JWST APT Pure Parallel Observations

Pure parallel science observations are proposed and implemented differently in JWST APT from regular observations and from coordinated parallel observations.

Introduction

See also: JWST Parallel Observations for an overview and templates allowing pure parallel attachments.

Pure parallel observations form entirely separate programs from the primary science observations they will be attached to, and hence involve a separate APT proposal. Pure parallel programs will use observing slots created by approved "regular" proposals that will be identified for possible use with pure parallel observing.   However, by the nature of these proposals, the details cannot be known at the time of initial submission.

For pure parallel proposing, you will not specify targets initially but rather enter some number of realistic placeholder observations into APT to indicate the kinds of pure parallel exposures that are needed for your proposed science. You must decide what kind of slots and pointing constraints will accommodate your science goals and the number of slots needed to accomplish the science you propose, and you will need to specify a reasonable estimate of the exposure specifications and total amount of observing resources that will be used if the proposal is accepted (see below). This information is needed so that you (and the TAC) will have an assessment of the total potential impact of the proposal, should it be approved. Details must be provided in your science justification, which will be attached to your APT file prior to submission (as with other programs).

After acceptance, and when the available pure parallel slots are known, you will develop a detailed APT proposal and attach proposed observations to actual parallel slots. This process is described in more detail below.

Pure parallel observing was not permitted as part of GTO or DD-ERS proposing, but is being made available to Cycle 1 proposers on a shared risk basis. Ongoing development is needed to support a full implementation in the scheduling system.

> ⊘ As with coordinated parallels, pure parallel exposures nominally hide completely under the primary exposures to which they attach. However, because of the way the onboard scripts operate, the script compile times must be done serially for the primary and parallel exposures. Hence, it is recognized that adding pure parallel exposures will have some modest impact on the resources accounted to the primary program. The magnitude of this impact is not currently known, and is not modeled in the APT accounting process, but this impact will not in actuality be accounted against the primary proposal.

Proposing for pure parallels

Proposers must decide what kind of parallel observations (observing mode, filters and/or grisms, minimum exposure time, etc.) will accommodate their proposed science, and how many such observations would be needed. (If appropriate, a *range* in the number of observations that would be acceptable may be given.) Furthermore, pure parallel proposers will have to specify any other restrictions on the desired slots to which their parallel observations are to be attached (e.g., allowed ranges of galactic or ecliptic latitude). These details must be described in the "Description of the Observations" section of the science PDF proposal attached to APT prior to submission. Pure parallel observations are not allowed to place timing or position angle constraints on the proposed observations.

How to use APT to prepare a pure parallel proposal: After opening a new JWST APT proposal, select the ***Pure Parallel Program*** check box on the Proposal Information page, which designates the APT file as being a pure parallel proposal. The proposer should then fill out one or more observing templates in APT to indicate the relevant parameters of the exposures to be attached in parallel. The "normal" proposal accounting numbers produced by APT will not not meaningful for pure parallel proposals and can be ignored, but an alternate method of calculating an estimated resource time to enter into the Proposal Information form of APT is given below.

For some observing modes, separate templates for pure parallel proposing in APT are not yet available. In those cases, proposers can use the "regular" observing templates to specify pure parallel observations. This requires temporary workarounds to deal with pure parallel proposing in Cycle 1. These issues are planned to be fixed by the time actual observing slot assignments will be needed for accepted pure parallel proposals. Details on how to fill out the relevant APT templates and how to enter proper accounting numbers for pure parallel observations in Cycle 1 are given below.

For *accepted* pure parallel programs, actual observing slots must be assigned. A helper tool within APT may be available in mid-2020 to assist successful proposers with this task, or STScI may simply provide a listing of available observing slots for pure parallel science that will include the characteristics of each slot, so users can judge their appropriateness for their science. Depending on the number of pure parallel proposals accepted and the severity of the competition for available slots, STScI may convene the accepted PIs of pure parallel programs into a negotiation process to assign the slots. Once the slots are assigned, each PI will need to prepare an APT proposal specifying the actual observational details for each slot and submit it for use in scheduling. This needs to happen as soon as feasible after acceptance because the details are needed to construct a valid long range plan, which drives the scheduling process for each new observing cycle. STScI will contact accepted proposal PIs with the details and schedule.

Filling out APT forms for pure parallel proposals

1. In the ***Proposal Information*** section, check box ***Pure Parallel Proposal***.
2. In the ***Observations*** section, click on ***New Observation Folder***.
3. Create one observation for each type of observation and exposure required to execute the proposed pure parallel science. In this context, "type of observation and exposure" means a combination of instrument, observing mode, optical element selection (filter(s) or grism), and minimum exposure duration. **Note that**

if more than one exposure setup is proposed to be obtained at a given position on the sky (e.g., imaging with more than one filter per filter wheel, or WFSS observations with a grism as well as direct images), **one observation needs to be created for each of those exposure setups**. This is different from regular observation template specifications where multiple filters could just be listed sequentially within a given instance of the observation template.

