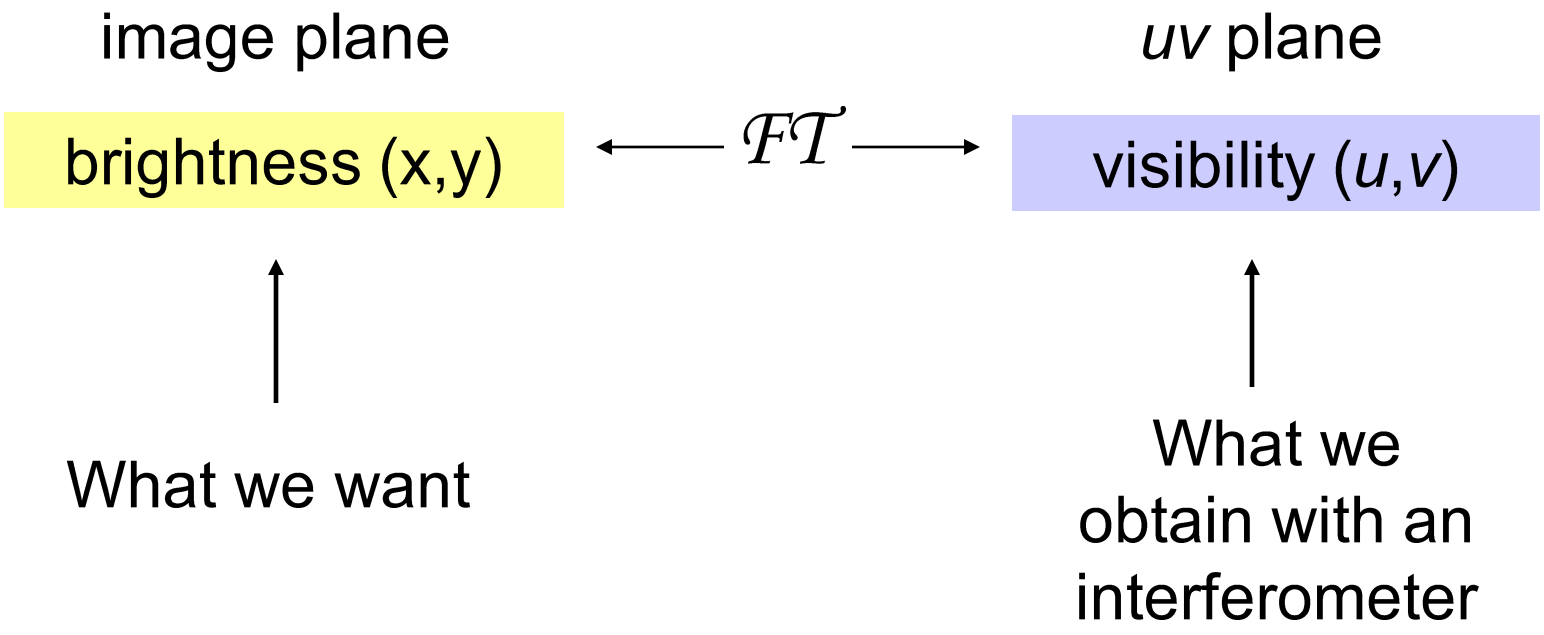
UV-data analysis in practice

Cinthya Herrera Contreras

General Picture



General Picture

image plane

brightness (x,y)

uv plane

visibility (*u*,*v*) instr

IPB data

(raw data)

Calibration

hpb files

lmv* (gdf)

brightness (x,y) *uv*

Gridding

FFT

Cleaning

visibility (*u*,*v*) obs

***uv*-table**

• Data processed enough to have removed all instrumental contribution

• Data raw enough to access to observational characteristics: baseline, scan, weight, etc.

• Data not yet affected by the 'imaging process': assumptions, interpolations, computations, etc.

Summary

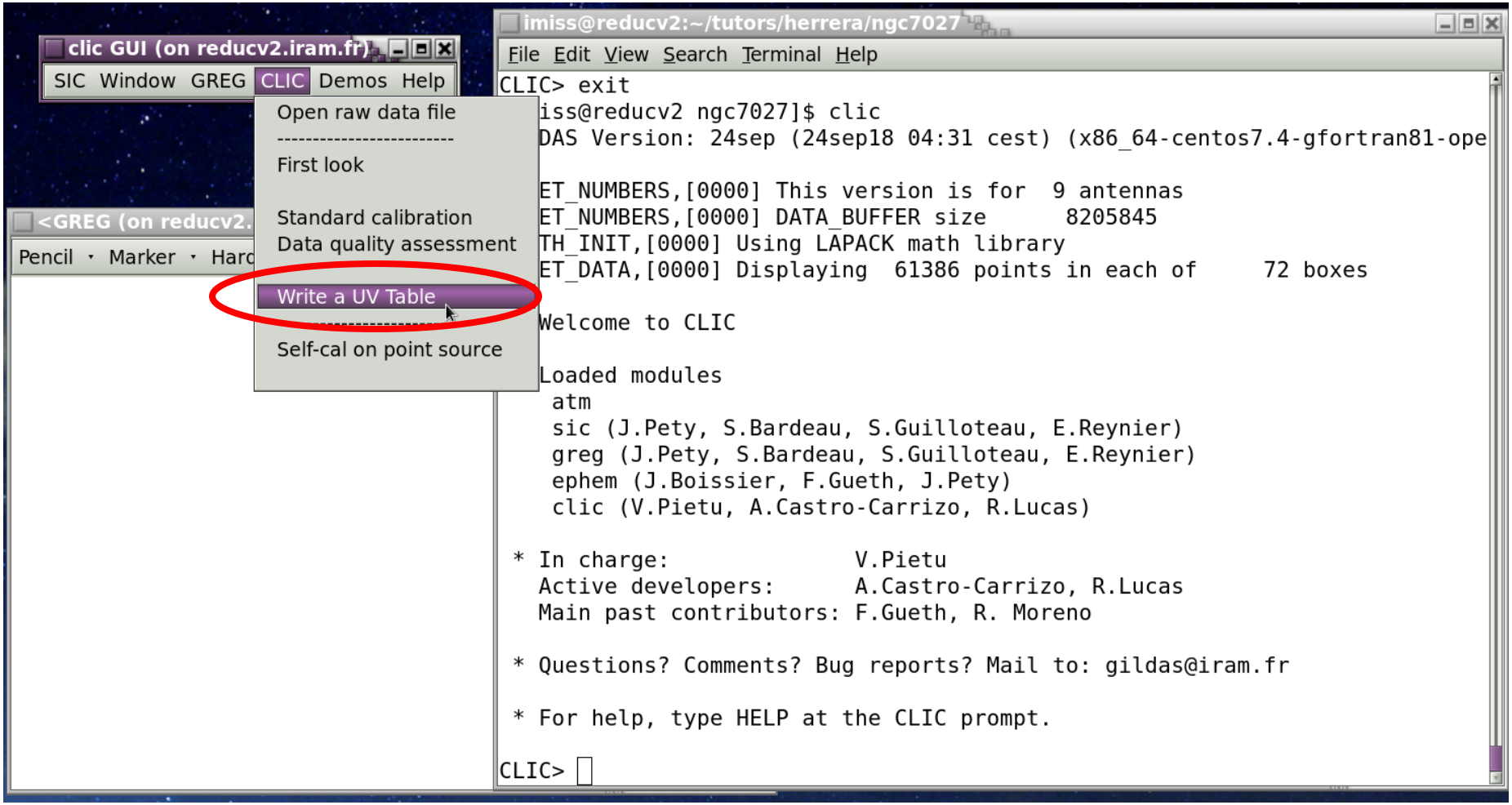
1. Let's create a uv-table, in CLIC
2. Data analysis, in MAPPING

