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 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 use /software/projects/pawsey1154/msok/setonix/2025.08/modules/zen3/gcc/14.2.0
  - 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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