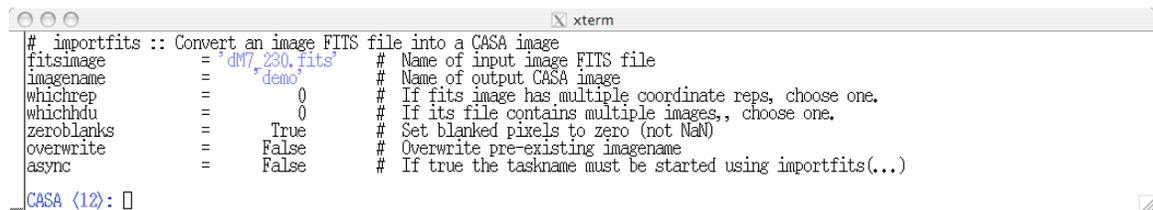


With the ALMA data reduction software, [CASA \(Common Astronomy Software Applications\)](#), we can simulate ALMA observations to prepare for ALMA proposals.

First, you need to have a fits file of the image you want to observe with ALMA. Then, you use task 'importfits';

- default('importfits')
- inp
- fitsimage='dM7\_230.fits'
- imagename='demo'



```
xterm
# importfits :: Convert an image FITS file into a CASA image
fitsimage      = 'dM7_230.fits' # Name of input image FITS file
imagename      = 'demo'       # Name of output CASA image
whichrep       = 0            # If fits image has multiple coordinate reps, choose one.
whichhdu       = 0            # If its file contains multiple images, choose one.
zeroblanks     = True        # Set blanked pixels to zero (not NaN)
overwrite      = False       # Overwrite pre-existing imagename
async          = False       # If true the taskname must be started using importfits(...)
CASA (12):
```

Here, dM7\_230.fits is the fits image, and ``demo'' is the name of the image file in the CASA format.

- go

Now, you have a CASA image file (=demo) you want to observe with ALMA. Then, use task 'simdata';

- default('simdata')
- inp (put parameters as follows for example)
- go

Here is an example;

```

# simdata :: simulation task:
project      = 'sim2'          # root for output files
complist    = ''              # [optional] component list table to observe
modelimage  = 'demo'         # model sky image name
inbright    = 'unchanged'    # set peak surface brightness in Jy/pixel or "unchanged"
ignorecoord = True           # change model coordinates
startfreq   = '230GHz'       # [only if ignorecoord=T] frequency of first channel
chanwidth   = '400MHz'       # [only if ignorecoord=T] channel width
refdate     = '2012/05/21/22:05:00' # center time/date of observation *see help
totaltime   = '7200s'        # total time of observation
integration  = '10s'         # integration (sampling) time
scanlength  = 5              # number of integrations per pointing in the mosaic
direction   = ['J2000.0Jh00m00 -23d00m00'] # mosaic center, or list of pointings
pointingspacing = 'larcmin'  # spacing in between beams in mosaic
mosaicsize  = ['1.0arcmin', '1.0arcmin'] # angular size of desired area to map [*NEMO*]
caldirection = ''           # pt source calibrator [experimental]
calflux     = '1Jy'         # flux of calibrator
checkinputs = 'no'          # graphically verify parameters [yes|no|only]
antennalist = '/Users/takakuwa/CASA/casa_data_and_scripts/newconfigs/alma.out01.cfg' # antenna position file
noise_thermal = False      # add thermal noise
cell        = '0.2arcsec'   # output cell/pixel size
imsize     = [512, 512]    # output image size in pixels (x,y)
threshold  = '0.01mJy'     # flux level (+units) to stop cleaning
niter      = 15000         # maximum number of iterations
psfmode    = 'clark'       # minor cycle PSF calculation method
weighting  = 'natural'     # weighting to apply to visibilities
uvtaper    = False         # apply additional uv tapering of visibilities.
stokes     = 'I'           # Stokes params to image
fidelity   = True          # Calculate fidelity images
display    = True          # Plot simulation result images, figures
verbose    = False         #
async      = False         # If true the taskname must be started using simdata(...)

CASA (14): go
----> go()
Executing: simdata()
[simdata] predicting from sim2.demo.coord
0%...10...20...30...40...50...60...70...80...90...100%
[simdata] clean(vis='sim2.ms', imagename='sim2_clean', niter=15000, threshold='0.01mJy', ftmachine='ft', imsize=[512, 512], cell=['0.2000000
0arcsec', '0.200000000arcsec'], phasecenter='J2000 00:00:00.00 -023.00.00.00')
0%...10...20...30...40...50...60...70...80...90...100%
CASA (15): █