   - Data analysis in the *uv*-plane
   - An inspection of the *uv*-data needed

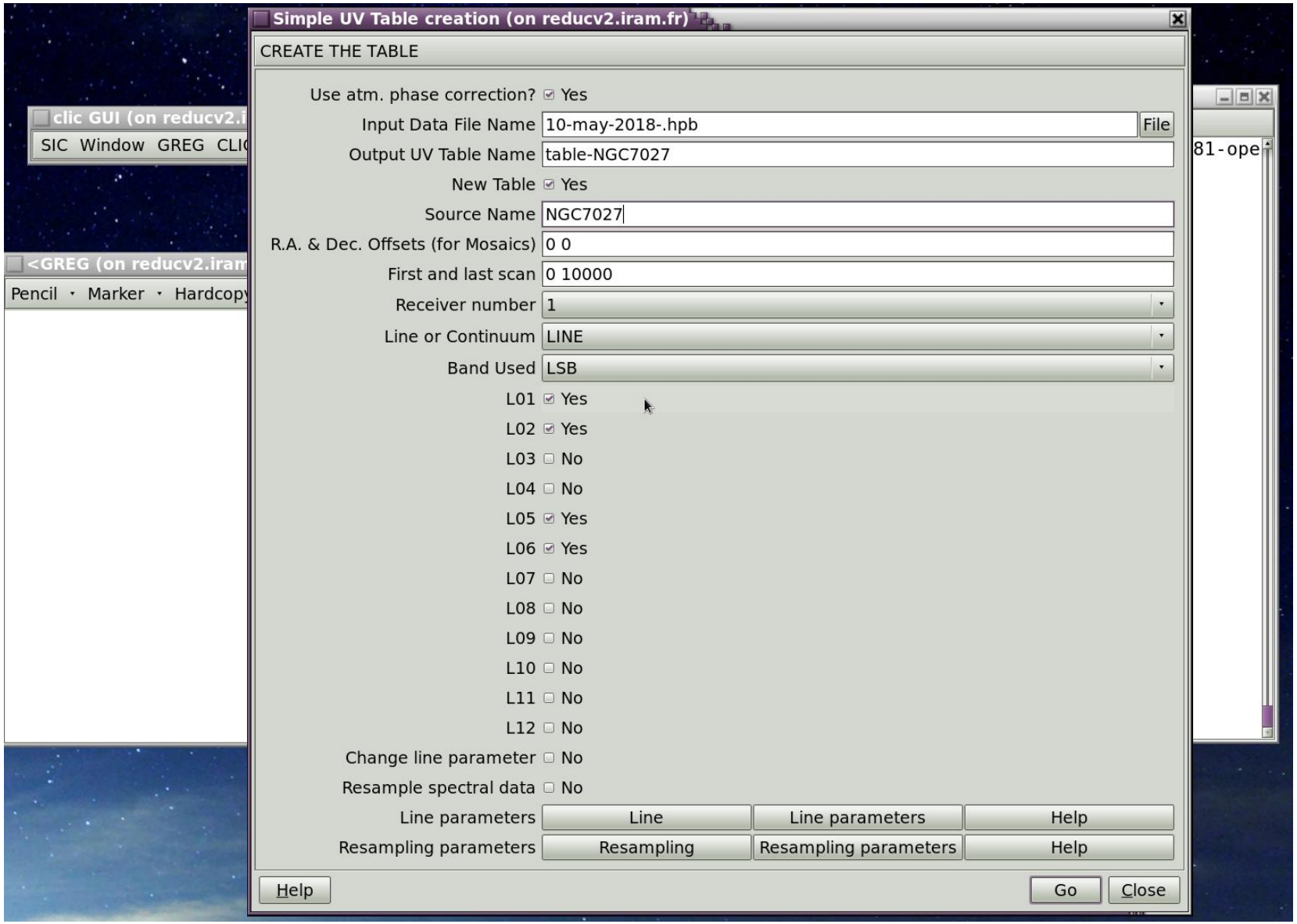
Let’s create a table (“mytable”.uvt),

in CLIC

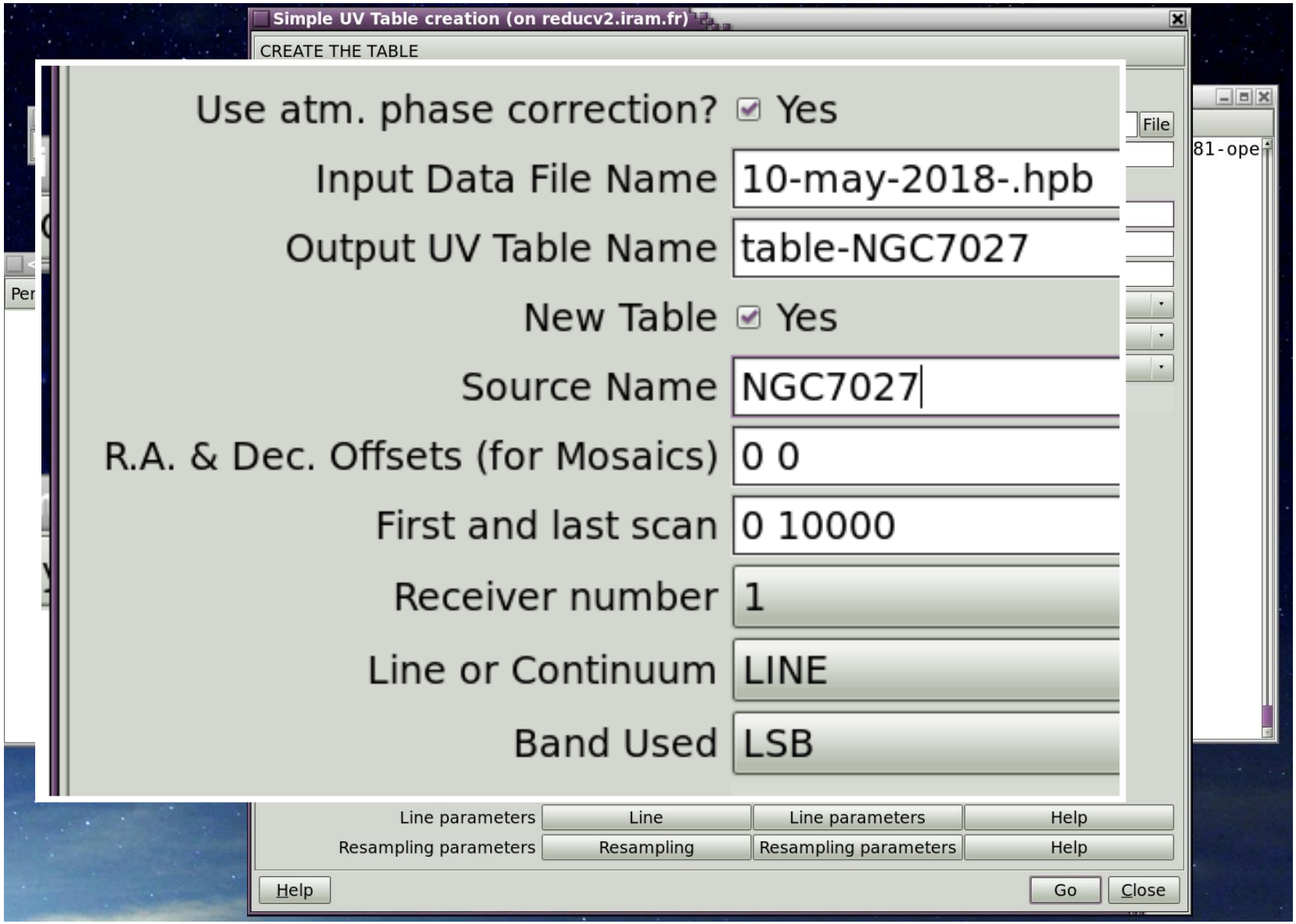
Creating a *uv*-table; CLIC



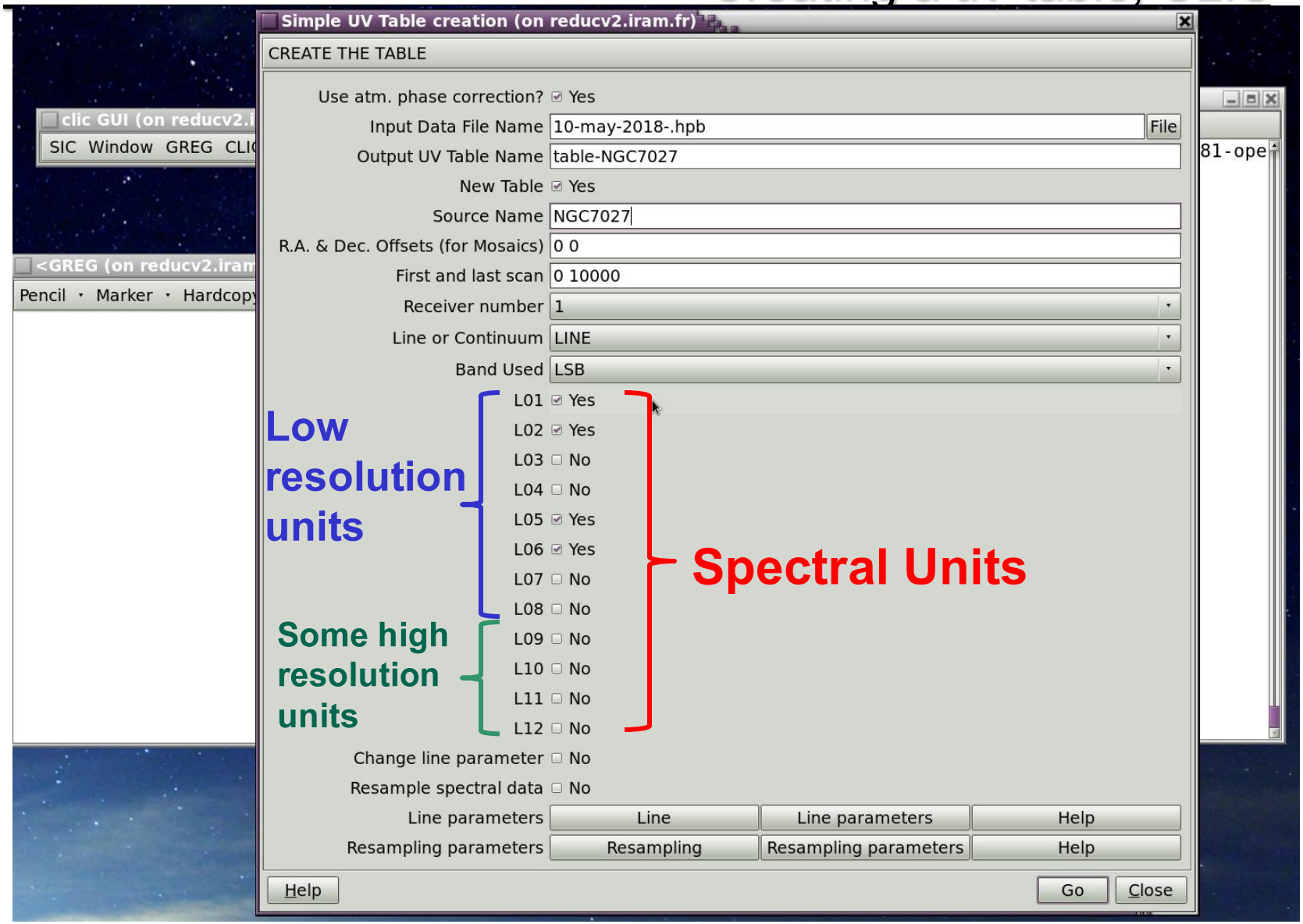
Creating a *uv*-table; CLIC



Creating a *uv*-table; CLIC

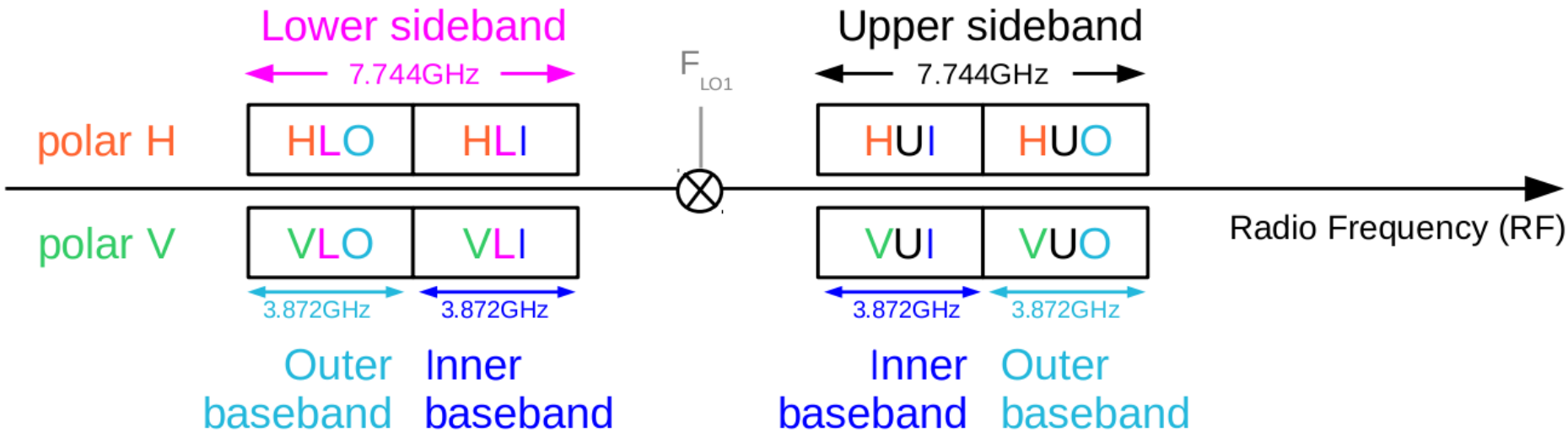


Creating a *uv*-table; CLIC



Creating a *uv*-table; CLIC

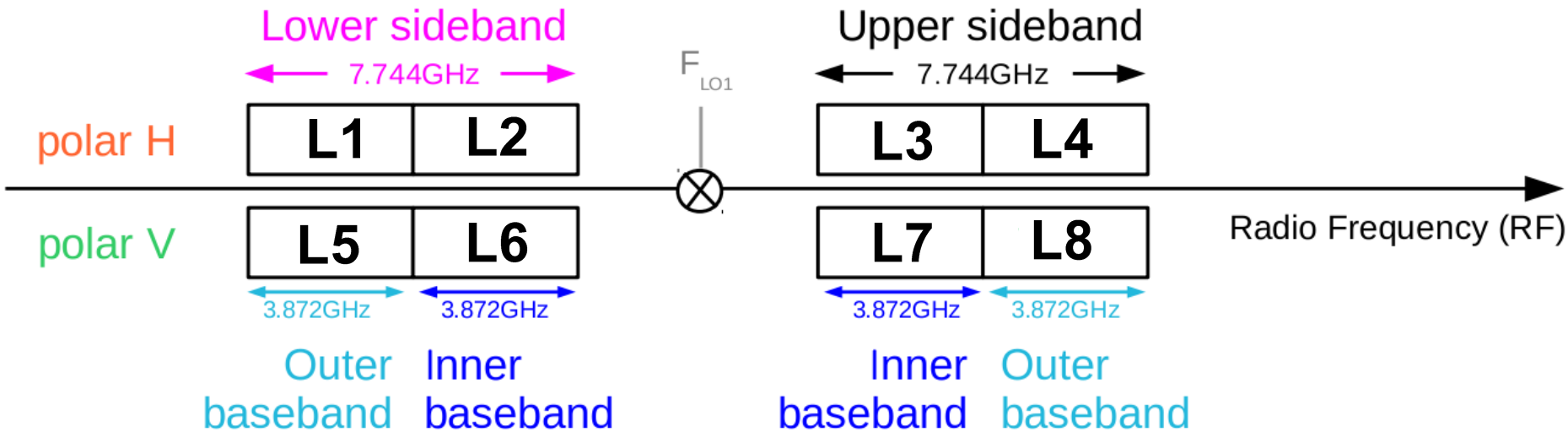
PolyFix



… more about PolyFiX on Friday morning

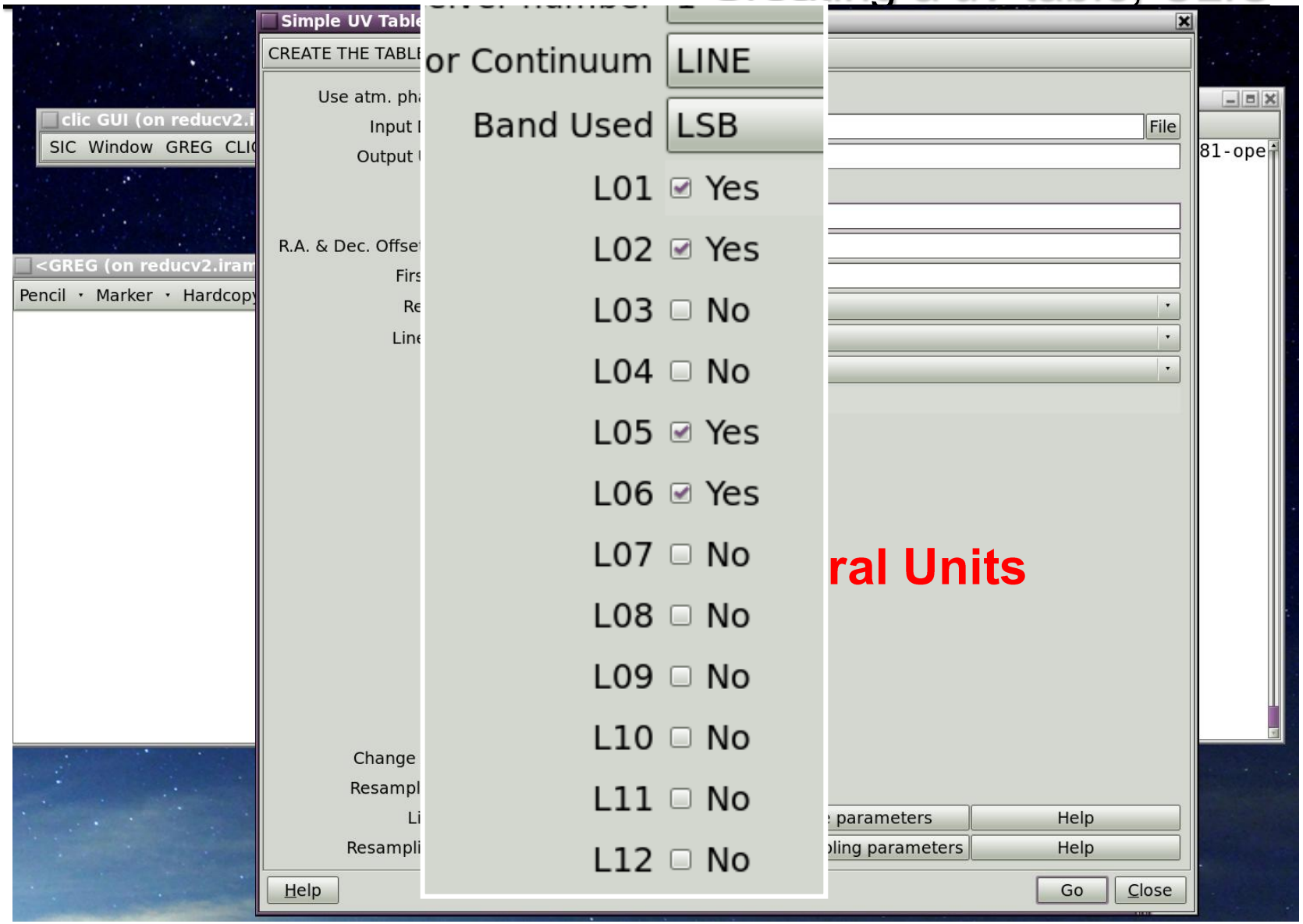
Creating a *uv*-table; CLIC

PolyFix



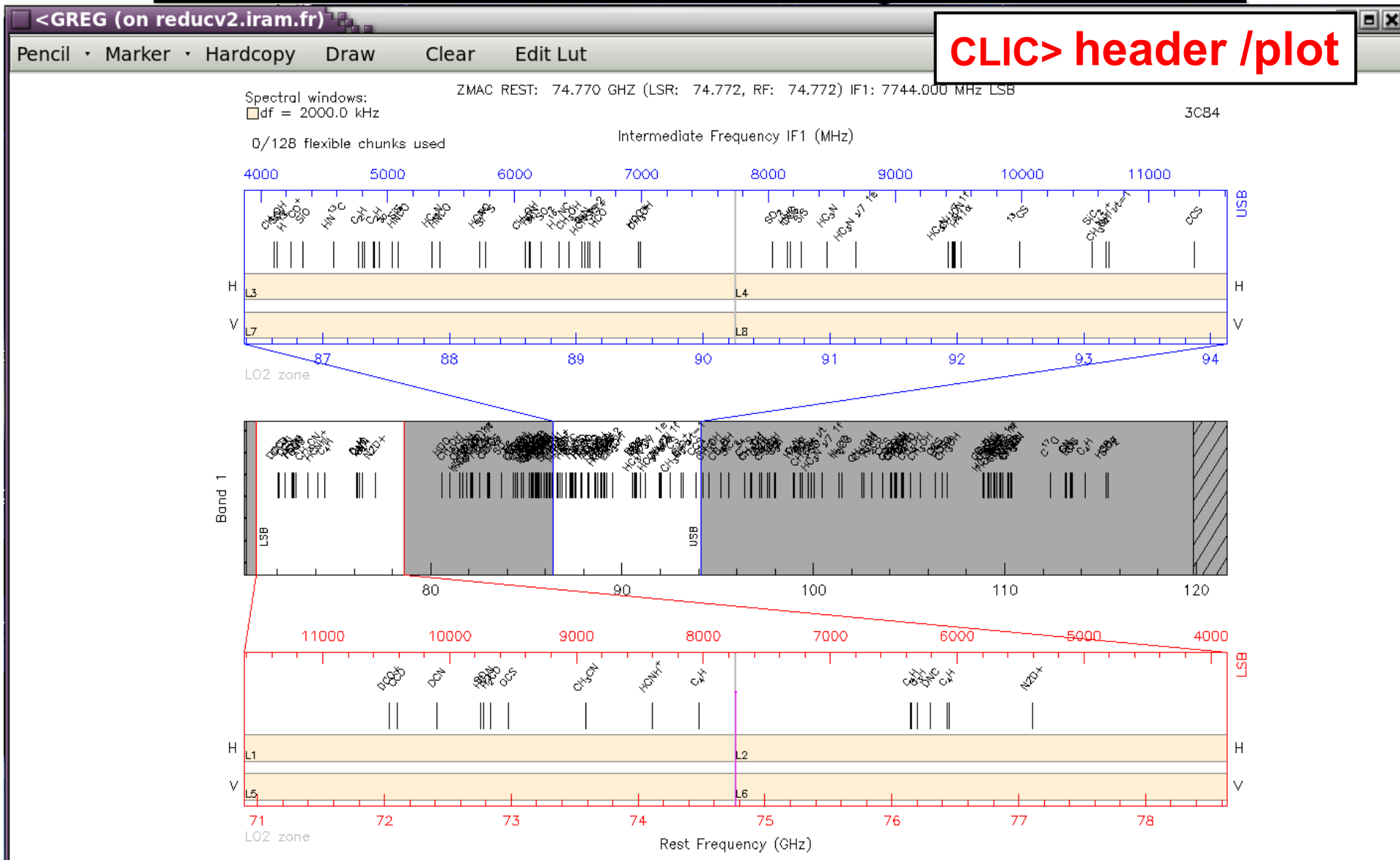
… more about PolyFiX on Friday morning

Creating a *uv*-table; CLIC

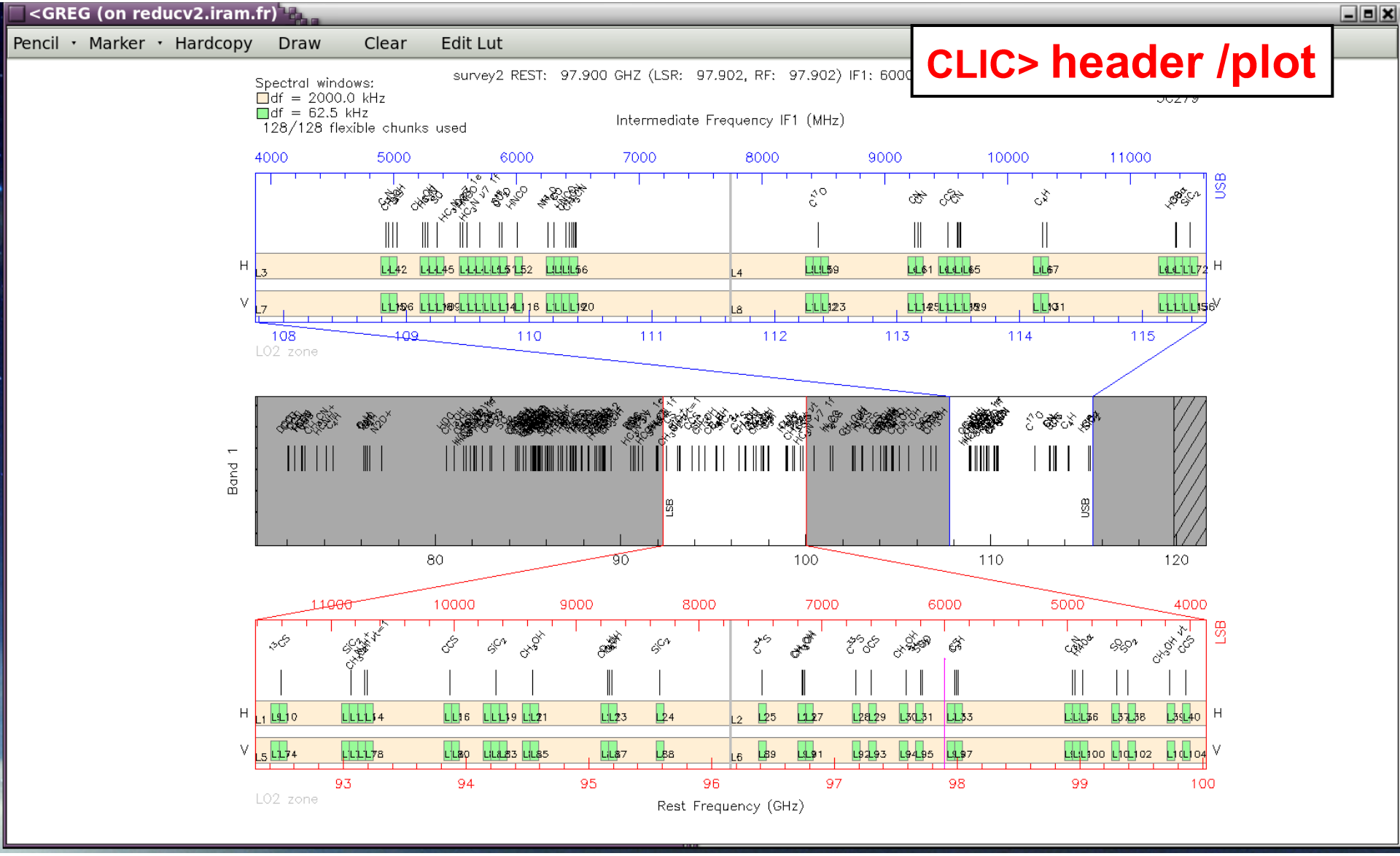


Creating a *uv*-table; CLIC

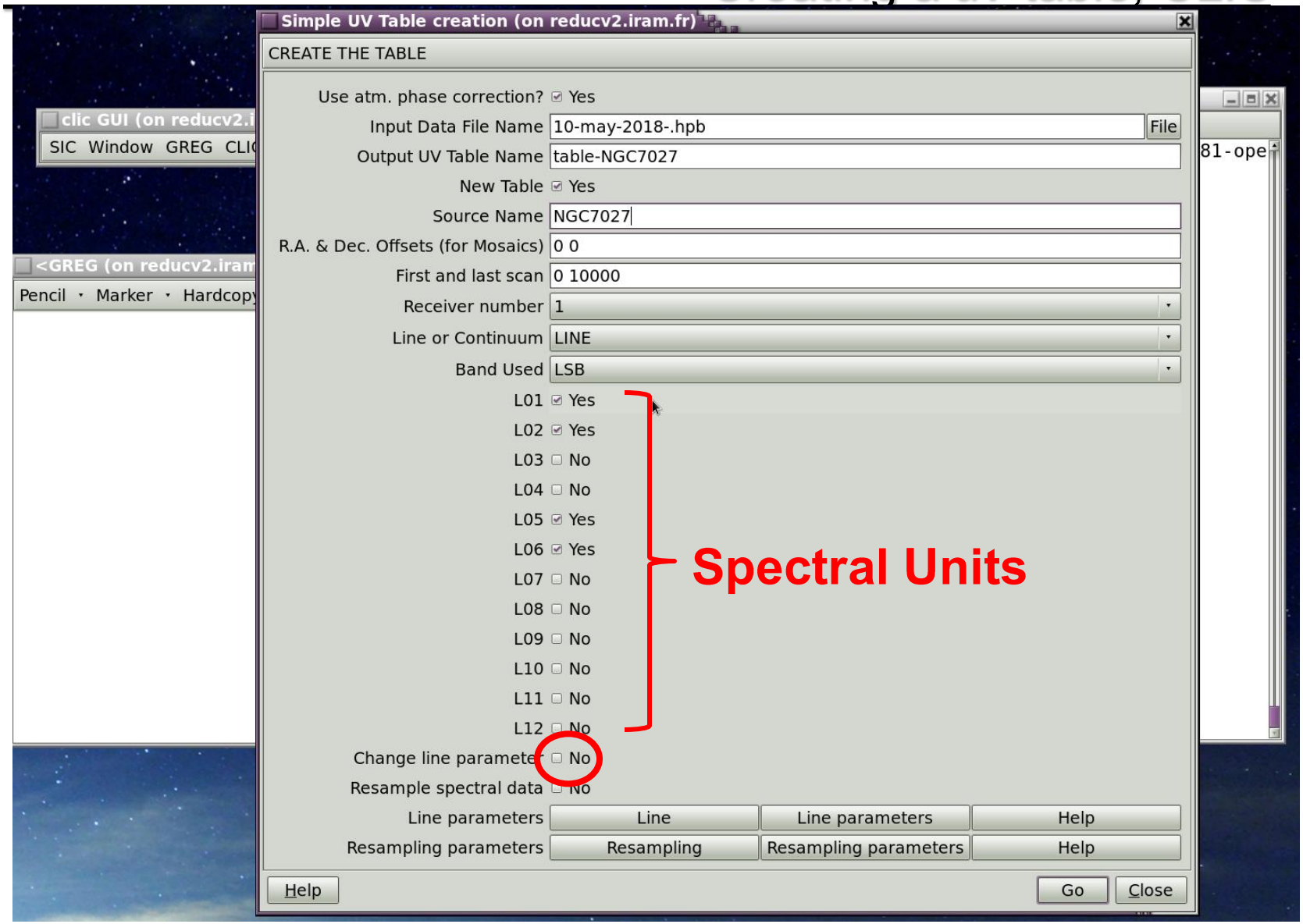
CLIC> header /plot



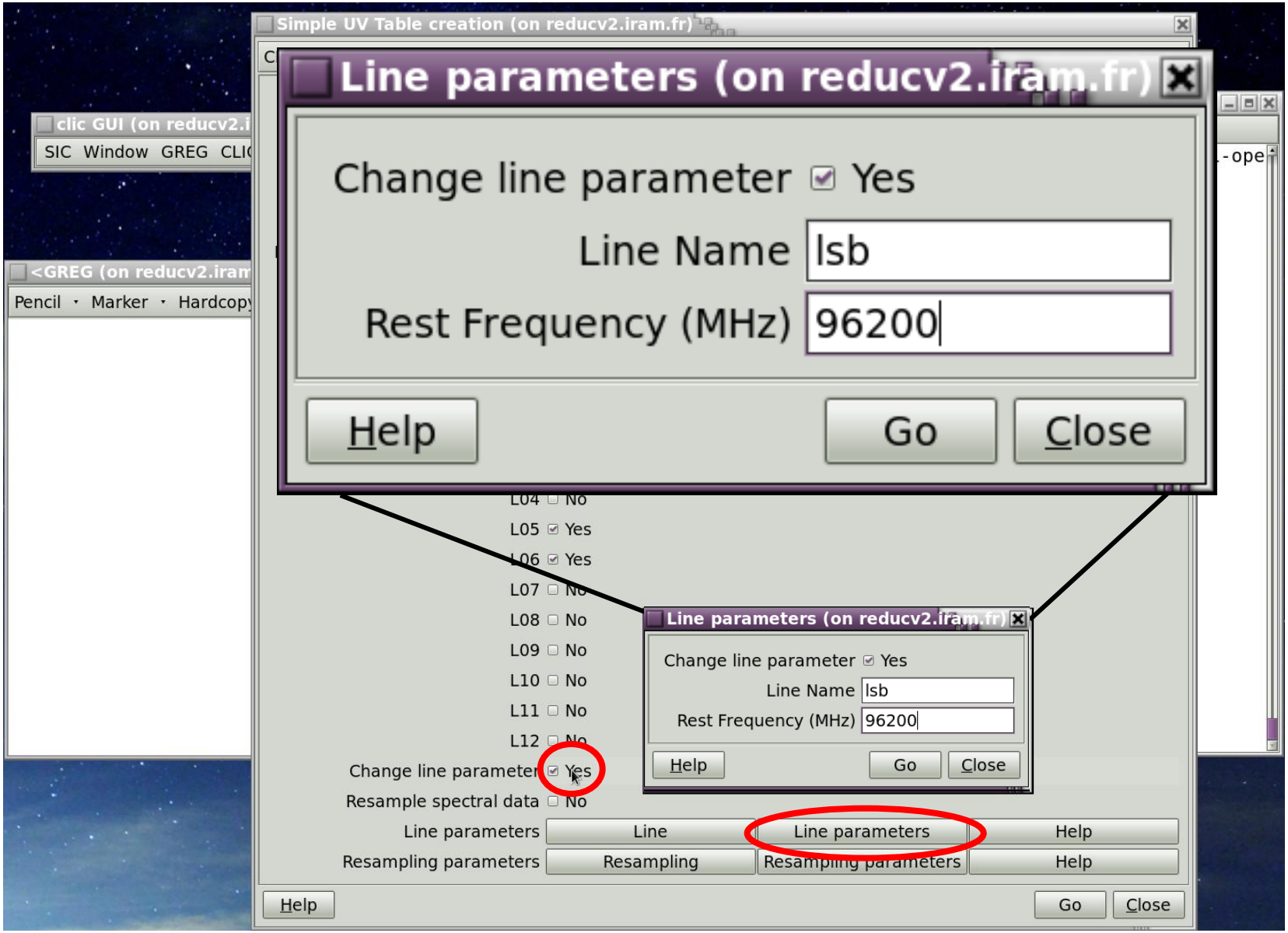
Creating a *uv*-table; CLIC



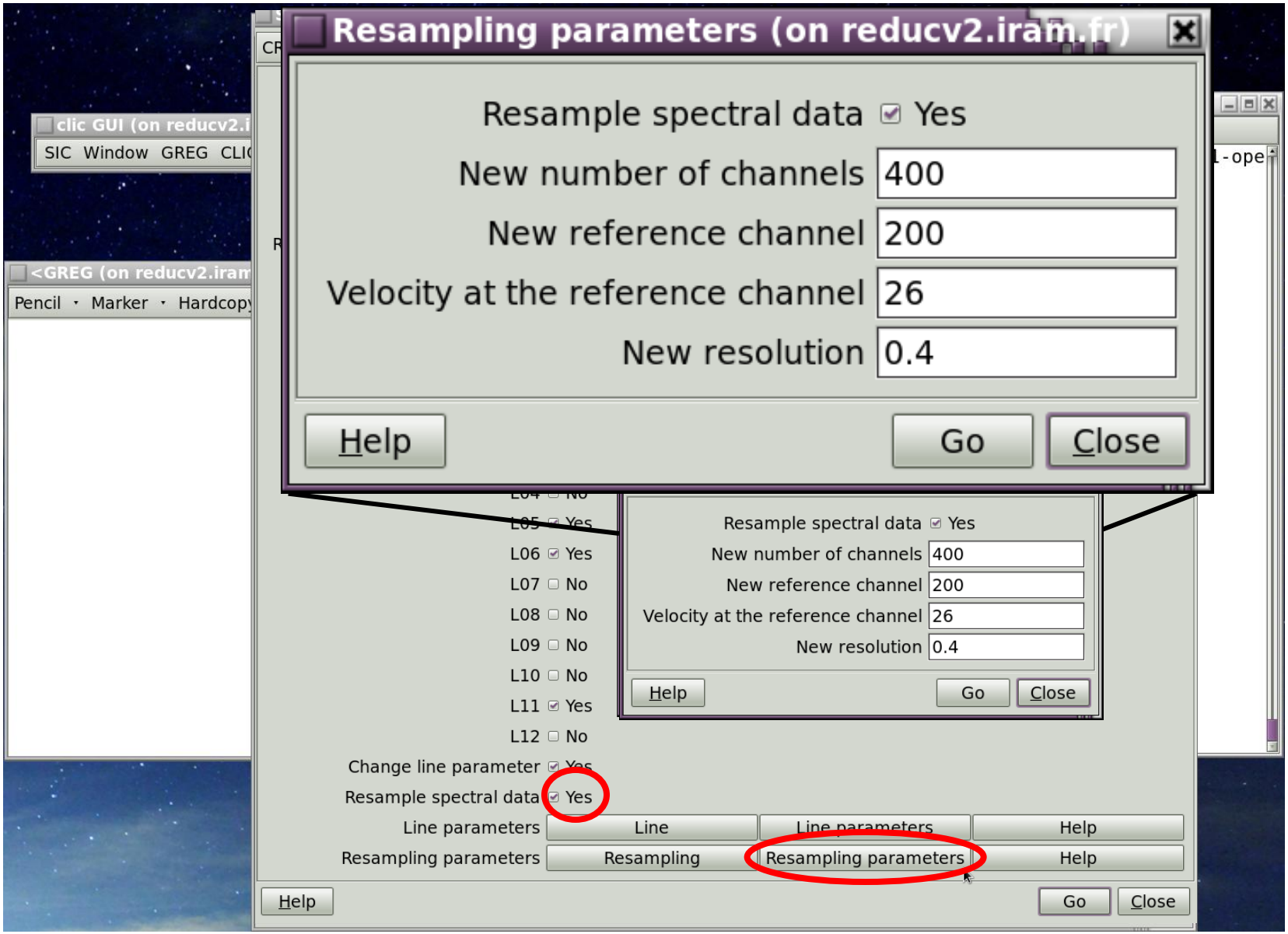
Creating a *uv*-table; CLIC



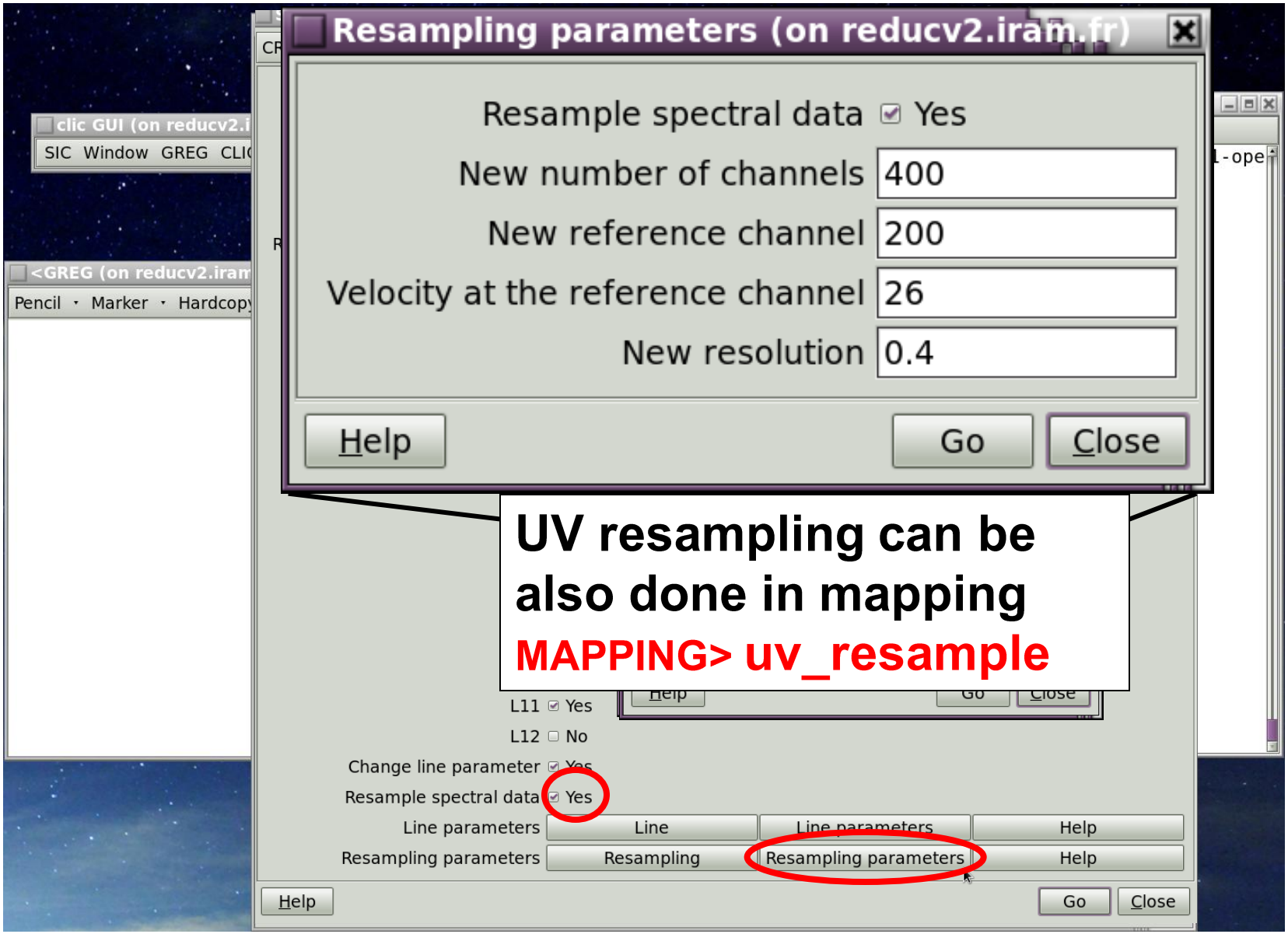
Creating a *uv*-table; CLIC



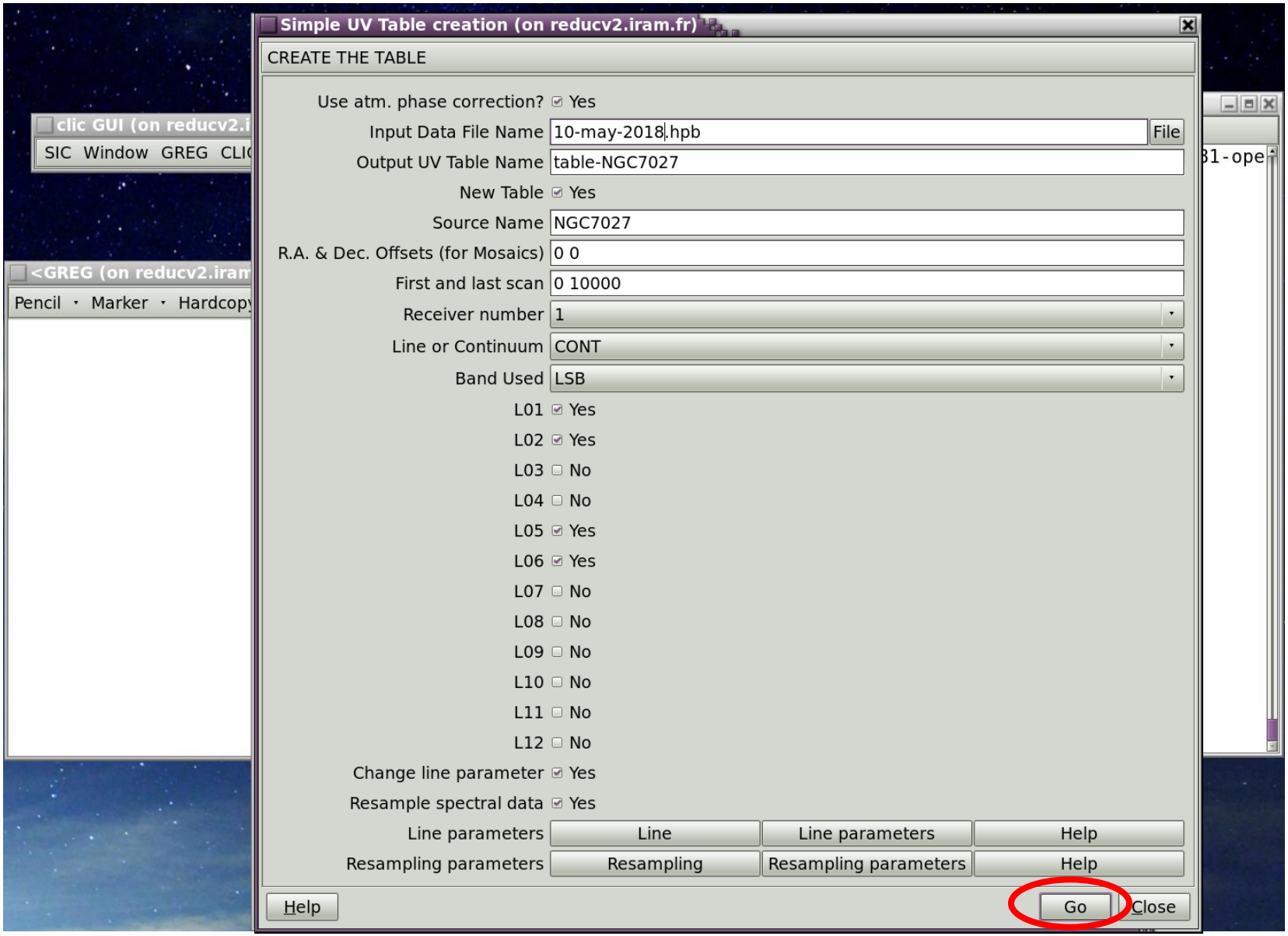
Creating a *uv*-table; CLIC



Creating a *uv*-table; CLIC



Creating a *uv*-table; CLIC



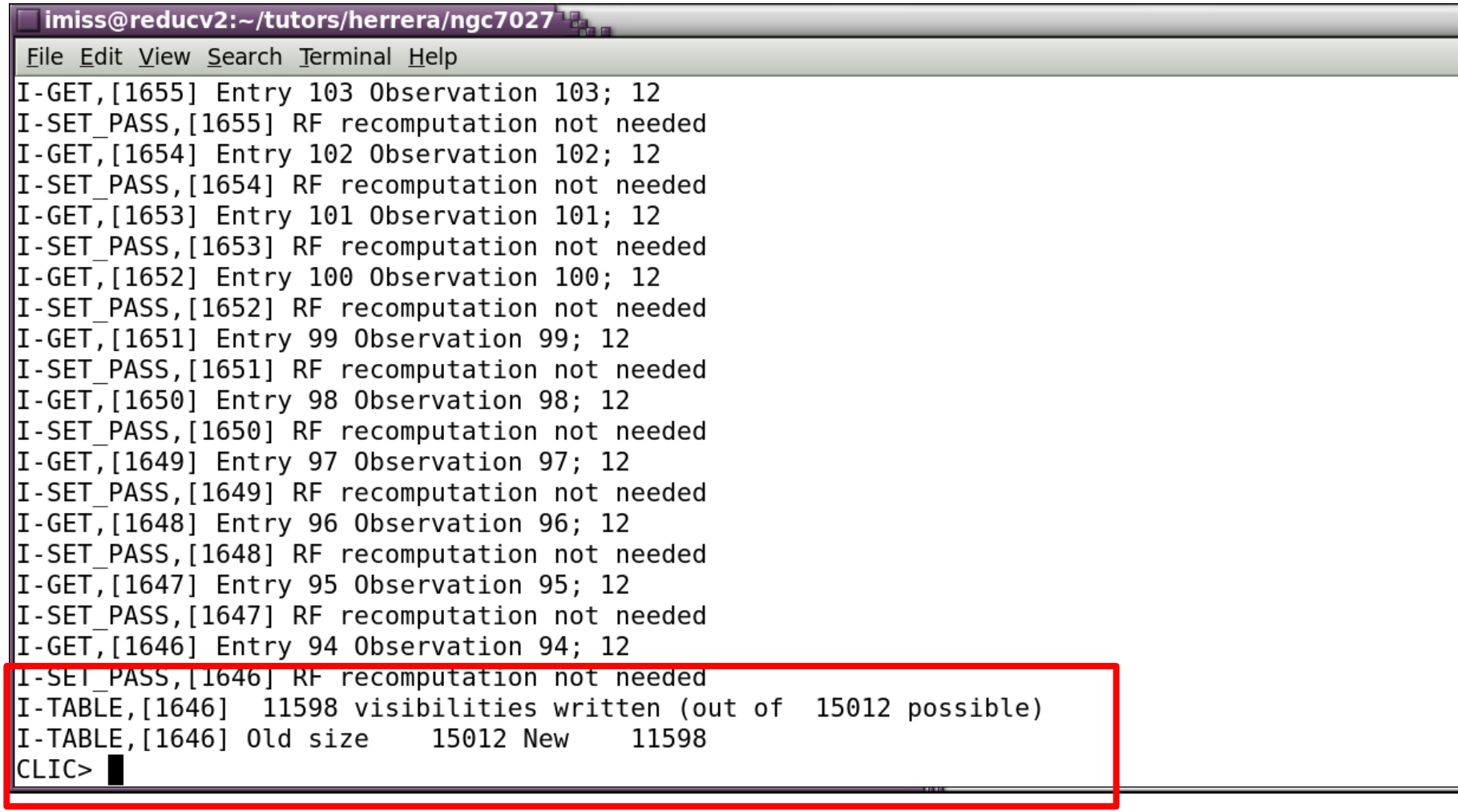
Creating a *uv*-table; CLIC

imiss@reducv2:~/tutors/herrera/ngc7027

File Edit View Search Terminal Help

```
 RF Passband Calibration is applied
 RF Passband Calibration is frequency dependent
 RF Passband Calibration is antenna-based
 RF Passband Calibration from input file
 Selection is LINE, LSB     ,  L001 L002 L005 L006
 All frequencies selected.
I-FIND,[1645] New generation receivers data
I-FIND,[1645]        417 observations found
I-GET,[2324] Entry 935 Observation 935; 26
I-SET_DATA,[2324] Displaying  61386 points in each of     72 boxes
 I-CLIC,  Primary beam size    52.3908539     "
I-GET,[2323] Entry 934 Observation 934; 26
W-TABLE,[2323] Spectrum resampling is needed, obs. #   934 Scan  2323
W-TABLE,[2323]  Frequency resolutions :   1.9999642372131348      -0.12835546574489437
W-TABLE,[2323]  Reference channels :   1951.9847154268400        200.00000000000000
W-TABLE,[2323]  Number of channels :                 3859                    400
I-GET,[2322] Entry 933 Observation 933; 26
I-GET,[2321] Entry 932 Observation 932; 29
I-GET,[2320] Entry 931 Observation 931; 32
I-GET,[2319] Entry 930 Observation 930; 32
I-GET,[2318] Entry 929 Observation 929; 32
I-GET,[2317] Entry 928 Observation 928; 27
I-GET,[2316] Entry 927 Observation 927; 27
```

Creating a *uv*-table; CLIC



Creating a *uv*-table; CLIC

imiss@reducv2:~/tutors/herrera/ngc7027

File Edit View Search Terminal Help

```
CLIC> $cat table-NGC7027-table.clic
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018.hpb"
!
set default
set scan 0 10000
set offset 0 0
set receiver 1
set quality AVERAGE
set weight tsys on
set weight calibration on
set phase antenna atmospher internal relative
set amplitude antenna absolute jansky relative
set rf_passband antenna frequency file on
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200             /res 400 200 26 0.4 velo
CLIC>
```

Easy and faster editable script

table-NGC7027-table.clic - emacs@reducv2.iram.fr (on reducv2

File Edit Options Buffers Tools F90 Help

```
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018.hpb"
!
set default
set scan 0 10000
set offset 0 0
set receiver 1
set quality AVERAGE
set weight tsys on
set weight calibration on
set phase antenna atmospher internal relative
set amplitude antenna absolute jansky relative
set rf_passband antenna frequency file on
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200 /res 400 200 26 0.4 velo
```

Calibration definitions

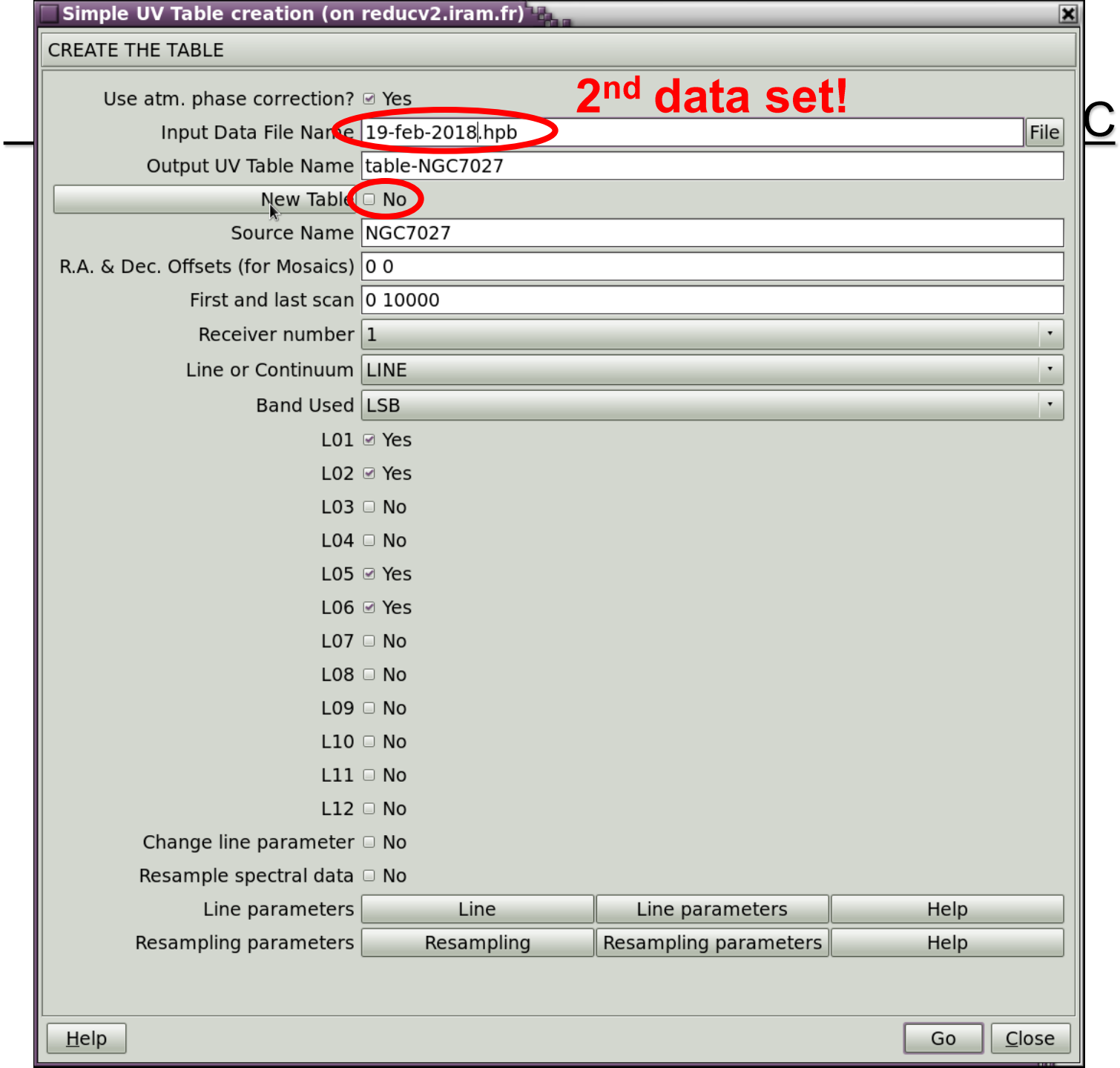

Simple UV Table creation (on reducv2.iram.fr)
CREATE THE TABLE
2nd data set!
Use atm. phase correction? Yes
