

Pattern Data Submission

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Description

A slew or dither pattern file can be used to slew the telescope between targets, dither, change exposure times, change filters & the number of exposures. If a user wishes to simply cycle through a series of filters (without moving the telescope), the input file can be very brief and only include exposure time and filter names. Not all exposure options are allowed in the pattern file, so it is recommended that the user takes one test image with the desired parameters such as binning factor so these values are cached and will be used while the pattern is running.

These pattern files need to be on the observer machines (`dct-obs1` / `dct-obs2`) because they will be input into the LOUI. All of the caveats for creating [Observer Target Lists](#) apply here, such as using a basic text editor (e.g., vi or emacs) and avoiding extended character sets. You may transfer your pattern files to the observer machines via USB drive or `scp`, as desired, or even create them directly on the observer machine during the observing session.

Format

Slew-dither pattern files must begin with a metadata line (starting with a #) indicating which fields are present in the file. Options include:

- **title:** This will be treated the same as the "Object name" in the LOUI's [LMI / DeVeny / NIHTS] Control view.
- **RA and DEC:** Only J2000.0 coordinates are allowed.
- **exposureTime:** The exposure time in seconds. This must be present.
- **numExposures:** If this is not specified, it will default to 1.
- **filter:** If this is not specified, it will default to whatever filter is in place at the time the sequence starts.
- **muRA, muDEC, and epoch:** the proper motion (in mas/yr) to be applied and the corresponding epoch. Note that muRA is really (`xcos()`); this is the form that most catalogs (and SIMBAD) provide.
- **dRA and dDEC:** any non-sidereal rates that need to be applied for tracking. The units are arcseconds per hour.

- **rotator PA:** By default the rotator PA is set to 0, but there may be occasions where the user would like a non-standard orientation.
- **rotator Frame:** Either Target or Fixed. "Target" frame causes the Cassegrain rotator to compensate for the apparent field rotation caused by the Alt-Az mount, and is usually used for imaging. "Fixed" frame maintains the same instrument angle with respect to the horizon, and is usually used for spectroscopy.
- **xi and eta:** Rather than provide RA and DEC, it is possible to simply specify tplane offsets from the current position. The offsets are in arcseconds, and will be performed as an "absolute" offset from the initially commanded telescope position.
- **comment:** This character string will be to added the image FITS header. The comment must be enclosed by double quotes.
- **commandOption:** This determines if the command is a "slew" (moving to another target) or a "dither" (small offset on the same target to compensate for bad pixels on the detector).

The format to follow is below starting with the metadata at the beginning of the document. This particular example is a dither pattern. More info can be found on the [Automated Functions page](#). Appropriate string names for the filters are listed in [LMI Filter Information](#).

```
#title=false ra=false dec=false exposureTime=true numExposures=true filter=true muRA=false muDec=false
epoch=false dRA=false dDec=false rotatorPA=false rotatorFrame=false xi=true eta=true comment=true
#
60.0 1 SL-g 0.0 0.0 "Centered SDSSg"
120.0 1 SL-r 0.0 0.0 "Centered SDSSr"
120.0 1 SL-i 0.0 0.0 "Centered SDSSi"
60.0 1 SL-g 15.0 30.0 "dXi,Eta = 15,30 SDSSg"
120.0 1 SL-r 15.0 30.0 "dXi,Eta = 15,30 SDSSr"
120.0 1 SL-i 15.0 30.0 "dXi,Eta = 15,30 SDSSi"
60.0 1 SL-g 33.0 -5.0 "dXi,Eta = 33,-5 SDSSg"
120.0 1 SL-r 33.0 -5.0 "dXi,Eta = 33,-5 SDSSr"
120.0 1 SL-i 33.0 -5.0 "dXi,Eta = 33,-5 SDSSi"
60.0 1 SL-g 0.0 0.0 "Centered SDSSg"
120.0 1 SL-r 0.0 0.0 "Centered SDSSr"
120.0 1 SL-i 0.0 0.0 "Centered SDSSi"
60.0 1 SL-g -30.0 15.0 "dXi,Eta = -30,15 SDSSg"
120.0 1 SL-r -30.0 15.0 "dXi,Eta = -30,15 SDSSr"
120.0 1 SL-i -30.0 15.0 "dXi,Eta = -30,15 SDSSi"
60.0 1 SL-g -5.0 -33.0 "dXi,Eta = -5,-33 SDSSg"
120.0 1 SL-r -5.0 -33.0 "dXi,Eta = -5,-33 SDSSr"
120.0 1 SL-i -5.0 -33.0 "dXi,Eta = -5,-33 SDSSi"
60.0 1 SL-g 0.0 0.0 "Centered SDSSg"
120.0 1 SL-r 0.0 0.0 "Centered SDSSr"
120.0 1 SL-i 0.0 0.0 "Centered SDSSi"
```



It may be helpful to end dither scripts with a (0,0) (xi,eta) offset. Otherwise, the last offset values will stay in and alter the pointing of the telescope until explicitly cleared.