4. For each of the observations specified, fill out the exposure specifics. This is done as follows for the observing modes available for pure parallel observations:

   a. For the *NIRCam Imaging* template (Instrument = NIRCam, Template = NIRCam Imaging):
      i. Select desired **Module** and **Subarray**.
      ii. Select desired **Short Filter, Long Filter, Readout Pattern, Groups/Int**, and **Integrations/Exp**.
      iii. Read off duration of Observation in "Total Charged" box in top area of the template. *Note down this value for this Observation*.

   b. For the *NIRCam WFSS* template (Instrument = NIRCam, Template = Wide Field Slitless Spectroscopy):
      i. Ignore the red cross (error sign) next to the **Template** selector.
      ii. Select **Module = ALL**.
      iii. Select **Grism (Long Wavelength) = GRISMC**.
      iv. In the "Science (Grism) Exposures area:
          1. With the "**Primary Dither Type**" pull-down selector, select **NONE**.
          2. With the "**Subpixel Positions**" pull-down selector, select **NONE**.
          3. In Exposure Specification area, do **not** select "**Direct Image**".
          4. For "**Long Filter**", select one of **F277W, F322W2, F356W**, or **F444W**.
          5. For "**Short Filter**", select any filter **except F070W, F090W, F115W**, or **F150W**.
          6. For "**Readout Pattern**", select any pattern **except RAPID, BRIGHT1**, or **BRIGHT2**.
          7. Select desired **Groups/Int** and **Integrations/Exp**.
          8. Read off duration of Observation in "Total Charged" box in top area of template. *Note down the resulting value for this Observation*.
          9. Then click on "**Direct Image**".
      v. In the "Direct Image Exposures" area, select same **Long Filter, Short Filter, Readout Pattern, Groups/Int,** and **Integrations/Exp** values as those in the "Science (Grism) Exposures" area. *Ignore the "Duration" values that now show in the top area of the template*.

      > ⊘ *NIRCam WFSS observations will require changes to the current APT template when operated in pure parallel mode. The template for pure parallel mode is planned to be made available in the APT version that will be used for attaching approved pure parallel observations to pre-existing (primary) observations. As such, accepted proposals requesting NIRCam WFSS in Cycle 1 will be on a shared risk basis, pending the implementation and testing of the new template.*

   c. For the *MIRI Imaging* template (Instrument = MIRI, Template = MIRI Imaging):
      i. Select desired **Subarray**.
      ii. Select desired **Filter, Readout Pattern, Groups/Int**, and **Integrations/Exp**.
      iii. *Select **Exposures/Dith = 1***.
      iv. Read off duration of Observation in "Total Charged" box in top area of the template. *Note down this value for this Observation*.

    d. For the *NIRISS Imaging* template (Instrument = NIRISS, Template = NIRISS Imaging):

        i. Select **Subarray = FULL**.

        ii. Select desired **Filter, Readout Pattern, Groups/Int**, and **Integrations/Exp**.

        iii. Read off duration of Observation in "Total Charged" box in top area of the template. *Note down this value for this Observation*.

    e. For the *NIRISS WFSS* template (Instrument = NIRISS, Template = NIRISS Wide Field Slitless Spectroscopy):

        i. Ignore "Coordinated Parallel" button. Do not check it.

        ii. In the "Science Observation" area:

            1. With the "**Image Dithers**" pull-down selector, *select 2*.

            2. Ignore the "**Pattern Size**" pull-down selector.

            3. Select desired **Grism, Filter, Readout Pattern, Groups/Int**, and **Integrations/Exp**.

        iii. In the "Direct Image Exposure Parameters" area:

            1. Select *same* **Readout Pattern, Groups/Int = 0,** and **Integrations/Exp = 0.** Ignore the red error signs that show up after entering those zeros.

            2. Read off duration of Observation in "Total Charged" box in top area of template, *and divide that value by the number of Image Dithers selected in the "Science Observation" area (i.e., 2). Note down the resulting value for this Observation*.

            3. Then select same **Readout Pattern, Groups/Int,** and **Integrations/Exp** values as those in the "Science Observation" area. *Ignore the "Duration" values that now show in the top area of the template.*

> ⊘ *NIRISS WFSS observations will require changes to the current APT template when operated in pure parallel mode. The template for pure parallel mode is planned to be made available in the APT version that will be used for attaching approved pure parallel observations to pre-existing (primary) observations. As such, accepted proposals requesting NIRISS WFSS in Cycle 1 will be on a shared risk basis, pending the implementation and testing of the new template.*

5. For each of the Observations created as described above, evaluate how many distinct pointings (meaning distinct targets of the primary observations, i.e., ignoring dithers) will be required at a minimum to fulfill the science goals laid out in the proposal. *For NIRCam WFSS and NIRISS WFSS, it is likely that direct image exposures will be needed in addition to grism exposures; for those cases, count 2 pointings per actual pointing on the sky.* Make sure these numbers are mentioned and justified in the *Description of Observations* section of the proposal PDF attachment.

6. Calculate the grand total duration of the pure parallel observations proposed. Calling the durations of the *m* different Observations "*Dur$_i$*" and the associated minimum number of pointings for each Observation "*N$_i$*", this grand total duration is equal to the following: $\sum_{i=0}^{m} N_i \, Dur_i$

7. In the "Proposal Information" section in APT, click on "Request custom time allocation" button.

8. In the "Requested Time" box that shows up, enter the grand total duration value calculated in the previous step. Make sure you choose the correct time unit (which is currently defaulted at "Days"). You can ignore the accounting numbers produced by APT automatically, as they are not relevant for pure parallel proposals.

9. In the "Time Req Explanation" box, enter the following: "Pure Parallel proposal. Allocation value entered following prescription given in the **JWST APT Pure Parallel Observations** article."