Input Data File Name 19-feb-2018.hpb
File
Output UV Table Name table-NGC7027
New Table No
Source Name NGC7027
R.A. & Dec. Offsets (for Mosaics) 0 0
First and last scan 0 10000
Receiver number 1
Line or Continuum LINE
Band Used LSB
L01 Yes
L02 Yes
L03 No
L04 No
L05 Yes
L06 Yes
L07 No
L08 No
L09 No
L10 No
L11 No
L12 No
Change line parameter No
Resample spectral data No
Line parameters
Line
Line parameters
Help
Resampling parameters
Resampling
Resampling parameters
Help
Help
Go
Close

table-NGC7027-table.clic - emacs@reducv2.iram.fr (on reducv2.iram.fr)

File Edit Options Buffers Tools F90 Help

```
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018.hpb"
!
set default
set scan 0 10000
set offset 0 0
set receiver 1
set quality AVERAGE
set weight tsys on
set weight calibration on
set phase antenna atmospher internal relative
set amplitude antenna absolute jansky relative
set rf_passband antenna frequency file on
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200 /res 400 200 26 0.4 velo
!
!-------------------------------------------------------
!
file in "19-feb-2018.hpb"
!
set default
set scan 0 10000
set offset 0 0
set receiver 1
set quality AVERAGE
set weight tsys on
set weight calibration on
set phase antenna atmospher internal relative
set amplitude antenna absolute jansky relative
set rf_passband antenna frequency file on
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027
```

1st data set!

2nd data set!

File Edit Options Buffers Tools F90 Help

```
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018-.hpb"
!
set default
set scan 0 10000
set offset 0 0
set receiver 1
set quality AVERAGE
set weight tsys on
set weight calibration on
set phase antenna atmospher internal relative
set amplitude antenna absolute jansky relative
set rf_passband antenna frequency file on
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200 /res 400 200 26 0.4 velo
!
!-------------------------------------------------------
!
file in "19-feb-2018.hpb"
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027
!
!-------------------------------------------------------
!
file in "01-mar-2018.hpb"
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027
```

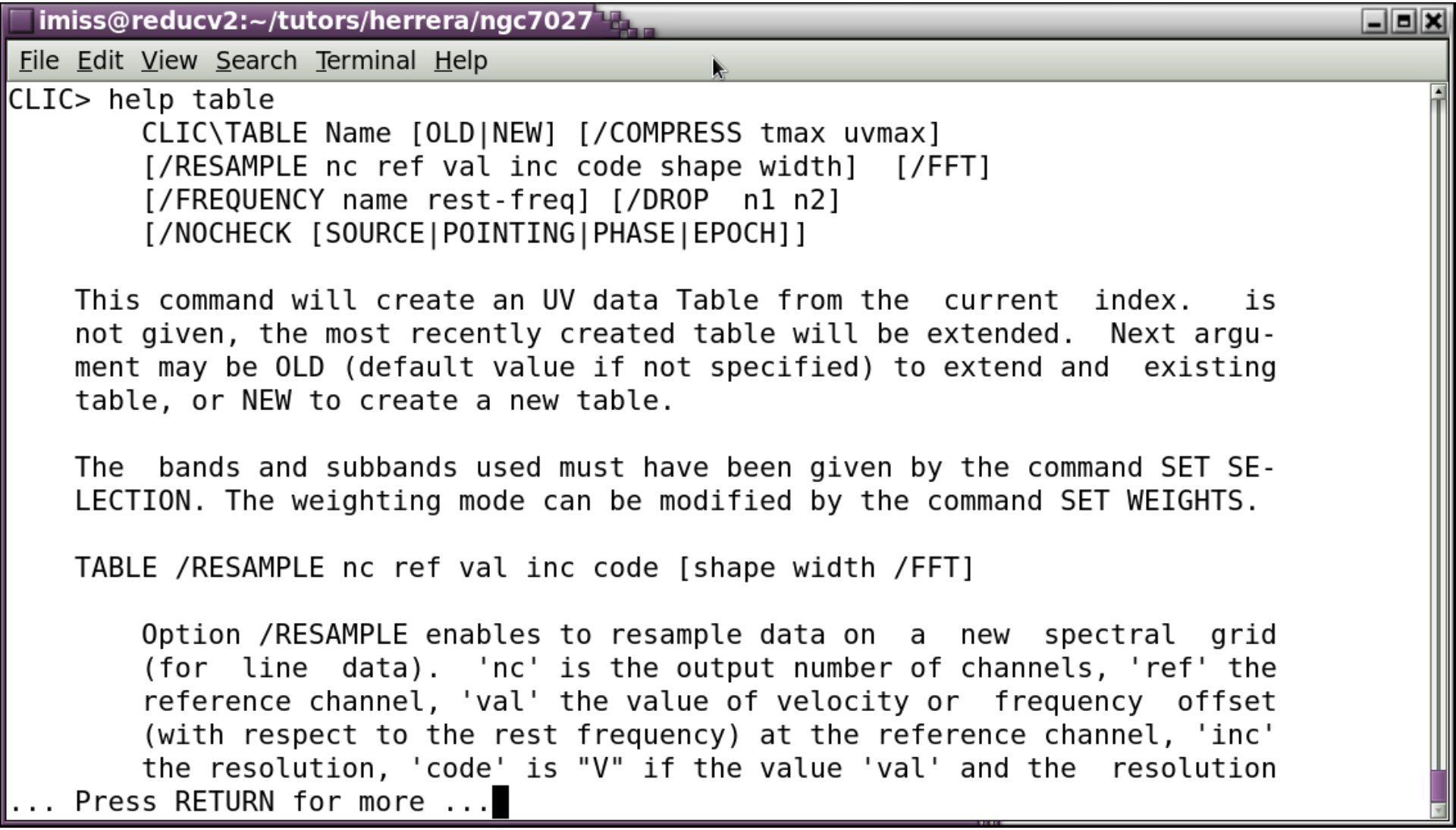
1st data set!

2nd data set!

3rd data set!

-:**- **table-NGC7027-table.clic** All L37 (F90)

Creating a *uv*-table; CLIC



File Edit Options Buffers Tools F90 Help

```
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018-.hpb"
!
set default
set scan 0 10000
set offset 0 0
```

For mosaics:
find /proc corr /source SourceName
table mosaic-source.uvt new /freq lsb 96200 /mosaic

```
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200 /res 400 200 26 0.4 velo
!
!-------------------------------------------------------
!
file in "19-feb-2018.hpb"
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027
!
!-------------------------------------------------------
!
file in "01-mar-2018.hpb"
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027
```

-:**- **table-NGC7027-table.clic**   All L37   (F90)

Note: a bug was found in version **sep18**. You should use version **oct18** (or later)

File Edit Options Buffers Tools F90 Help

```
!
! table-NGC7027-table.clic
!
!
file in "10-may-2018-.hpb"
!
set default
set scan 0 10000
set offset 0 0
```

For mosaics:
find /proc corr /source SourceName
table mosaic-source.uvt new /freq lsb 96200 /mosaic

```
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027 new /freq lsb 96200 /res 400 200 26 0.4 velo
```

For continuum:
Go to MAPPING and:
MAPPING>uv_continuum

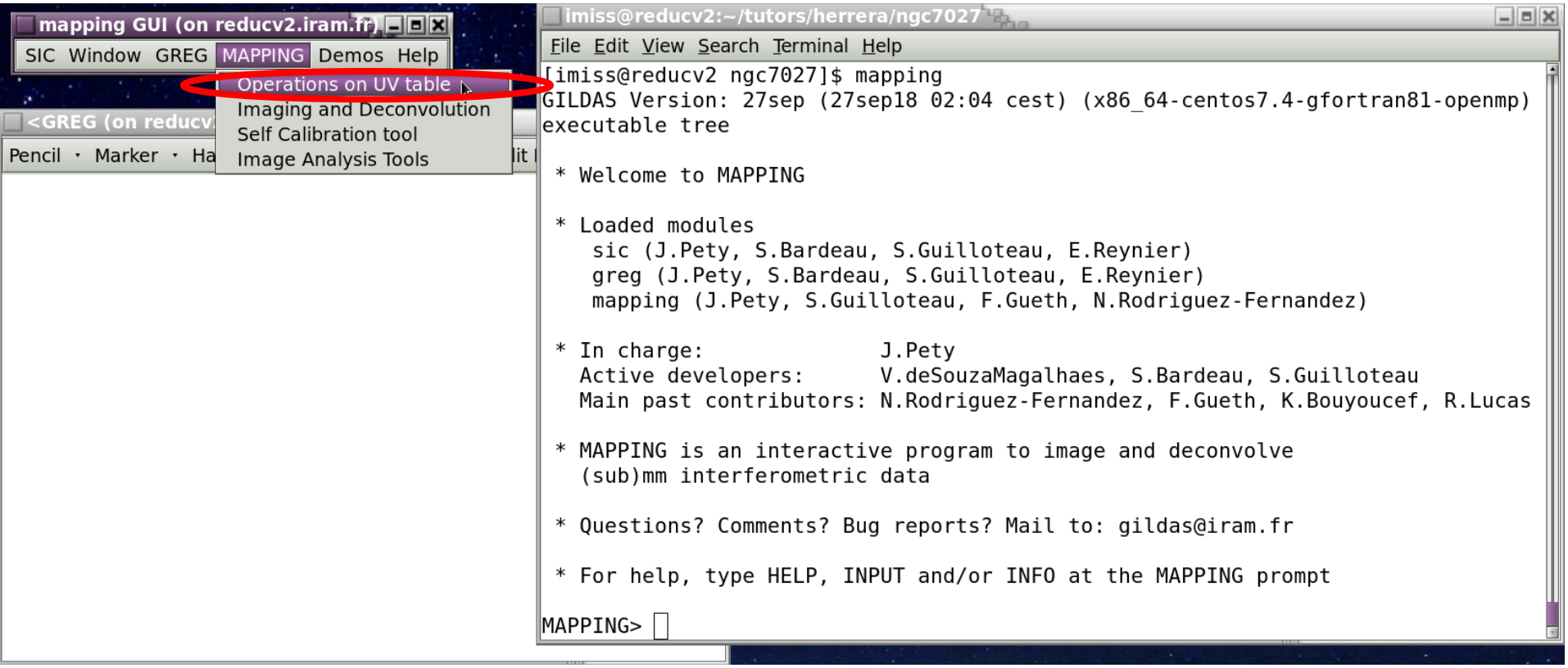
```
!
!-------------------------------------------------------
!
file in "01-mar-2018.hpb"
!
set selection LINE LSB l01 and l02 and l05 and l06
find /proc corr /sou NGC7027
table table-NGC7027


-:**-  table-NGC7027-table.clic   All L37    (F90)
```