```

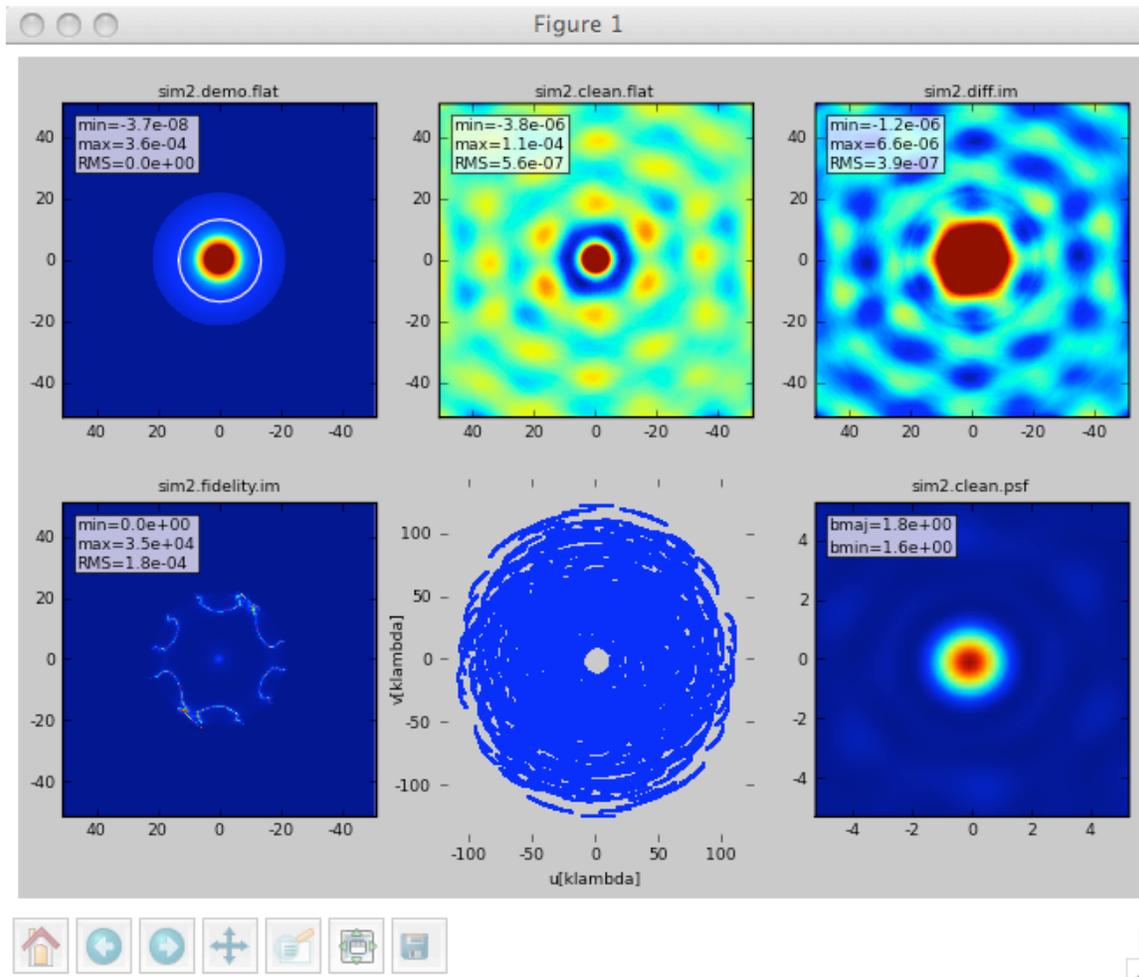
``modelimage`` is the name of the image file. ``startfreq``, ``chanwidth`` specify the frequency in the first correlator channel and the channel width, respectively. ``totaltime`` and ``integration`` specify the total observing time and the sampling time, respectively. ``direction`` is the source coordinate. ``antennalist`` specifies the text file of the ALMA antenna coordinates (i.e., baselines). ``cell``, ``imsize`` specify the resultant image cell size and the dimensions. ``niter`` is the maximum iteration of CLEAN, and ``weighting`` and ``uvtaper`` specify imaging weighting and taper parameters.

For more details, you can read the help file;

➤ help simdata

You can obtain some detailed instruction on simdata.

and the result is;



The above example is an observing simulation of the extended ( $\sim 40''$ ) disk with the 12-m array at high angular resolution, and hence the extended components are significantly missed.

Simdata is sophisticated, with lots of parameters that you can play with. Basic understanding of interferometric imaging is required to use it properly.