tutorial on it to the TSO WG or both.
		Nikolay Nikolov Brian Brooks	**NIRCam.** Currently compiling the data they have on NIRCam. One detail is that analyses have been done on full frame only.
30min	**3. Activities on each instrument branch (all)**		
		Nestor Espinoza Arpita Roy	**NIRISS activities**. Nestor Espinoza mentions that there the IS Checklists are being defined within the branch. He mentions that he put forward a discussion on uncertainties on the ephemerides (especially for eclipses, where eccentricity and argument of periastron might be a problem) that he believes might really be cross-instrument. He'll do some write-up within NIRISS to define the details on how to check for this (which is a bit more complicated for eclipses), and share with the WG.
		Tony Keyes Stephan Birkmann Diane Karakla	**NIRSpec activities**. There are some concerns about the total duration of the visit. Tony Keyes mentions that internal discussion was focused on how to define the "padding" before the event that wants to be scheduled, as this might be different for NIRSpec due to detector settling concerns. Nestor Espinoza mentions that this was loosely defined in the exoplanet examples in JDox, but that there is no clear guideline on this on, e.g., the TSO best-practices — we should discuss this, and define any consensus for these reviews ASAP, as well as plan ahead for Cycle 2 (which might receive important input from Comissioning/Calibration exposures). ☐ Nestor Espinoza proposes this *should be a discussion point on the next meeting*.
		Sarah Kendrew	**MIRI activities**. There is a good discussion on very long exposures. There seems to be some limitations we might need to discuss/understand. Jira ticket: . ☐ *Will also be a discussion item on the next TSO WG meeting.*

		Nikolay Nikolov Brian Brooks	**NIRCam activities.** Nikolay Nikolov has been doing some tests on wavelength limits for the 1D extraction for the pipeline. This is all good — however, when you have a multi-segment TSO (which are "artificially" created so that data is split into smaller volumes), there are problems with the time-stamps when joining those segments when passing them through the pipeline: the second segment does not continue from the first segment. This might be a TSO3 issue, but not sure yet; doing some checks right now.
			☑ Nikolay Nikolov will work into this and generate a Jira ticket on the issue. Ticket created: JP-1831.
5min	**4. Closing remarks of the meeting**		In order to facilitate (and encourage) taking time at the end-of-year, the next scheduled TSO WG meeting will be canceled. The next TSO WG meeting, thus, will be happening on January 13th.