Created “mytable”.uvt, in CLIC

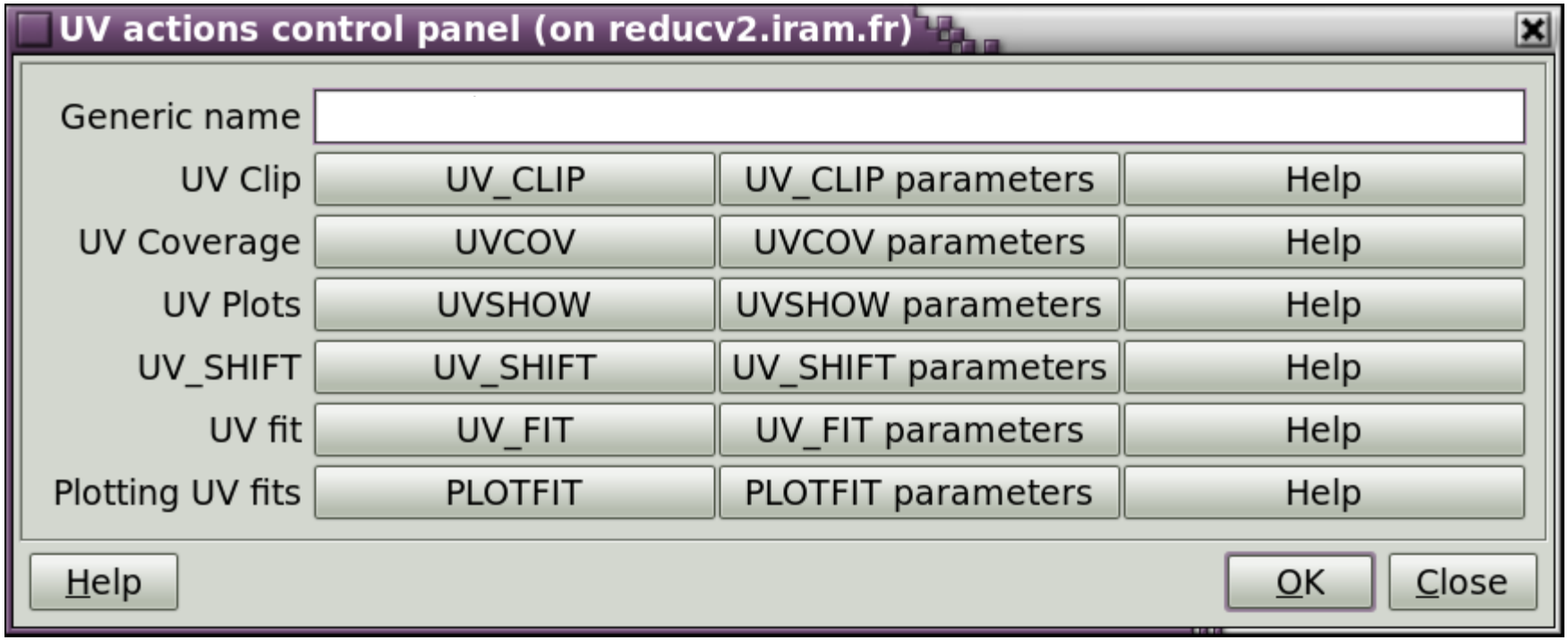
Analyze the data, in MAPPING

1. Data analysis in the *uv*-plane

Data analysis in the *uv*-plane

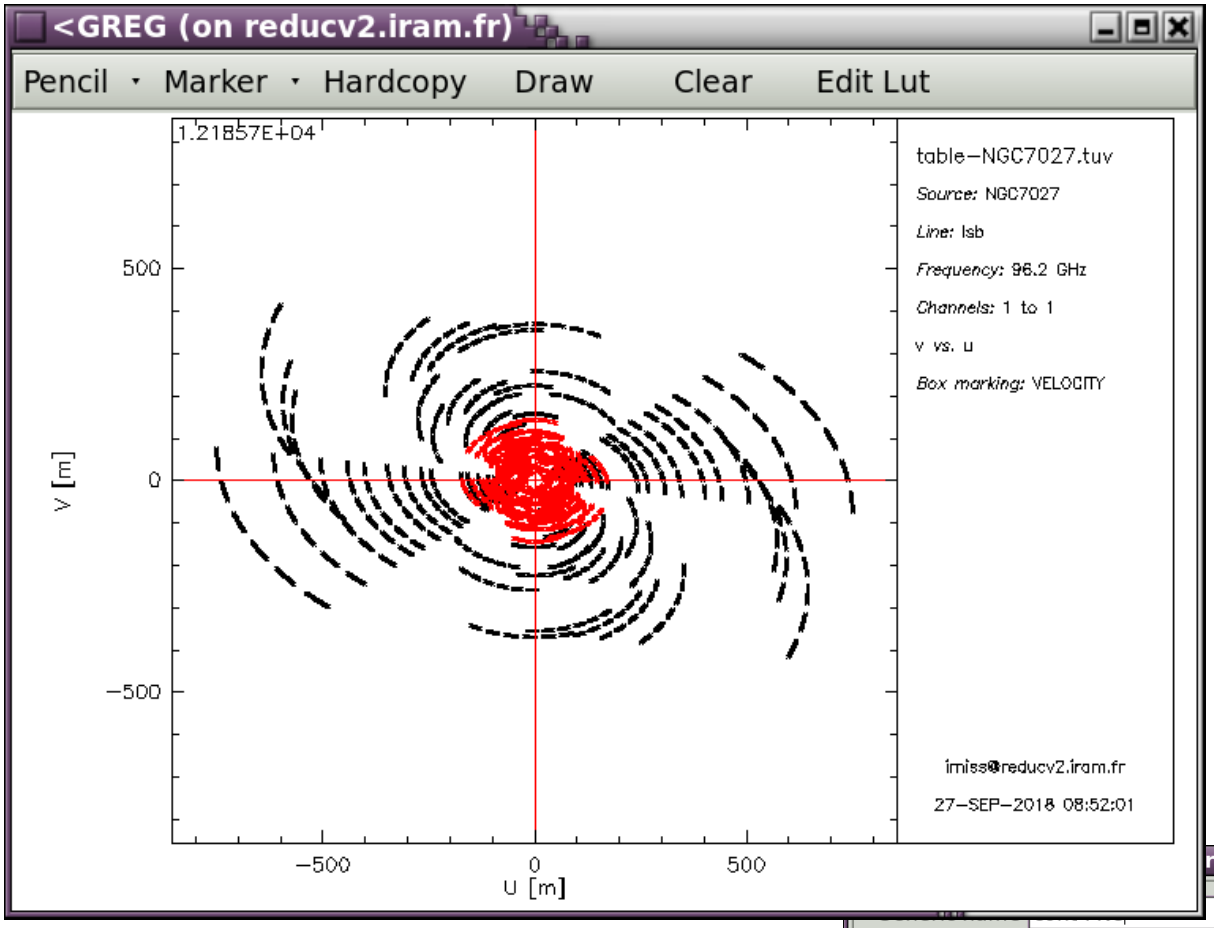


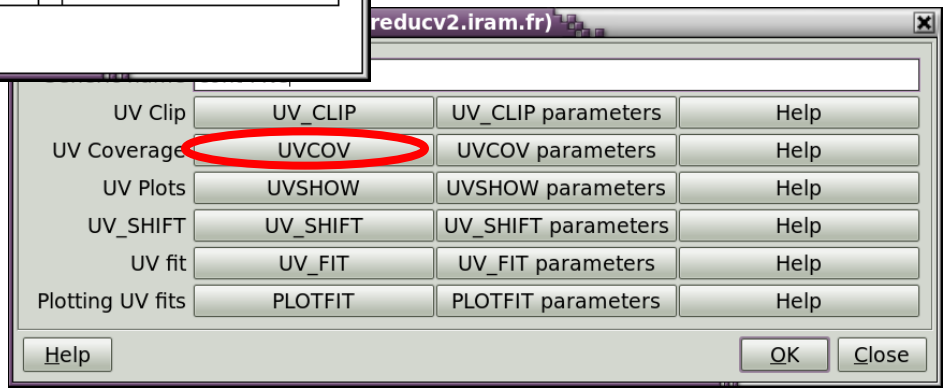
Data analysis in the *uv*-plane



Data analysis in the *uv*-plane

Data analysis in the *uv*-plane





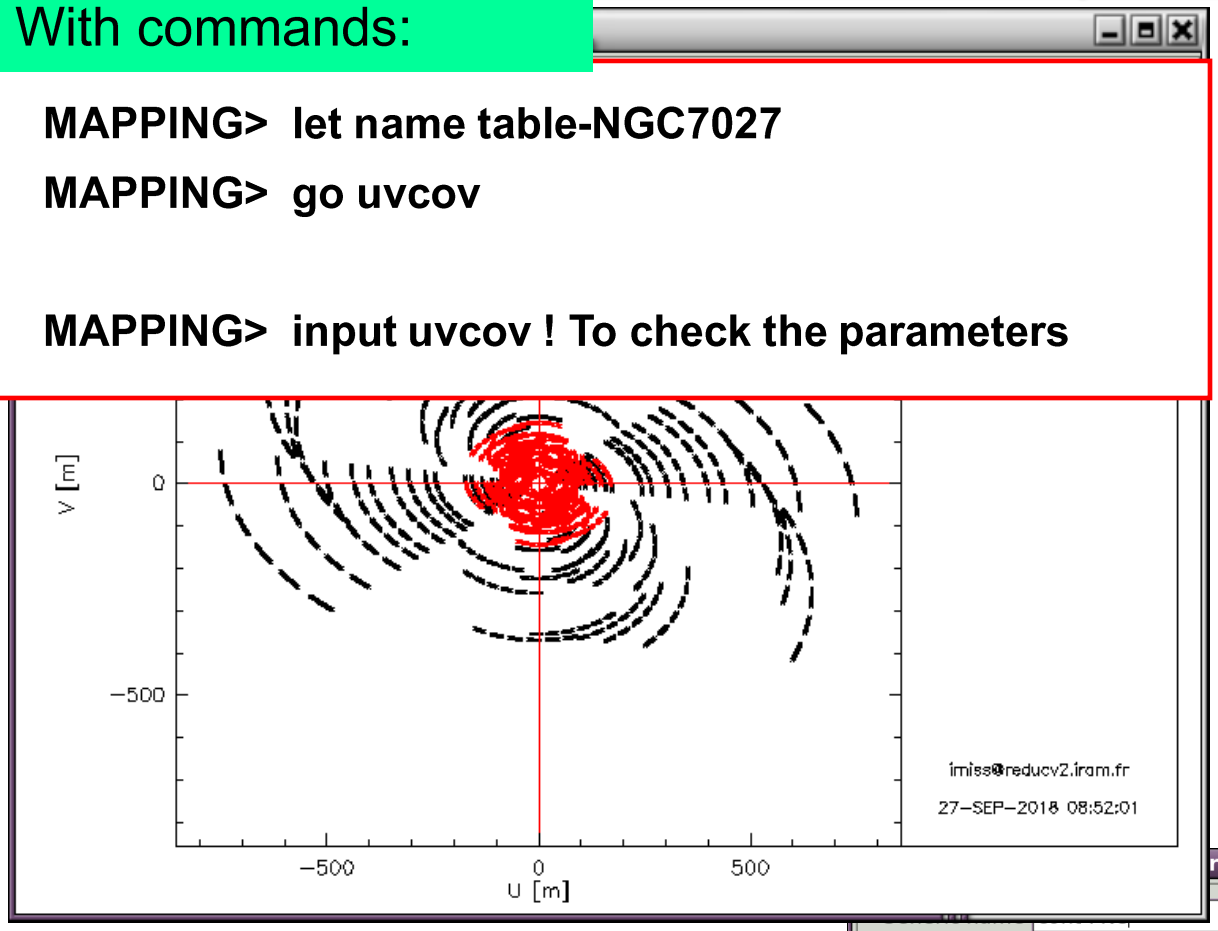
Data analysis in the *uv*-plane

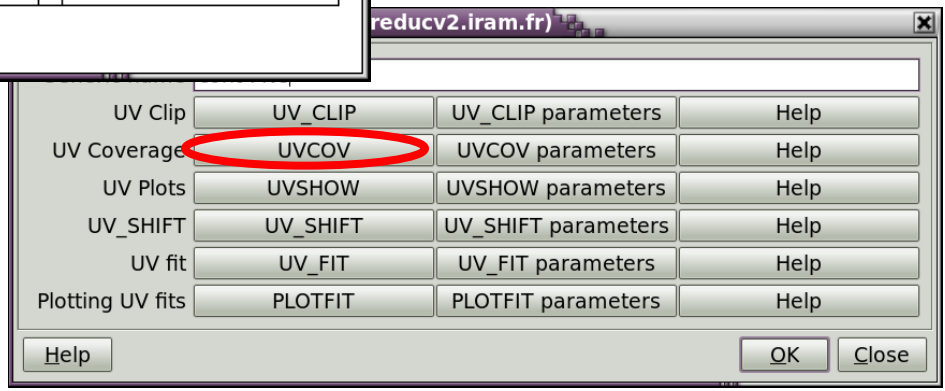
With commands:

MAPPING> let name table-NGC7027

MAPPING> go uvcov

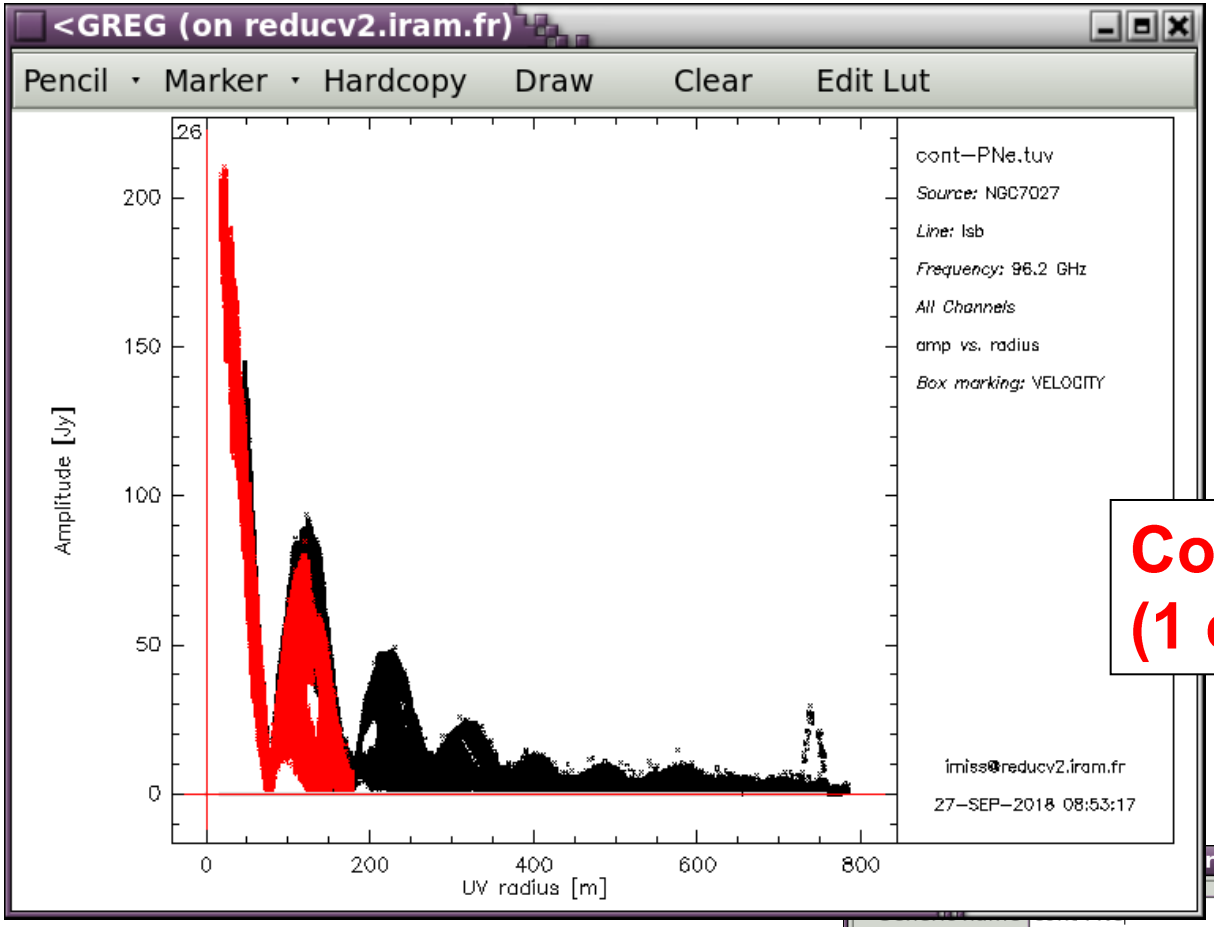
MAPPING> input uvcov ! To check the parameters



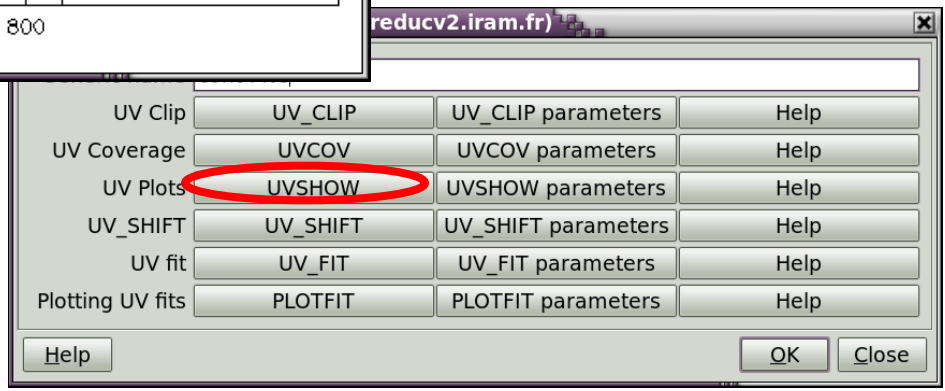


Data analysis in the *uv*-plane

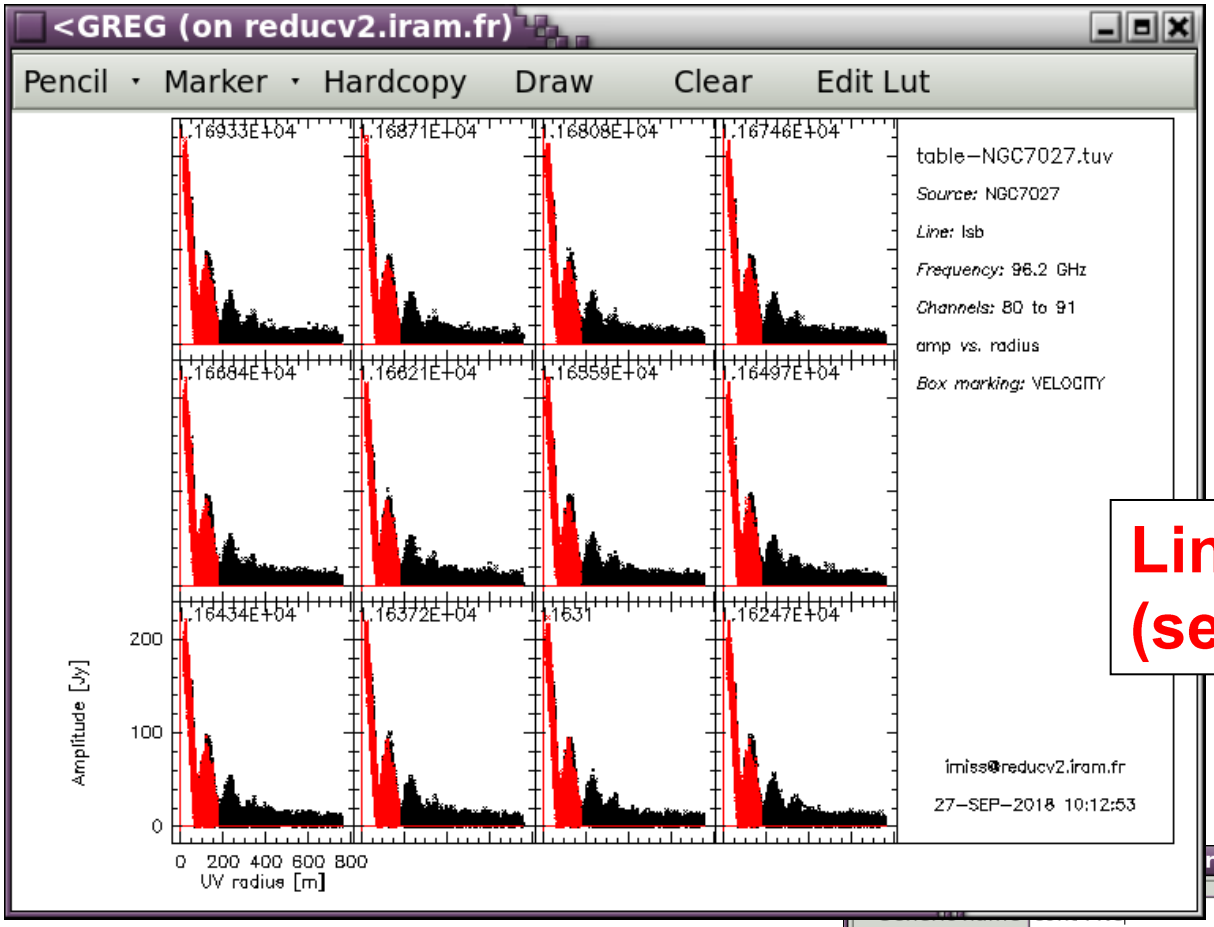
Data analysis in the *uv*-plane



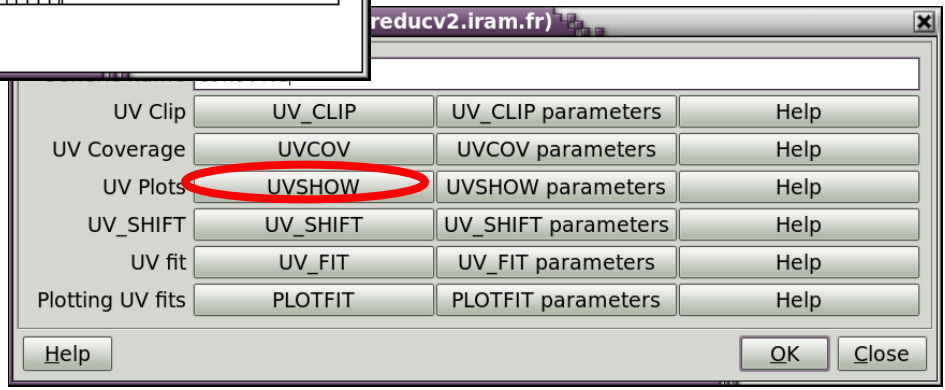
Continuum uv table (1 channel)



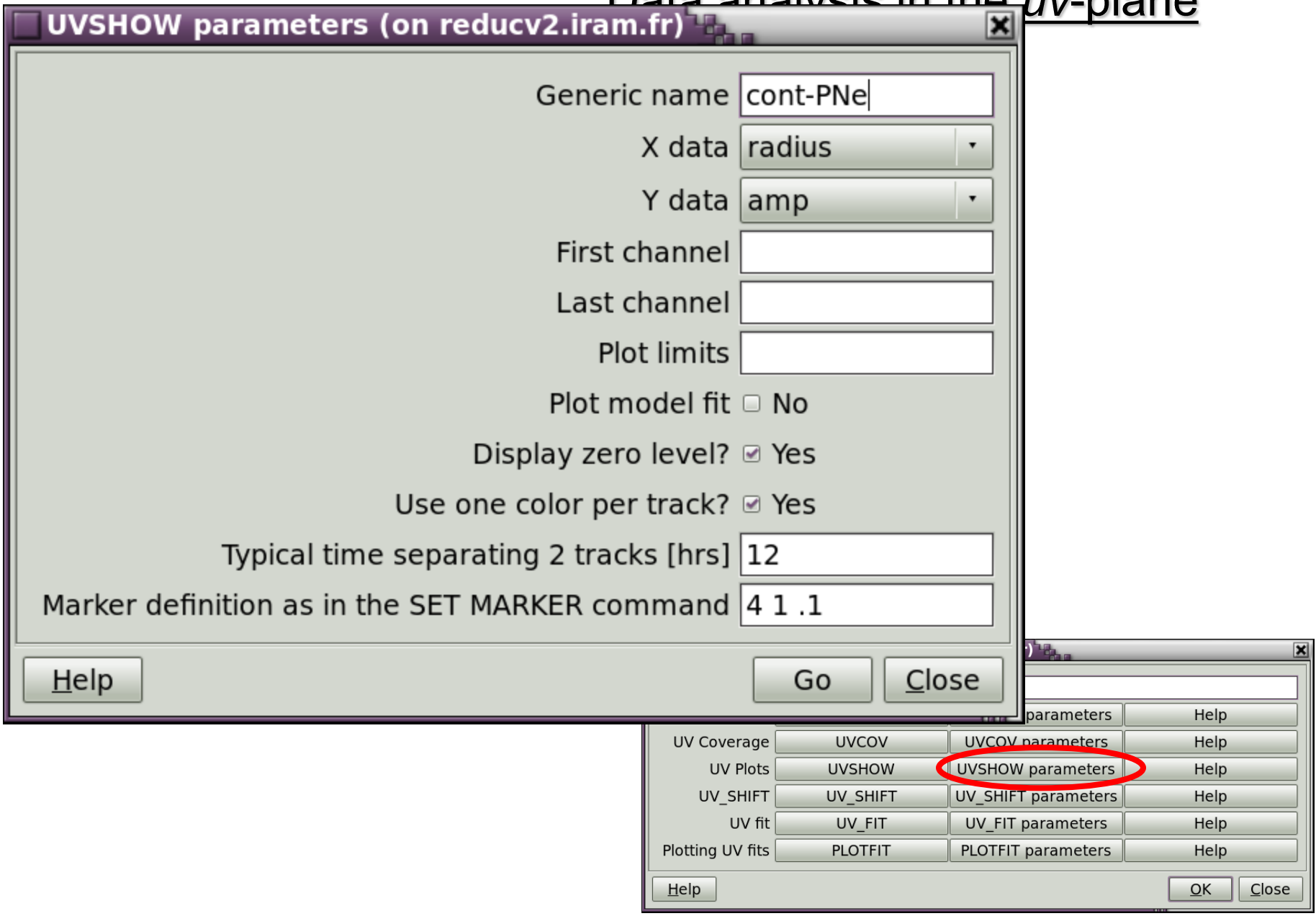
Data analysis in the *uv*-plane



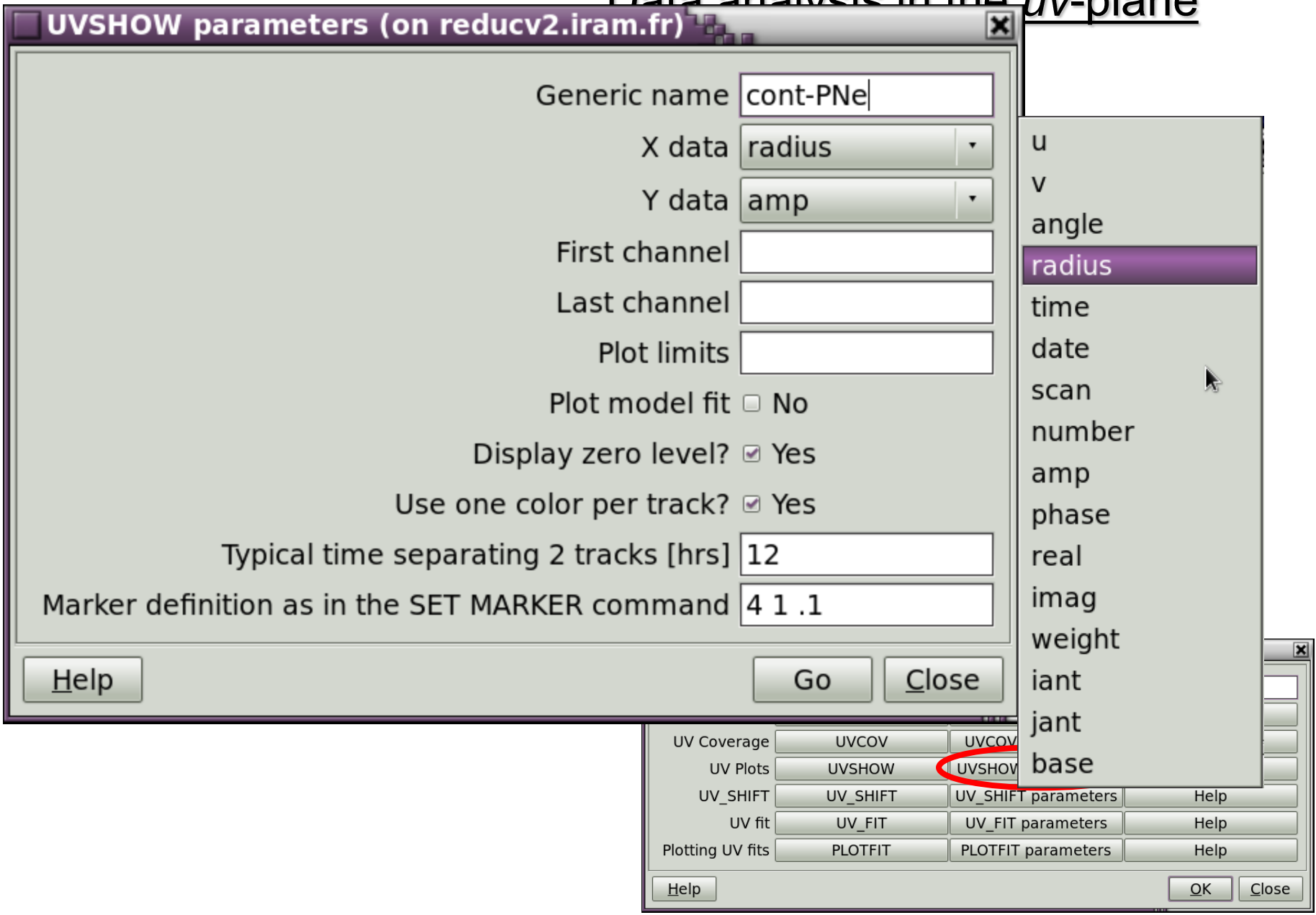
Line uv table (several channels)

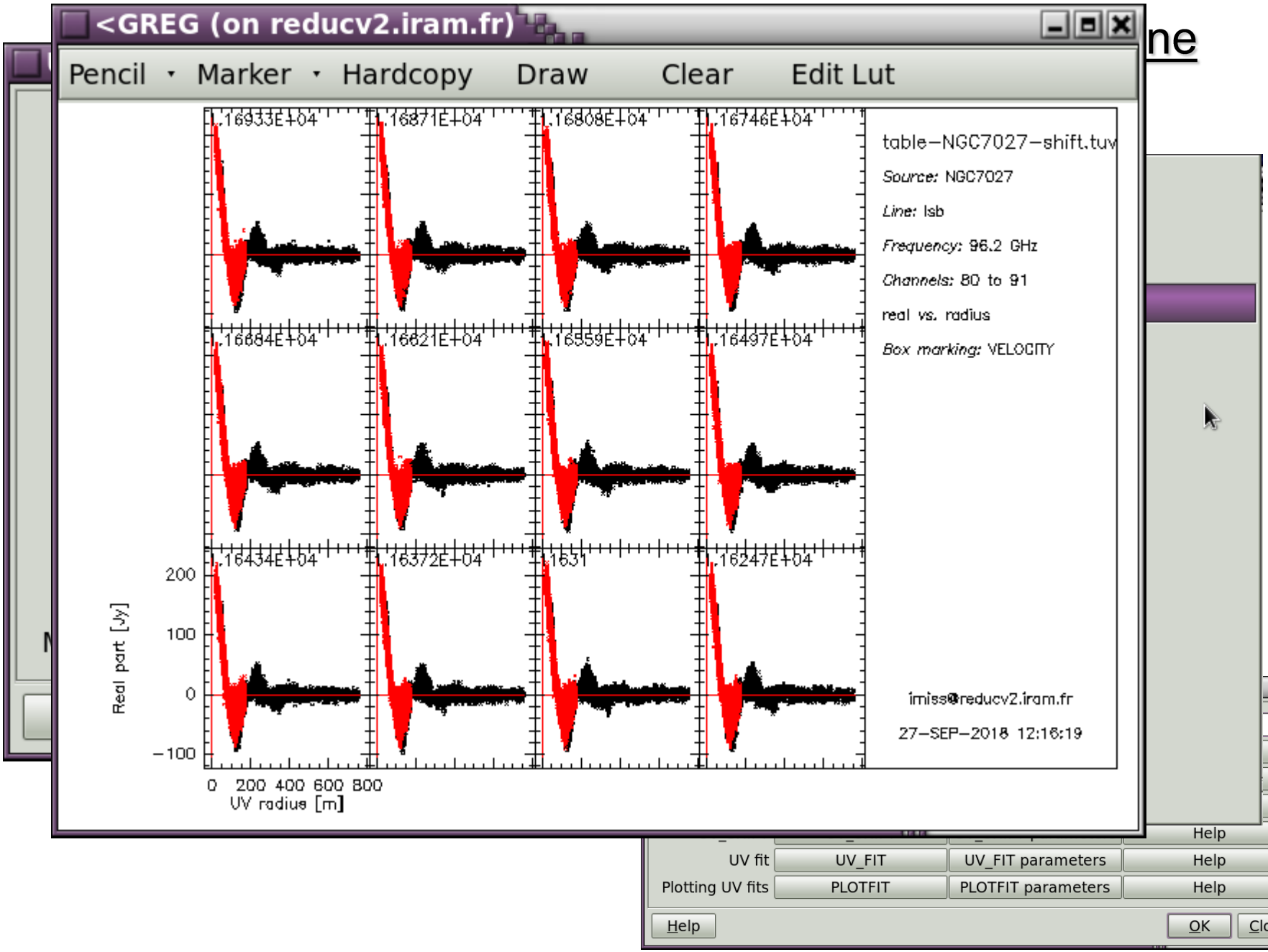


Data analysis in the *uv*-plane



Data analysis in the *uv*-plane




<GREG (on reducv2.iram.fr)
Pencil
Marker
Hardcopy
Draw
Clear
Edit Lut
1.16933E+04
1.16871E+04
1.16808E+04
1.16746E+04
1.16684E+04
1.16621E+04
1.16559E+04
1.16497E+04
1.16434E+04
1.16372E+04
1631
1.16247E+04
table-NGC7027-shift.tuv
Source: NGC7027
Line: lsb
Frequency: 96.2 GHz
Channels: 80 to 91
real vs. radius
Box marking: VELOCITY
imiss@reducv2.iram.fr
27-SEP-2018 12:16:19
Real part [Jy]
200
100
0
-100
0
200
400
600
800
UV radius [m]
Help
UV fit
UV_FIT
UV_FIT parameters
Help
Plotting UV fits
PLOTFIT
PLOTFIT parameters
Help
Help
OK
Close

