

HOW TO CREATE DYNAMIC SPECTRA AND DE-DISPERSED TIME SERIES (DTS) FROM BLINK PIPELINE IMAGES

(last updated 2025-08-26)

- We assume that FITS files created by the blink pipeline are in the directory images/ and their names look like:

start_time_**1508442485**_int_**00**_coarse_**109**_fine_ch**00**_image_real.fits

The meaning of the numbers in FITS file name as follows:

- **1508442485** - unixtime second
- int_**00** - 00 is the time integration within 1-second
- **109** - coarse channel
- ch**00** - fine channel within coarse channel

- So in general FITS file names are :

start_time_**UNIXTIME**_int_**TIMESTEP**_coarse_**COARSECHANNEL**_fine_ch**FINE
CHANNEL**_image_real.fits

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- **Commands on Setonix to**

- cd images/ # go to directory with the images here images/
- salloc --mem 64g --time 02:00:00 --nodes=1 # request interactive session on CPU node
- module load frb-search/main # load relevant module

- Execute create_dynaspec program with the following parameters :

```
create_dynaspec -p "(377,896)" -o 1192477696 -S 1508442485 -f start_time_%d_int_  
%02d_coarse_%03d_fine_ch%02d_image_real.fits -v 10 -N 10 -X 0.02 -I 1 -C 109 -T ./   
-t 500 -d dynamic_spectrum -P > outout 2>&1
```

- where :

- -p "(377,896)" : specifies which pixel to create dynamic spectrum for
- -o 1192477696 : observation ID (obsID)
- -S 1508442485 : first second from where to create dynamic spectrum (here 1st second of the observation)
- -f start_time_%d_int_%02d_coarse_%03d_fine_ch%02d_image_real.fits :
template for the FITS files names as explained above
- -v 10 : high level of verbosity / debugging (set to 0 to make the program less "talkative")
- -N 10 : number of fine channels per coarse channel (here for processing 120 kHz images -> 10 fine channels per coarse channel of 1.28 MHz)
- -X 0.02 : time resolution of images in seconds
- -I 1 : images from the MWA telescope
- -C 109 : first coarse channel
- -T ./ : not important
- -t 500 : total number of timesteps, which is the total size of the dynamic spectrum (i.e. number of seconds * number of images per second). Here 50 images/second * 10 seconds = 500
- -d dynamic_spectrum/ : name of output directory
- -P : specifies that these are images from BLINK pipeline

- **Example bash script is provided in :**
 - frb_search/scripts/dynamic_spectra/blink_dynamic_spectrum.sh
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