With commands:

MAPPING> let name table-NGC7027

MAPPING> let first 80

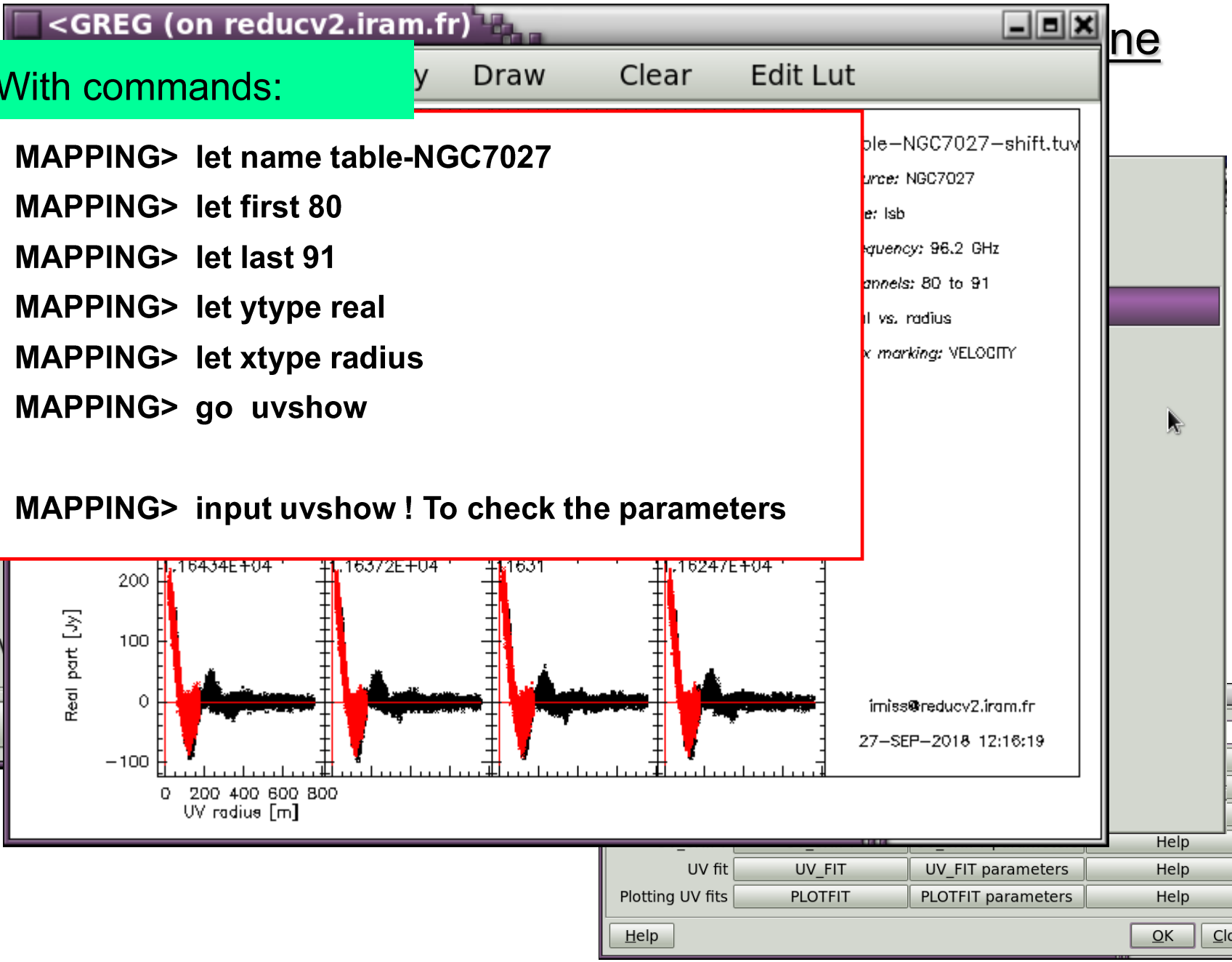
MAPPING> let last 91

MAPPING> let ytype real

MAPPING> let xtype radius

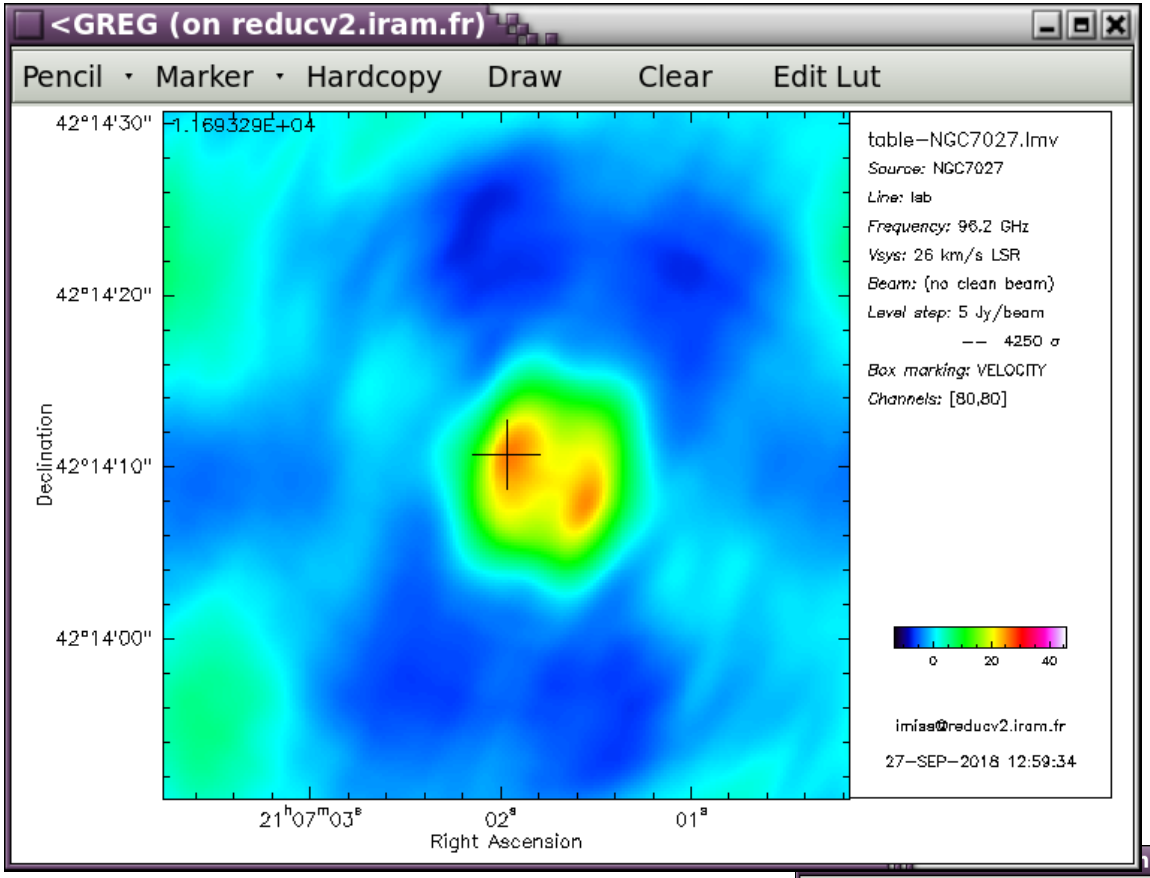
MAPPING> go uvshow

MAPPING> input uvshow ! To check the parameters

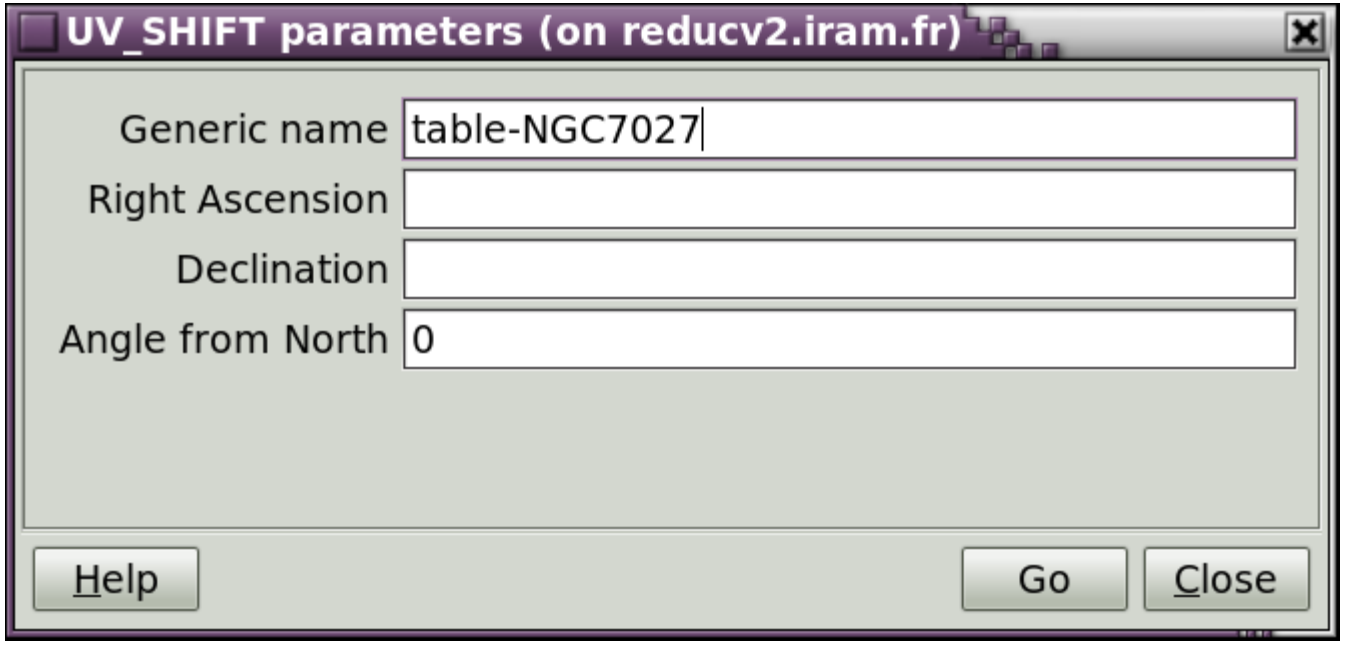


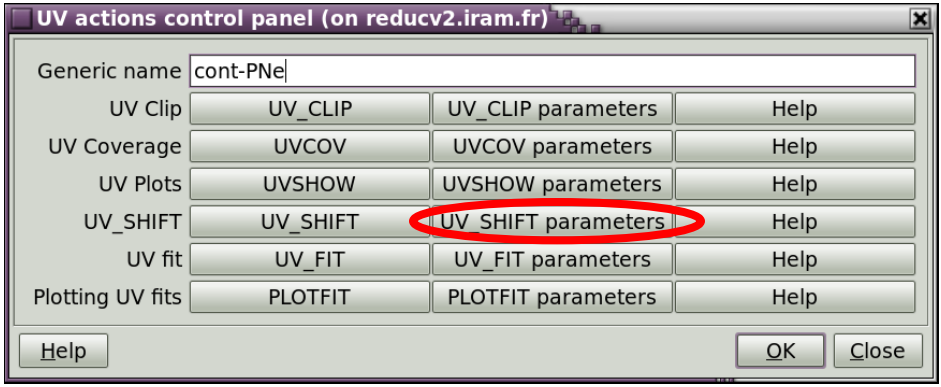
Data analysis in the *uv*-plane

Data analysis in the *uv*-plane



Data analysis in the *uv*-plane





Data analysis in the *uv*-plane

uv_shift through commands:

imiss@reducv2:~/tutors/herrera/ngc7027

File Edit View Search Terminal Help

```
MAPPING> help uv_shift
        [CLEAN\]UV_SHIFT
        [CLEAN\]UV_SHIFT OffX OffY [Angle]
        [CLEAN\]UV_SHIFT HH:MM:SS.SSS DDD:MM:SS.SSS [Angle]

    Shift a UV table to a new phase center.

    -  If  the table is an observed mosaic with phase and pointing described
    by the same offsets, the visibilities are aligned to a common phase cen-
    ter and the offsets are replaced by pointing offsets only, with pointing
    reference matching the phase center.
    - If the table is already a phase-shifted mosaic with pointing  offsets,
    the visibilities are realigned to the new phase center, and the pointing
    offsets are recomputed so that the pointing reference matches the  phase
    center.
    - If the table is single field UV table (i.e. with no offsets), the vis-
    ibilities are realigned to the new phase center. The pointing  reference
    is left unchanged.

    If  a new phase center (absolute or relative coordinates) is provided on
    the command line, it is used as new center. Without  argument,  UV_SHIFT
    rely  on  the variables MAP_RA, MAP_DEC, and MAP_ANGLE if MAP_RA is non-
... Press RETURN for more ...
```

Data analysis in the *uv*-plane

With commands:

MAPPING> read uv "mytable"

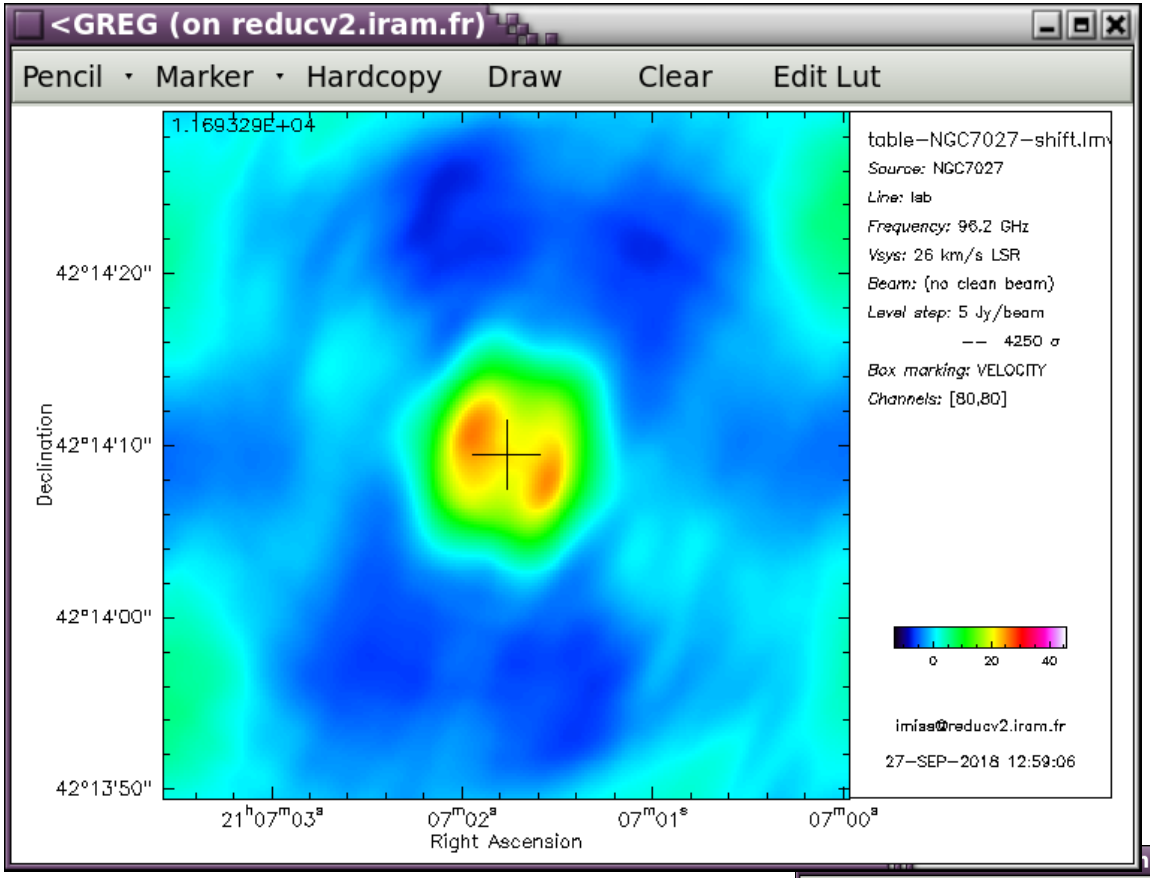
MAPPING> uv_shift Xoff Yoff

MAPPING> write uv table-name-shift

MAPPING> help uv_shift ! To check the parameters

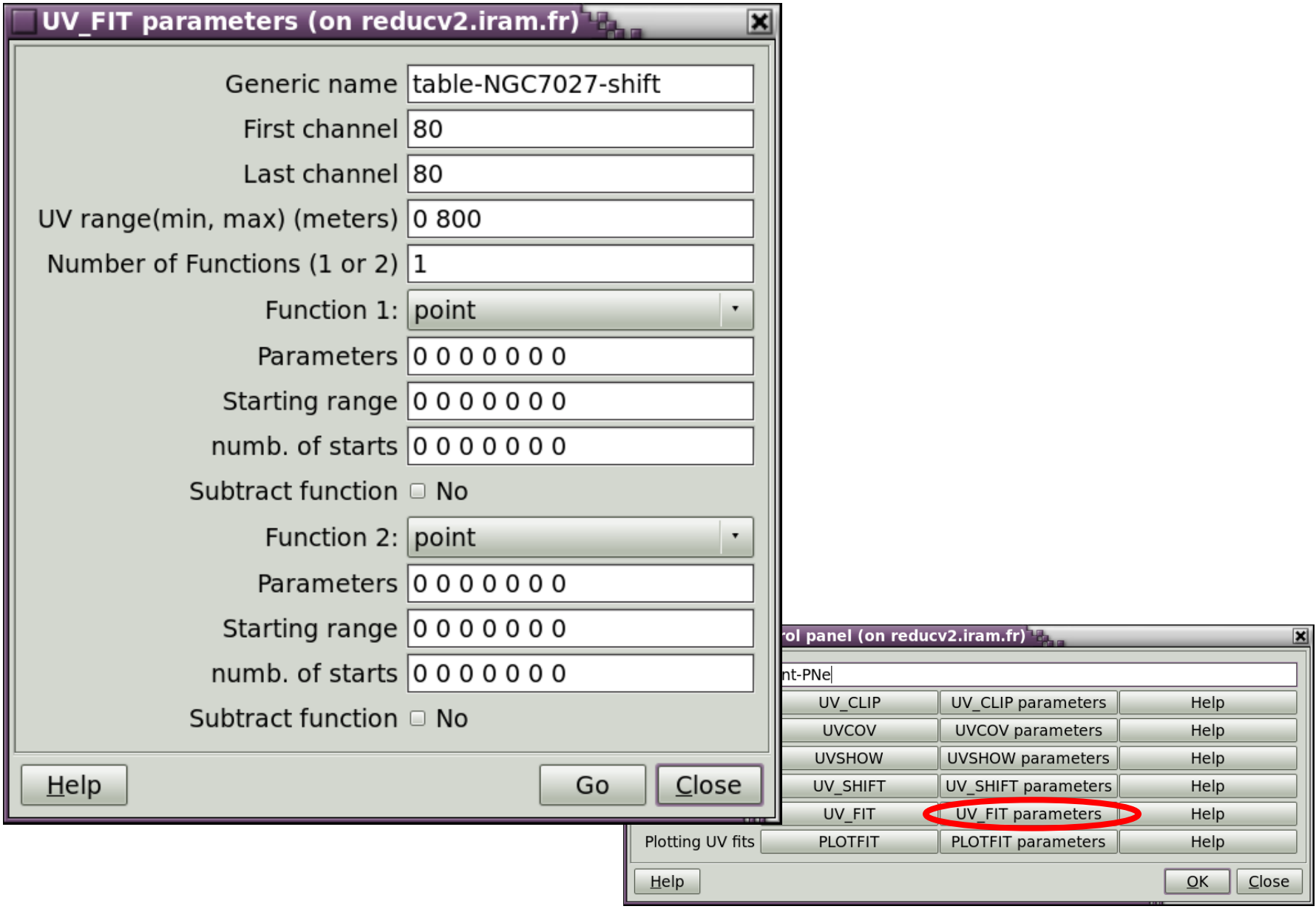
```
MAPPING> read uv table-NGC7027
W-READ,  File not modified and same range  -- not reloaded
W-READ,  Reading enforced by user
W-GDF_READ_UVDATASET,  Producing a UVT order
MAPPING> uv shift -2.25 -1.25
I-UV_SHIFT,  UV table is a single field
I-UV_SHIFT,  New phase center  21:07:01.7674   42:14:09.4500 (offsets  -2.25  -1
.25)
MAPPING> write uv table-NGC7027-shift
MAPPING>
```

Data analysis in the *uv*-plane

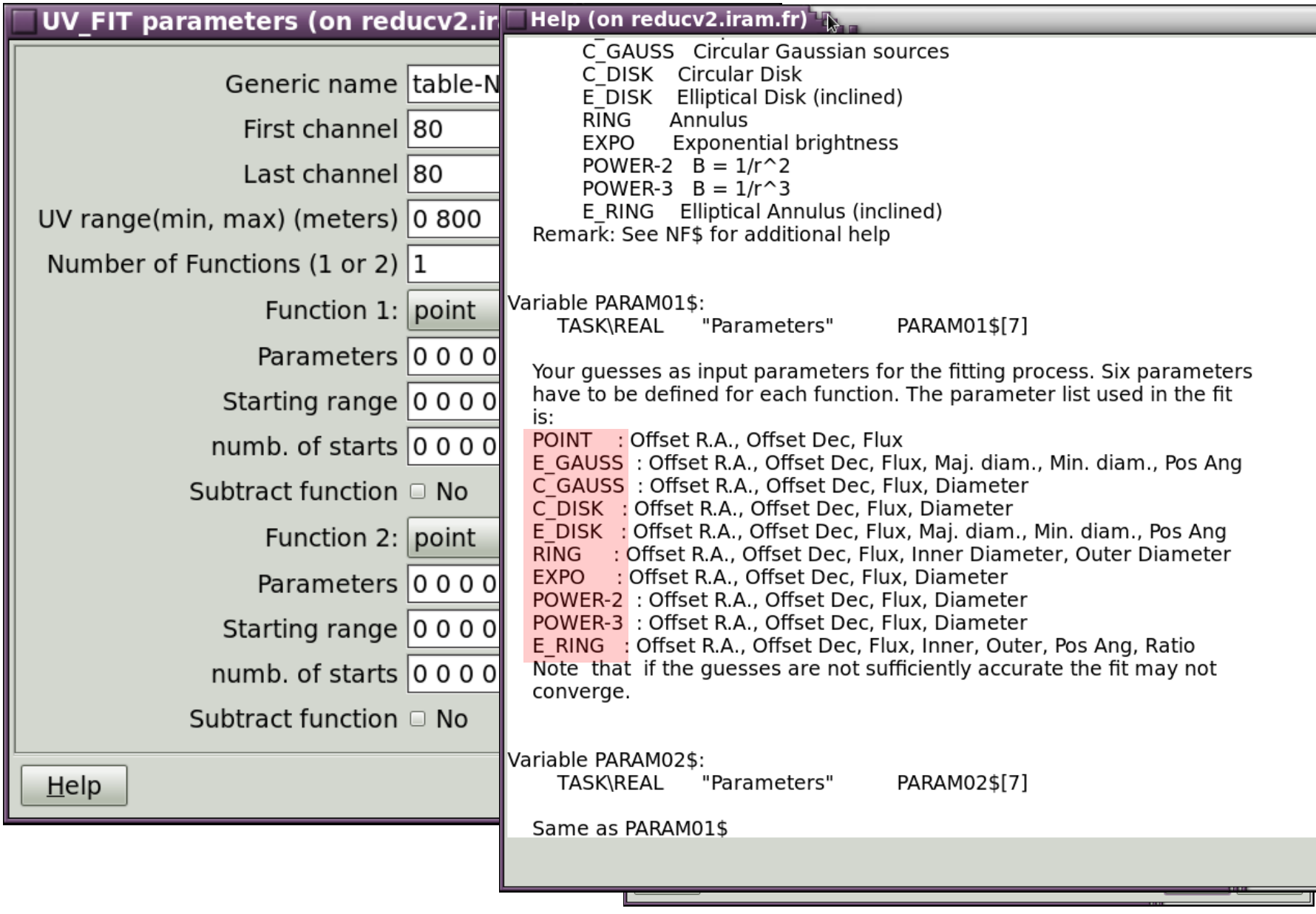


Data analysis in the *uv*-plane

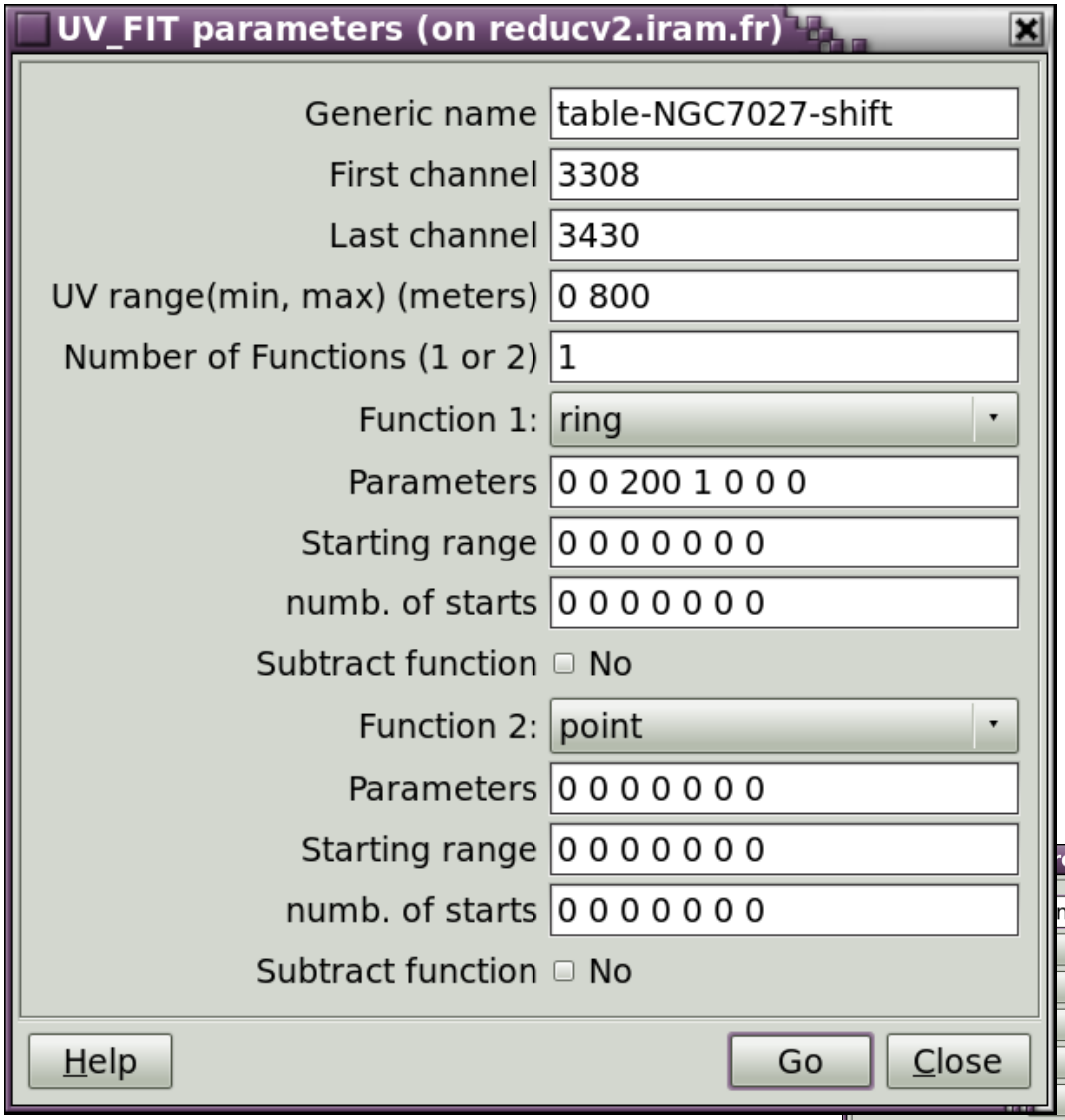
Data analysis in the *uv*-plane

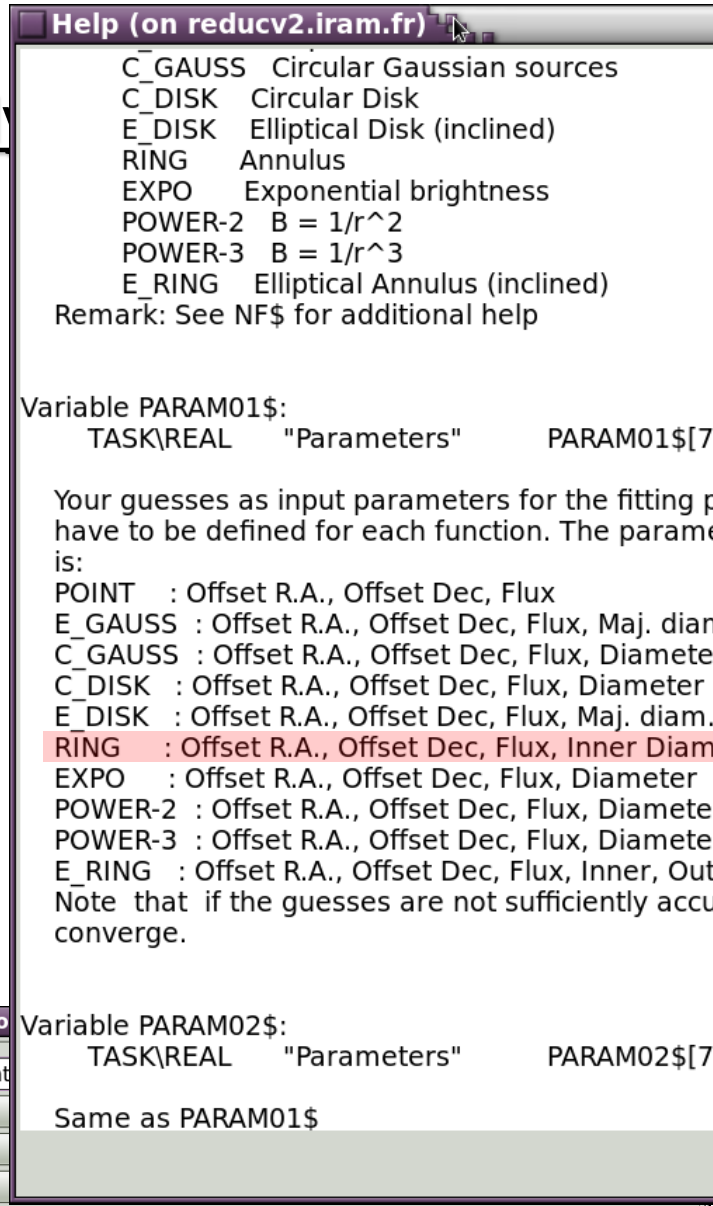


Data analysis in the *uv*-plane



Data anal


UV_FIT parameters (on reducv2.iram.fr)
Generic name
table-NGC7027-shift
First channel
3308
Last channel
3430
UV range(min, max) (meters)
0 800
Number of Functions (1 or 2)
1
Function 1:
ring
Parameters
0 0 200 1 0 0 0
Starting range
0 0 0 0 0 0 0
numb. of starts
0 0 0 0 0 0 0
Subtract function
No
Function 2:
point
Parameters
0 0 0 0 0 0 0
Starting range
0 0 0 0 0 0 0
numb. of starts
0 0 0 0 0 0 0
Subtract function
No
Help
Go
Close


Help (on reducv2.iram.fr)
C_GAUSS Circular Gaussian sources
C_DISK Circular Disk
E_DISK Elliptical Disk (inclined)
RING Annulus
EXPO Exponential brightness
POWER-2 B = 1/r^2
POWER-3 B = 1/r^3
E_RING Elliptical Annulus (inclined)
Remark: See NF$ for additional help
Variable PARAM01$:
TASK\REAL "Parameters" PARAM01$[7
Your guesses as input parameters for the fitting p
have to be defined for each function. The parame
is:
POINT : Offset R.A., Offset Dec, Flux
E_GAUSS : Offset R.A., Offset Dec, Flux, Maj. dian
C_GAUSS : Offset R.A., Offset Dec, Flux, Diamete
C_DISK : Offset R.A., Offset Dec, Flux, Diameter
E_DISK : Offset R.A., Offset Dec, Flux, Maj. diam.
RING : Offset R.A., Offset Dec, Flux, Inner Diam
EXPO : Offset R.A., Offset Dec, Flux, Diameter
POWER-2 : Offset R.A., Offset Dec, Flux, Diamete
POWER-3 : Offset R.A., Offset Dec, Flux, Diamete
E_RING : Offset R.A., Offset Dec, Flux, Inner, Out
Note that if the guesses are not sufficiently accu
converge.
Variable PARAM02$:
TASK\REAL "Parameters" PARAM02$[7
Same as PARAM01$
UV_SHIFT
UV_SHIFT parameters
Help
UV_FIT
UV_FIT parameters
Help
Plotting UV fits
PLOTFIT
PLOTFIT parameters
Help
Help
OK
Close

Data analysis in the *uv*-plane

imiss@reducv2:~/tutors/herrera/ngc7027

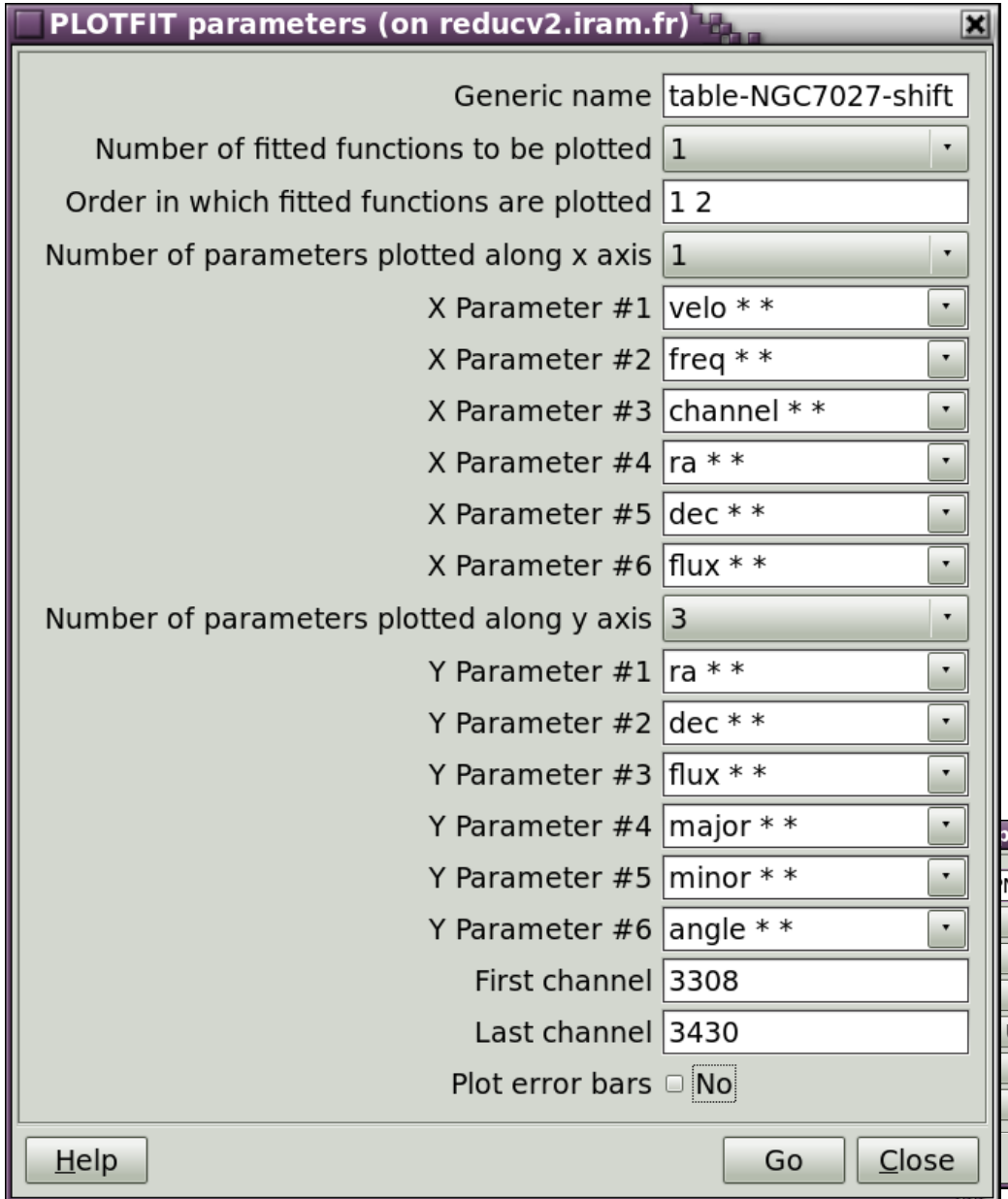
File Edit View Search Terminal Tabs Help

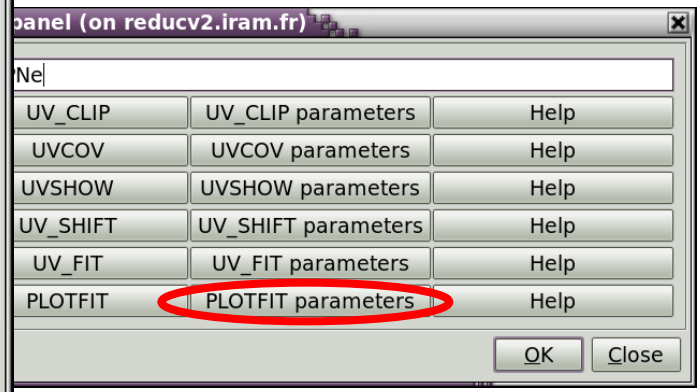
imiss@reducv2:~/tutors/herrera/ngc7027 | herrera@herrera:~

```
 W-DCOV, Jacobian singular, info=           2
 r.m.s.=    30.6978 Jy.
 RING     R.A.        =    -0.18724 (   .35419)   21:07:01.75054
 RING     Dec.        =     0.18611 (   .34386)   42:14:09.6361
 RING     Flux        =   203.57039 (   .04314)  Jy
 RING     I.Diam.     =     9.67553 (   .27221)
 RING     O.Diam.     =     0.00000 (   .00000)

I-UV_FIT,  18078 data points for channel3430
I-UV_FIT,  Starting minimization on channel3430   Velocity= -9.186E+03
I-UV_FIT, Starting from   0.0000      0.0000      200.00      1.0000      0.0000

 W-DCOV, Jacobian singular, info=           2
 r.m.s.=    30.6410 Jy.
 RING     R.A.        =    -0.19016 (   .35428)   21:07:01.75028
 RING     Dec.        =     0.19305 (   .34393)   42:14:09.6430
 RING     Flux        =   203.45130 (   .04316)  Jy
 RING     I.Diam.     =     9.66825 (   .27228)
 RING     O.Diam.     =     0.00000 (   .00000)
I-UV_FIT,  Successful completion

I-RUN,  Elapsed 24.4, User 1633.7, System 5.3
I-RUN,  Task uv_fit completed successfully
MAPPING>
```

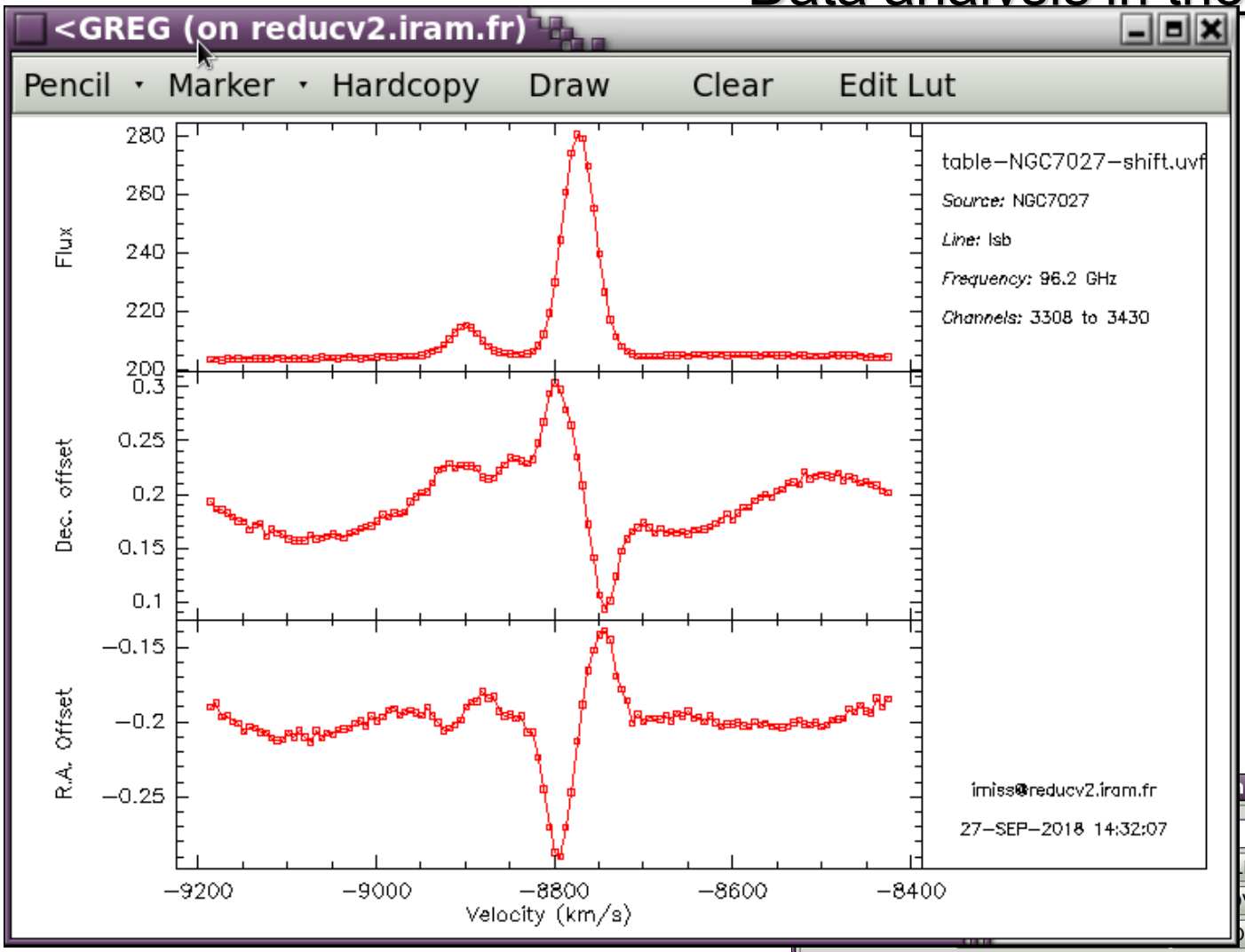
Data analysis in the *uv*-plane

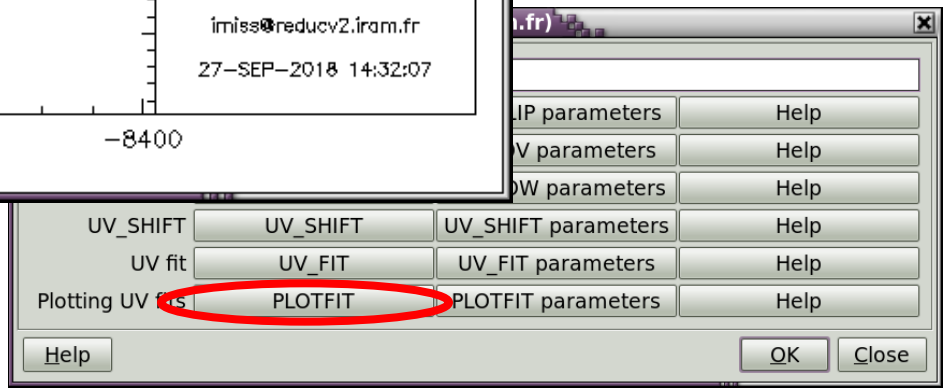
Data analysis in the *uv*-plane





Data analysis in the *uv*-plane





MAPPING procedures / commands

MAPPING> input “command” or help “command”
MAPPING> let name uvtable-name
MAPPING> go “command”

Type: INPUT command-name for further information on a command
Type: GO command-name to execute a command

MAPPING procedures / commands

MAPPING> input “command” or help “command”

MAPPING> go “command”

These can be also found in the widgets:

go setup
go uvclip
go uvcov
go uvshow
go uv shift
go uvfit
go plotfit

go uvshort
go uvstat
go uvmap
go clean
go support
go view

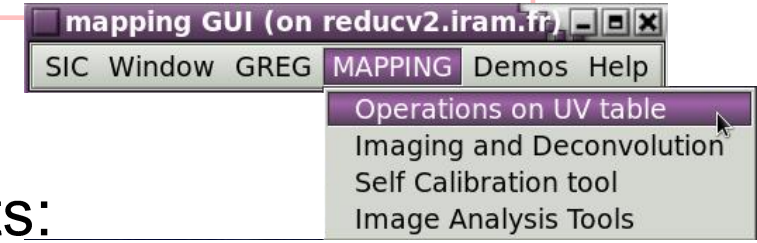
go flux
go noise
go moments
go velocity

Data analysis in the *uv*-plane

MAPPING procedures / commands

MAPPING> input “command” or help “command”

MAPPING> go “command”



These can be also found in the widgets:

- go setup
- go uvclip
- go uvcov
- go uvshow
- go uvshift
- go uvfit
- go plotfit

MAPPING procedures / commands

MAPPING> input “command” or help “command”

MAPPING> go “command”

These can be also found in the widgets:

go setup
go uvclip
go uvcov
go uvshow
go uvshift
go uvfit
go plotfit

go uvshort
go uvstat
go uvmap
go clean
go support
go view

go flux
go noise
go moments
go velocity

Data analysis in the *uv*-plane

MAPPING> input

INPUT & GO possibilities:

Commands for multichannel viewing:

- **VIEW** interactive viewing of spectra data cube
- **3VIEW** interactive viewing of position/velocity diagrams
- **BIT** plot a color map of all or selected channels
- **MAP** plot a contour map of all or selected channels
- **XV** plot x-axis/velocity diagrams
- **VY** plot velocity/y-axis diagrams
- **SPECTRE** plot spectra from a data cube
- **VELOCITY** plot mean, velocity and width maps
- **OVER** Overlay bitmaps and contours of several images
- **COLOR, LUT** Fiddle Color Table

Commands for analysis

- **NOISE** Compute noise histogram of data cubes
- **MOMENT** Compute mean, velocity and width maps

Commands for UV-visibility analysis:

- **UVSHOW** plot UV data for all or selected channels

Commands for multichannel mapping:

- **UVMAP** compute an image from UV data
- **CLEAN** clean a dirty image
- **SUPPORT** define a deconvolution support
- **IMAGE** compute an image from UV data and clean it
- **CCT** [Ncc] display Clean Components up to Ncc

Commands for self-calibration:

- **SELFCAL** compute phase gains using self calibration

MAPPING procedures / commands

MAPPING> input “command” or help “command”

MAPPING> go “command”

go uv_applyphase
go uv_average
go uv_cal
go uv_ccmodel
go uv_cct
go uv_center
go uv_circle
go uv_clip
go uv_compress
go uv_cuts
go uv_dft
go uv_extract
go uv_fidelity
go uv_flag
go uv_fmodel
go uv_gain
go uv_hanning
go uv_hybrid
go uv_list
go uv_merge
go uv_mflag
go uv_model
go uv_mult
go uv_noise
go uv_observe
go uv_pointing
go uv_short
go uv_sinusphase
go uv_solve
go uv_sort
go uv_splitfield
go uv_substract
go uv_table
go uv_timeaverage
go uv_timebase
go uv_track
go uv_track_phase
go uv_zero

go uv_circle

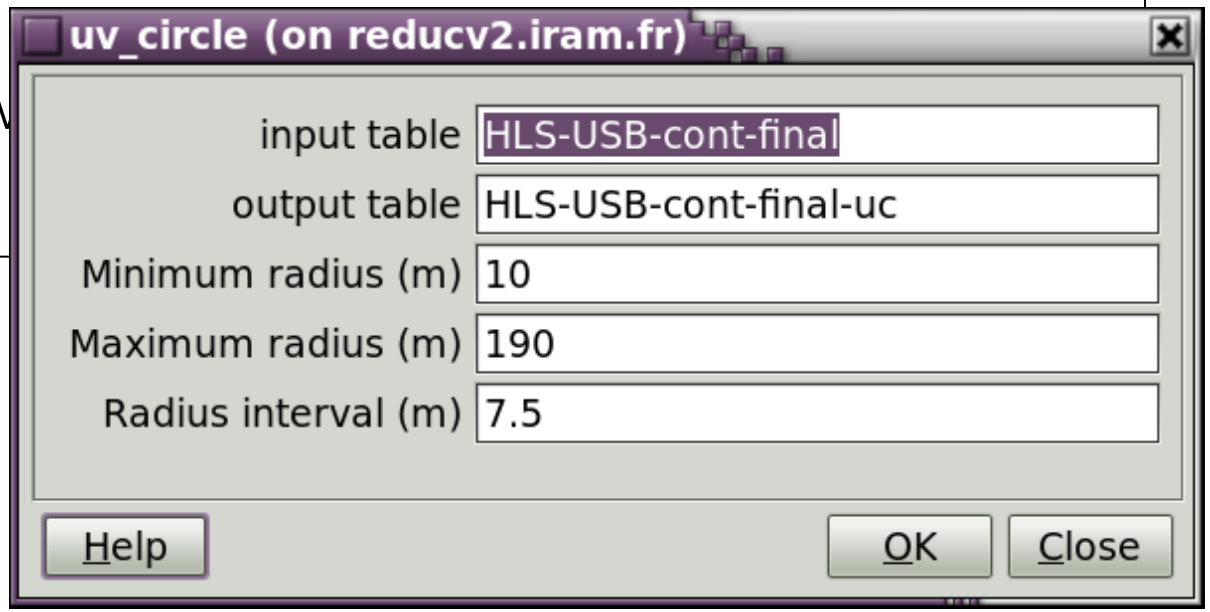
MAPPING> help uv_circle

Compute the azimuthal average of the visibilities around the UV plane center. The output UV table gives for each bin one visibility associated to one UV radius. This radius is the actual average of sqrt(U^2+V^2) of the visibilities in the bin (i.e. it is not the theoretical bin center). Flagged visibilities are ignored. If no input visibility is found inside a bin, then it is skipped in the output table.

Additional Help Available:
UVTABLE$ OUTABLE$ QM

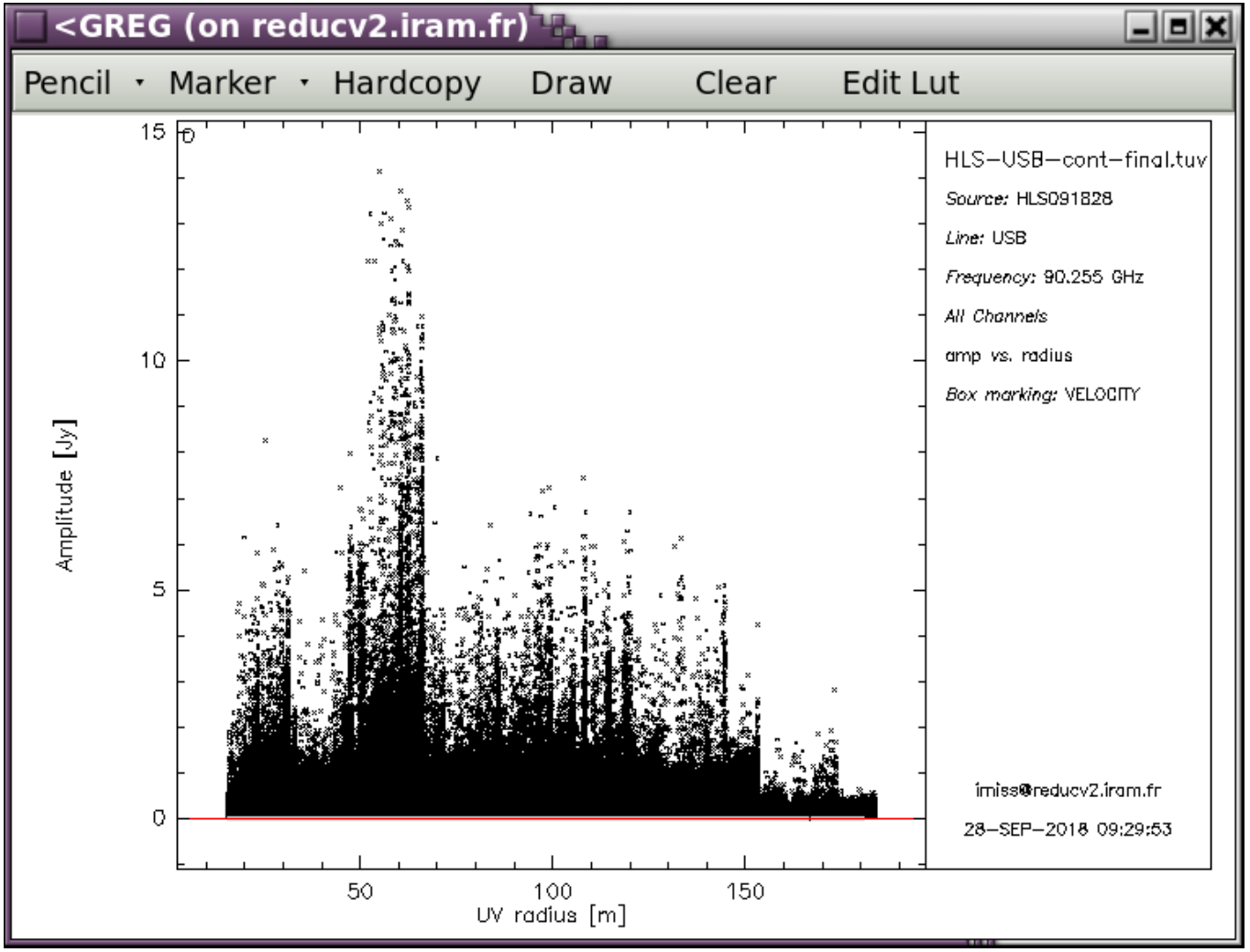
MAPPING> go uv_circle

Note: use only in symmetrical sources.



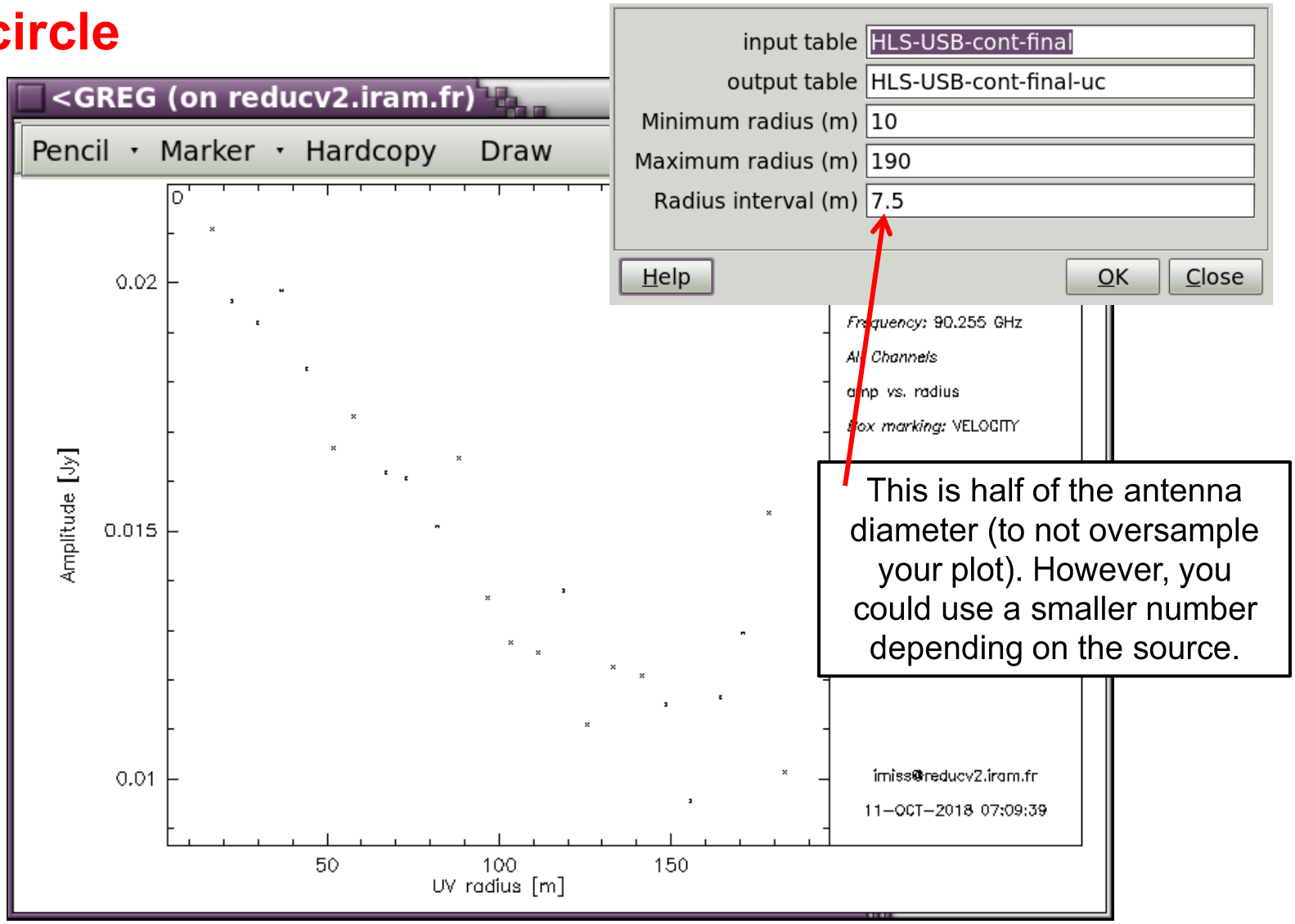
Data analysis in the *uv*-plane

go uv_circle



Data analysis in the *uv*-plane

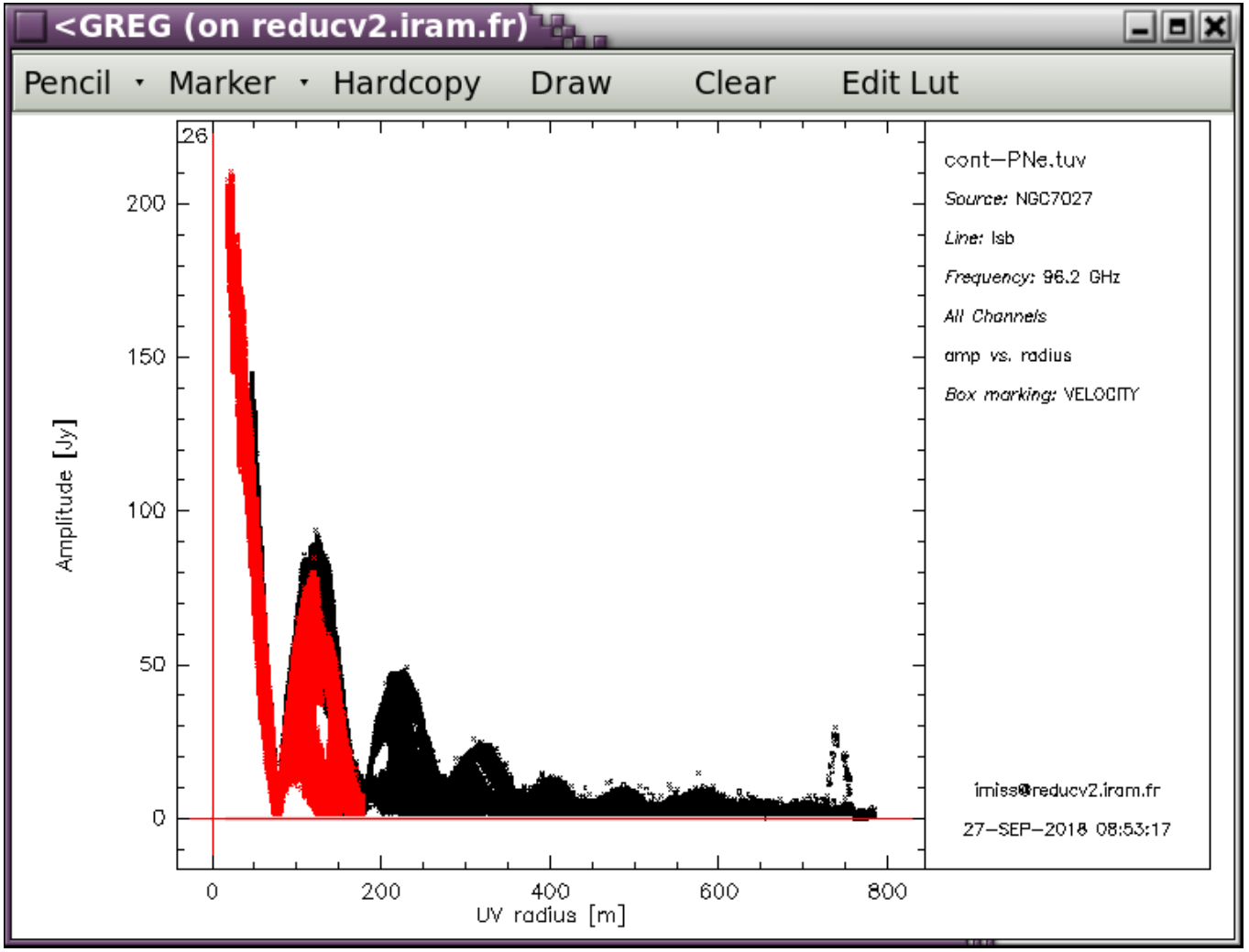
go uv_circle



This is half of the antenna diameter (to not oversample your plot). However, you could use a smaller number depending on the source.

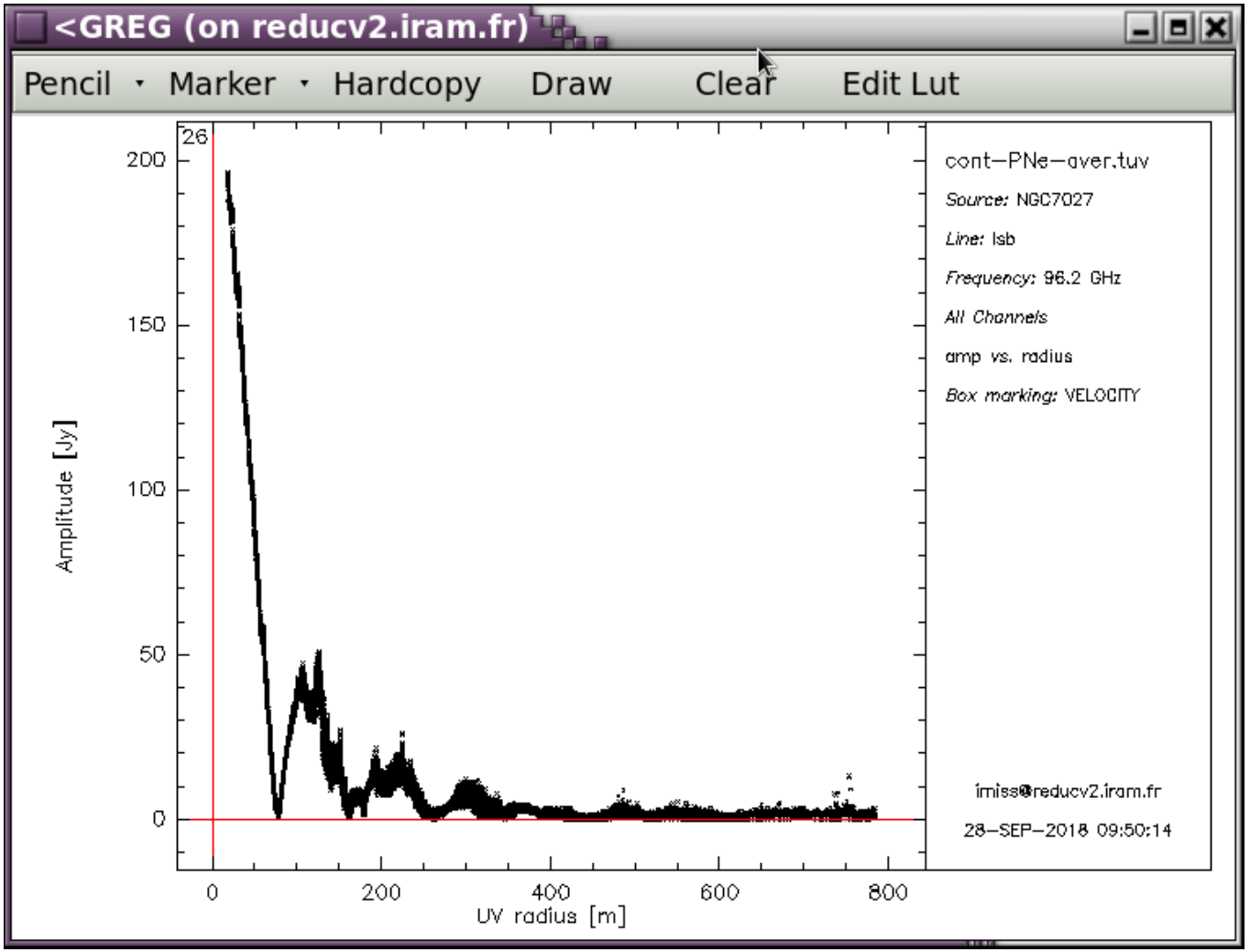
Data analysis in the *uv*-plane

go uv_circle



Data analysis in the *uv*-plane

go uv_circle



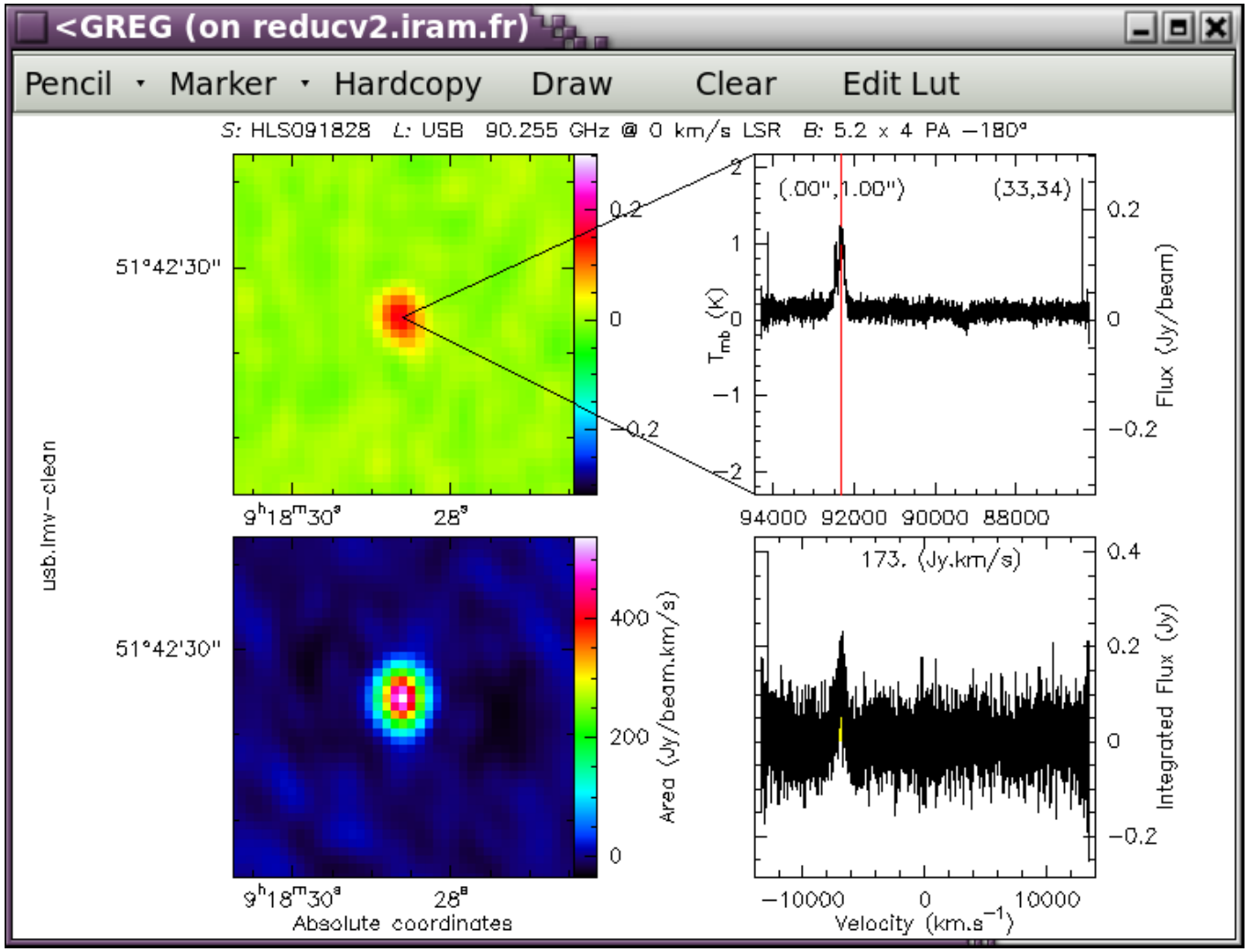
MAPPING procedures / commands

```
MAPPING>  help “command”
MAPPING>  READ UV uvtable-name
MAPPING>  “command” [Arg]
MAPPING>  WRITE UV uvtable-name-output
```

uv_baseline
uv_check
uv_compress
uv_continuum
uv_flag
uv_filter
uv_map
uv_resample
uv_residual
uv_restore
uv_reweight
uv_shift
uv_sort
uv_stat
uv_time
uv_truncate

Data analysis in the *uv*-plane

uv_compress



uv_compress

MAPPING> help uv_compress

[CLEAN\]UV_COMPRESS Nc

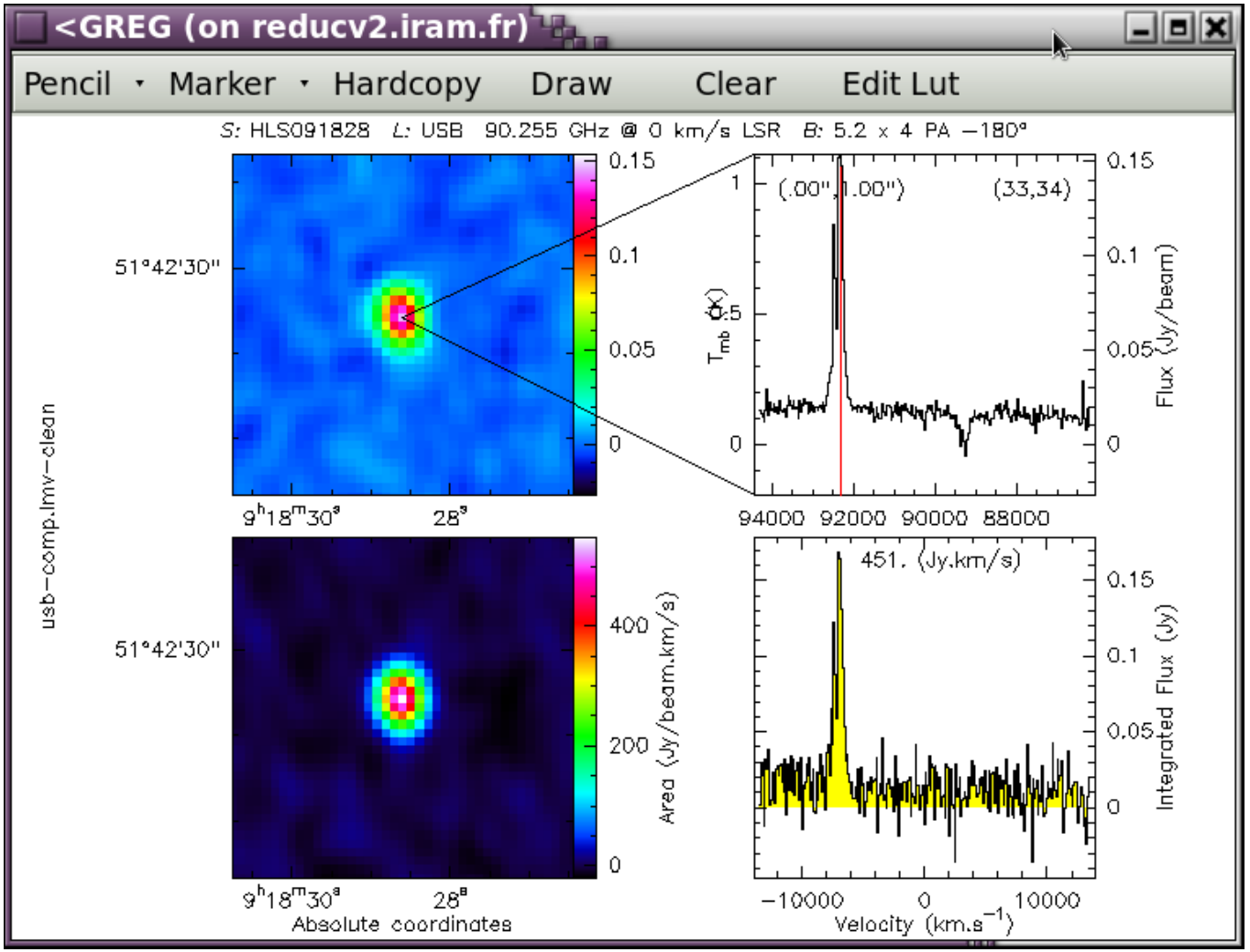
Resample the UV data loaded by READ UV by averaging NC adjacent channels. All other UV commands except UV_RESAMPLE work on the "Resampled" UV table.

The "Resampled" UV table is a simple copy of the original one after a READ UV command, or after a UV_RESAMPLE or UV_COMPRESS commands without arguments.

MAPPING> read uv usb
W-GDF_READ_UVDATASET, Producing a UVT order
I-PAUSE, Generated by pressing ^C
MAPPING> uv_compress 15
I-UV_COMPRESS, Averaging by chunks of 15 channels
MAPPING> write uv usb-comp
MAPPING> $ls usb-comp.uvt
usb-comp.uvt

Data analysis in the *uv*-plane

uv_compress



Data analysis in the *uv*-plane

How to create a continuum uv table from a cube?

1. **uv_filter:** to filter channels with line emission

MAPPING> help uv_filter
[CLEAN\]UV_FILTER [/ZERO] [/CHANNELS Channel_List] [/FREQUENCY List Of Frequencies] [/WIDTH Width]

"Filter" line emission, by flagging the corresponding channels. The channels can be specified either by the /CHANNEL option or by the /FREQUENCY and /WIDTH options.

…

2. **uv_continuum**: to create uv table from the filtered one

MAPPING> help uv_continuum
[CLEAN\]UV_CONTINUUM Naver [First Last]

Transform the (presumably spectral line) UV data set loaded by READ UV into a "continuum" data set.

The transformation selects line channels from First to Last, average them by groups of Naver contiguous channels, and concatenate the resulting visibilities into a "continuum" UV table.

…

MAPPING procedures / commands

```
MAPPING>  help “command”
MAPPING>  READ UV uvtable-name
MAPPING>  “command” [Arg]
MAPPING>  WRITE UV uvtable-name-output
```

uv_baseline
uv_check
uv_compress
uv_continuum
uv_flag
uv_filter
uv_map
uv_resample
uv_residual
uv_restore
uv_reweight
uv_shift
uv_sort
uv_stat
uv_time
uv_truncate

MAPPING procedures / commands

MAPPING> help “command”
MAPPING> READ UV uvtable-name
MAPPING> “command” [Arg]
MAPPING> WRITE UV uvtable-name-output

uv_baseline
uv_check
uv_compress
uv_continuum
uv_flag
uv_filter
uv_map
uv_resample
uv_residual
uv_restore
uv_reweigh
uv_shift
uv_sort
uv_stat
uv_time

MAPPING> **type**
To see in the screen all commands that you have typed

Data analysis in the *uv*-plane

uv tables are fully editable

Each visibility contains:

- *u* in meters
- *v* in meters
- scan number
- observation date (CLASS number)
- time in seconds (since date above)
- start antenna in the baseline
- end antenna in the

- real part fo
- imaginary part
- weight

- real part fo[illegible] channel
- imaginary part 2nd channel
- …

uv table [visib dimension, # visibilities]

visib dimension = 7 + 3 x (# channels)

7 visib. characteristics

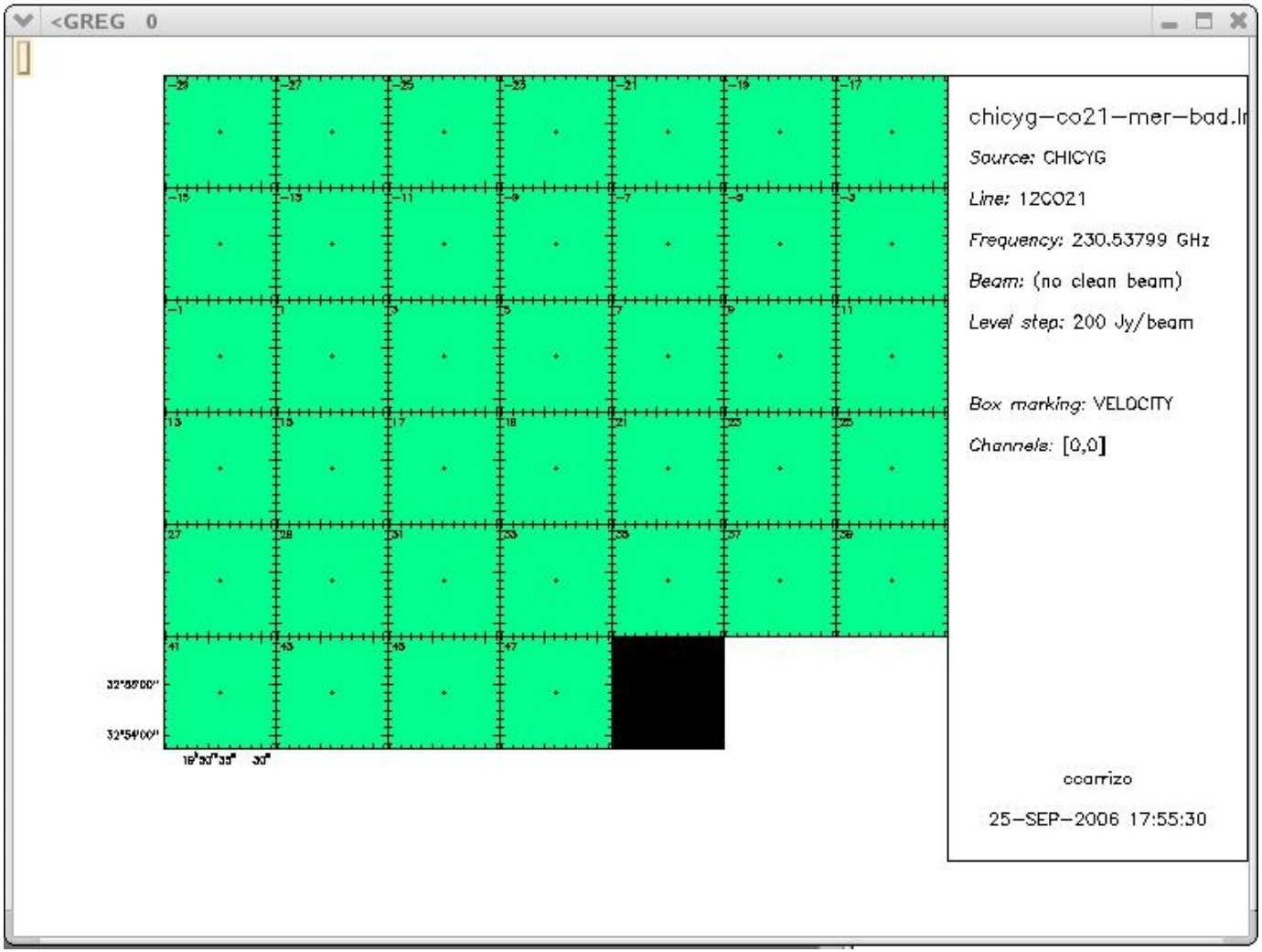
```
mapping>  define table aa mytable.uvt write
mapping>  let  aa[8,2380]  6000
mapping>  delete /variable aa
```

data at 2nd channel

3. An inspection of the data in the *uv*-plane is recommended

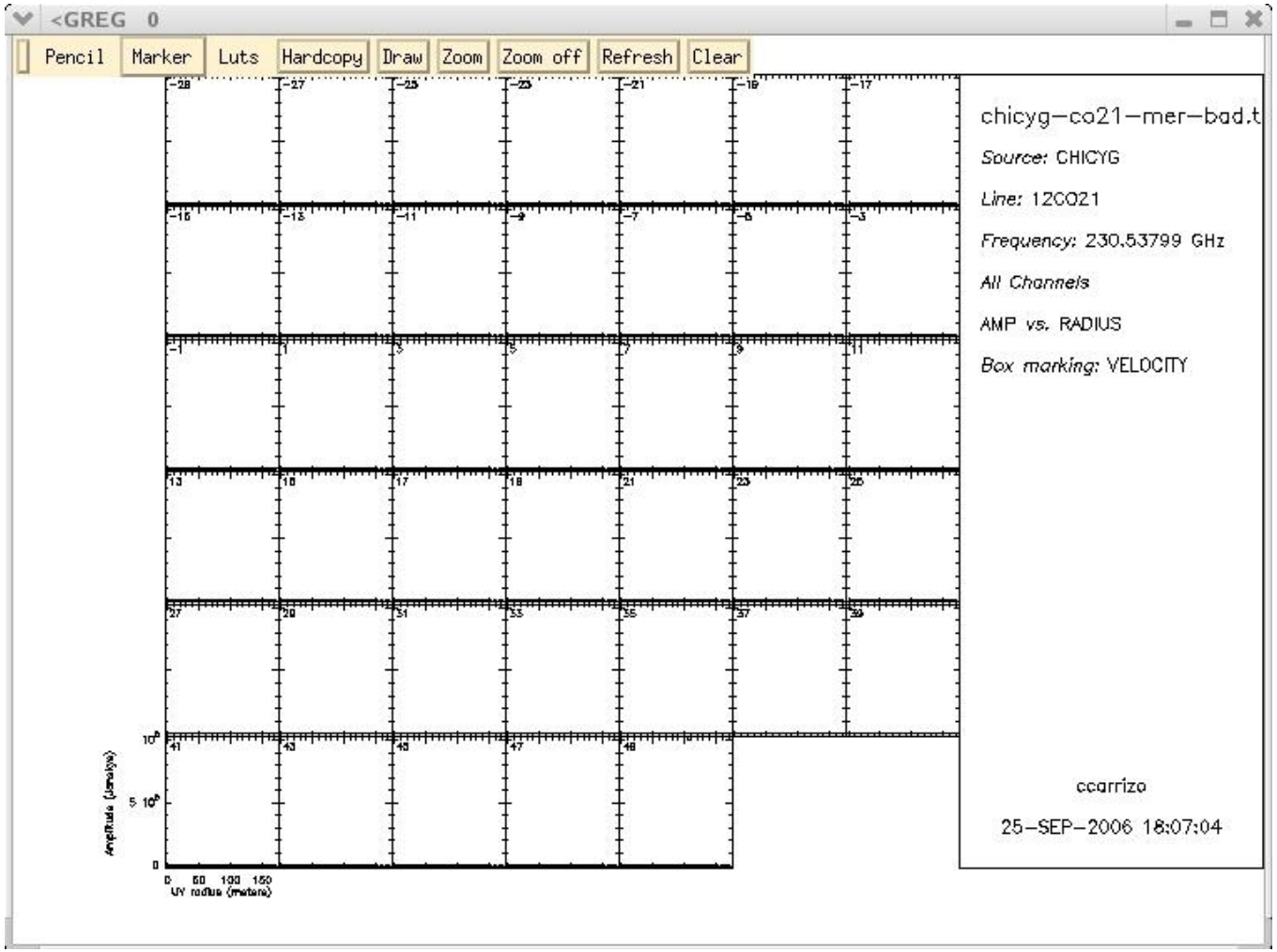
(1) Passing directly from hpb → mapping

It may happen…



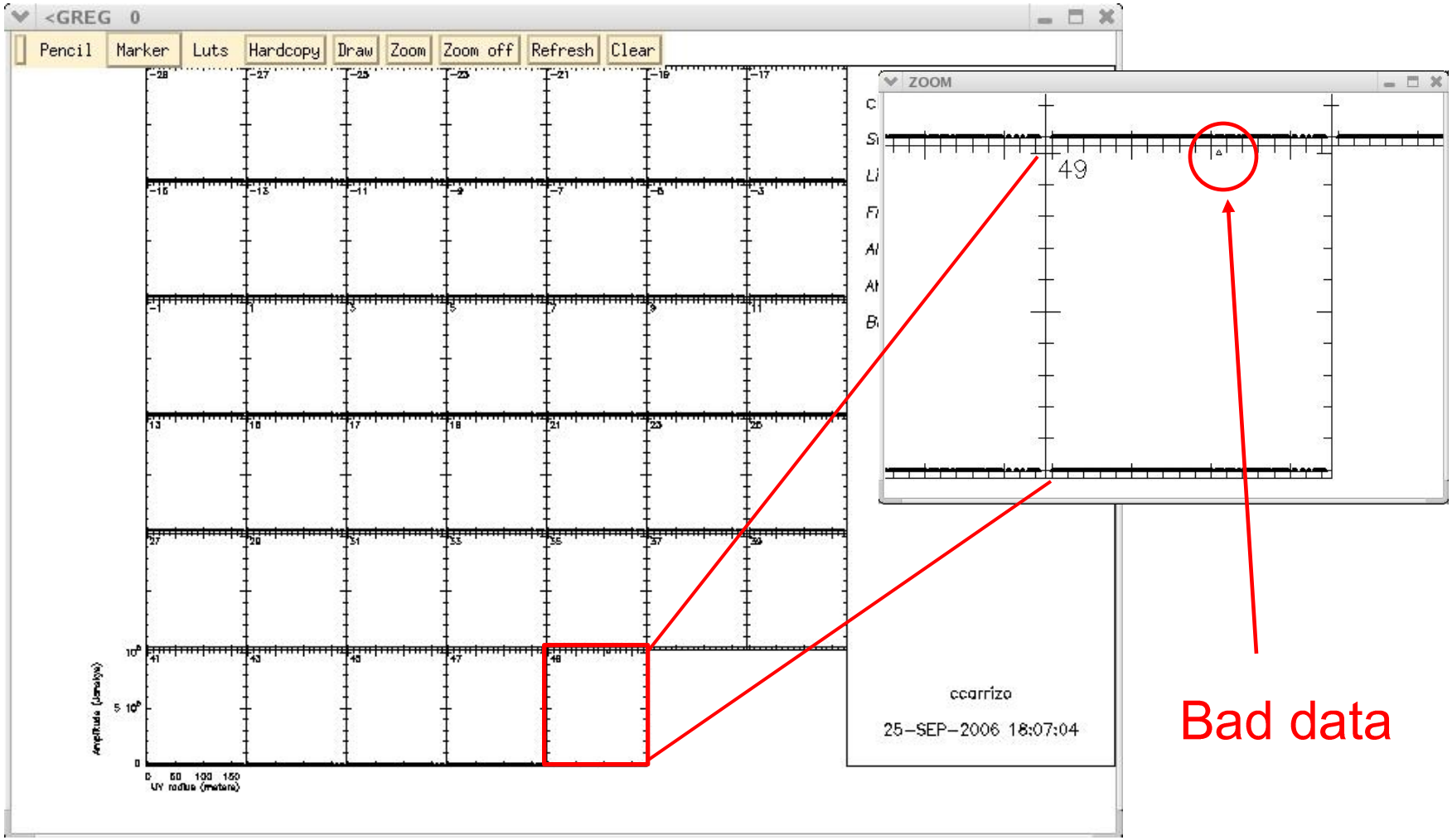
(1) Passing directly from hpb → mapping

It may happen…



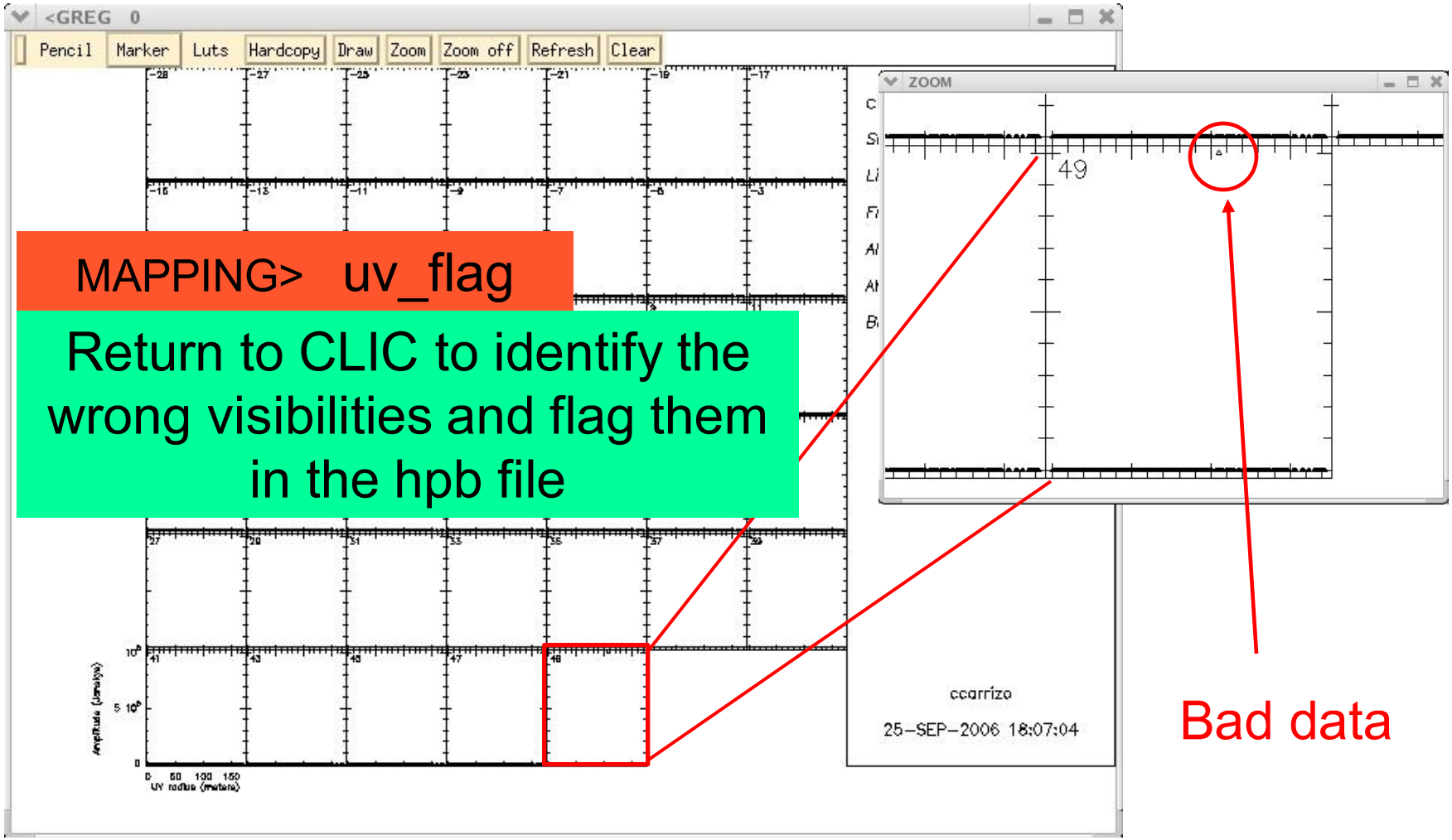
(1) Passing directly from hpb → mapping

It may happen… that there remain some wrong visibilities



(1) Passing directly from hpb → mapping

It may happen… that there remain some wrong visibilities



(1) Passing directly from hpb → mapping

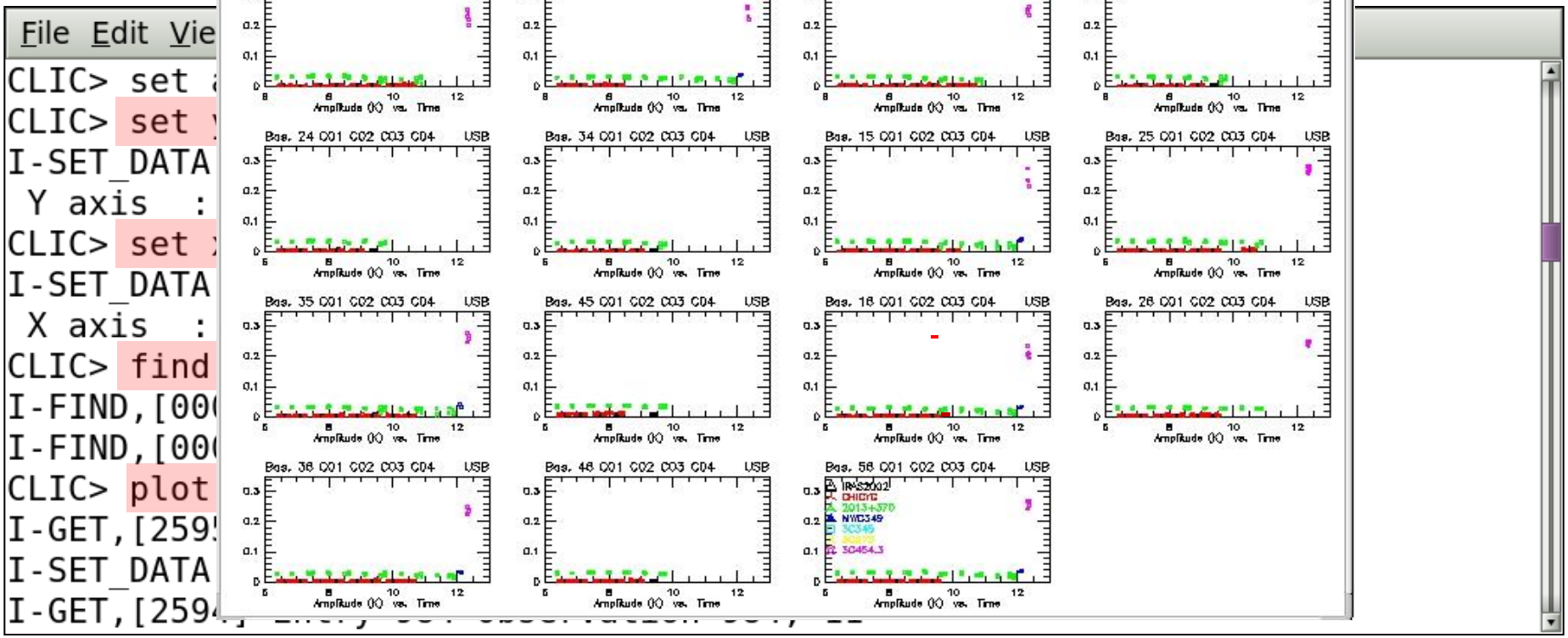
It may happen… that there remain some wrong visibilities

Returning to CLIC to flag the bad visibilities

```
File  Edit  View  Search  Terminal  Help
CLIC> set aver scan
CLIC> set y amp
I-SET_DATA,[0000] Displaying 122773 points in each of     36 boxes
 Y axis  : Amplitude           ,   0.00 to  *
CLIC> set x time
I-SET_DATA,[0000] Displaying 122773 points in each of     36 boxes
 X axis  : Time                , * to  *
CLIC> find /proc corr /type o
I-FIND,[0000] New generation receivers data
I-FIND,[0000]        418 observations found
CLIC> plot /id col
I-GET,[2595] Entry 985 Observation 985; 12
I-SET_DATA,[2595] Displaying 122773 points in each of     36 boxes
I-GET,[2594] Entry 984 Observation 984; 11
```

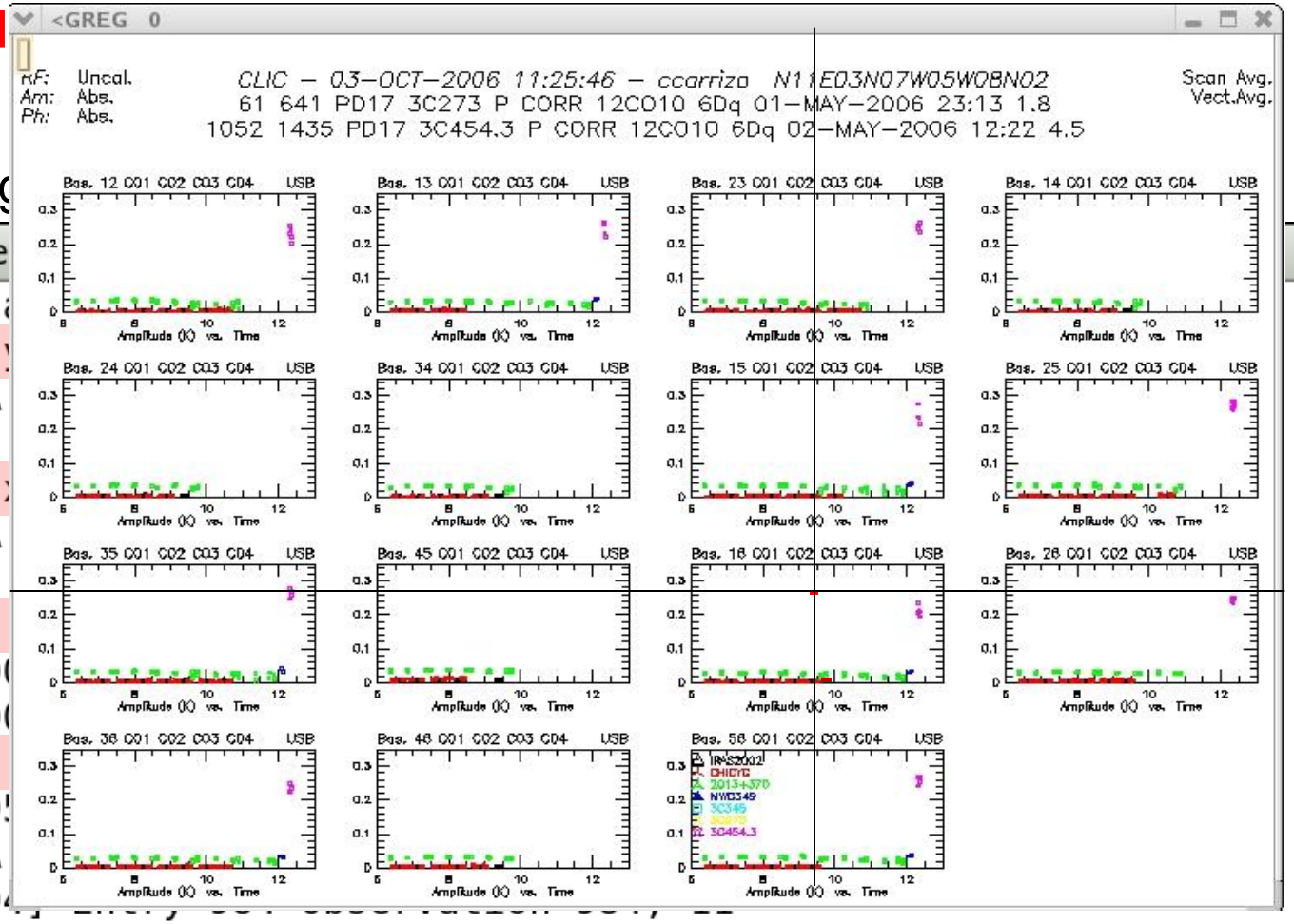
(1) Passing directly from hpb → mapping

Returning



(1) Passing directly from hpb → mapping

Returning



File Edit Vie

```
CLIC> set
CLIC> set
I-SET_DATA
 Y axis  :
CLIC> set
I-SET_DATA
 X axis  :
CLIC> find
I-FIND,[00
I-FIND,[00
CLIC> plot
I-GET,[259
I-SET_DATA
I-GET,[259
```

CLIC> cursor To define the scan range

(1) Passing directly from hpb → mapping

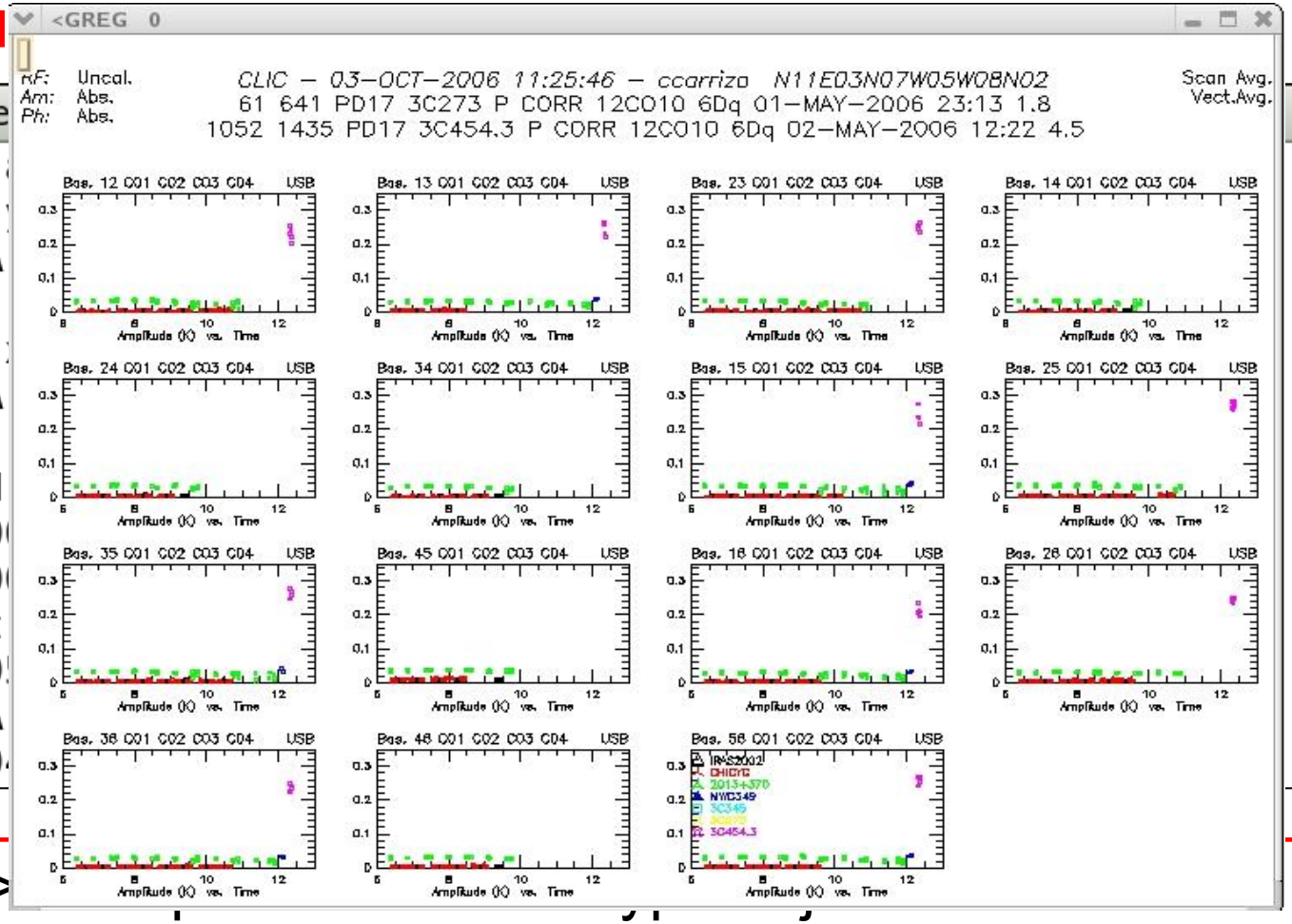
It may happen… that there remain some wrong visibilities

```
File  Edit  View  Search  Terminal  Help
CLIC> set aver scan
CLIC> set y amp
I-SET_DATA,[0000] Displaying 122773 points in each of     36 boxes
 Y axis  : Amplitude            ,   0.00 to  *
CLIC> set x time
I-SET_DATA,[0000] Displaying 122773 points in each of     36 boxes
 X axis  : Time                 , * to  *
CLIC> find /proc corr /type o
I-FIND,[0000] New generation receivers data
I-FIND,[0000]        418 observations found
CLIC> plot /id col
I-GET,[2595] Entry 985 Observation 985; 12
I-SET_DATA,[2595] Displaying 122773 points in each of     36 boxes
I-GET,[2594] Entry 984 Observation 984; 11
```

CLIC> find /procedure corr /type object /scans 1245 1255

CLIC> store quality 9

(1) Passing directly from hpb → mapping



File Edit Vie

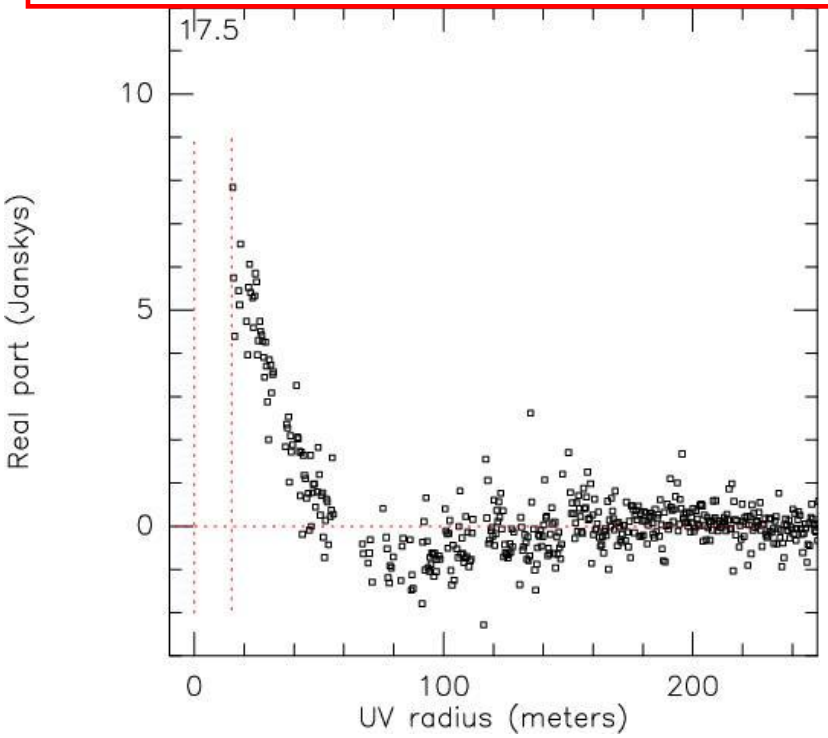
```
CLIC> set
CLIC> set
I-SET_DATA
 Y axis  :
CLIC> set
I-SET_DATA
 X axis  :
CLIC> find
I-FIND,[00
I-FIND,[00
CLIC> plot
I-GET,[259
I-SET_DATA
I-GET,[259
```

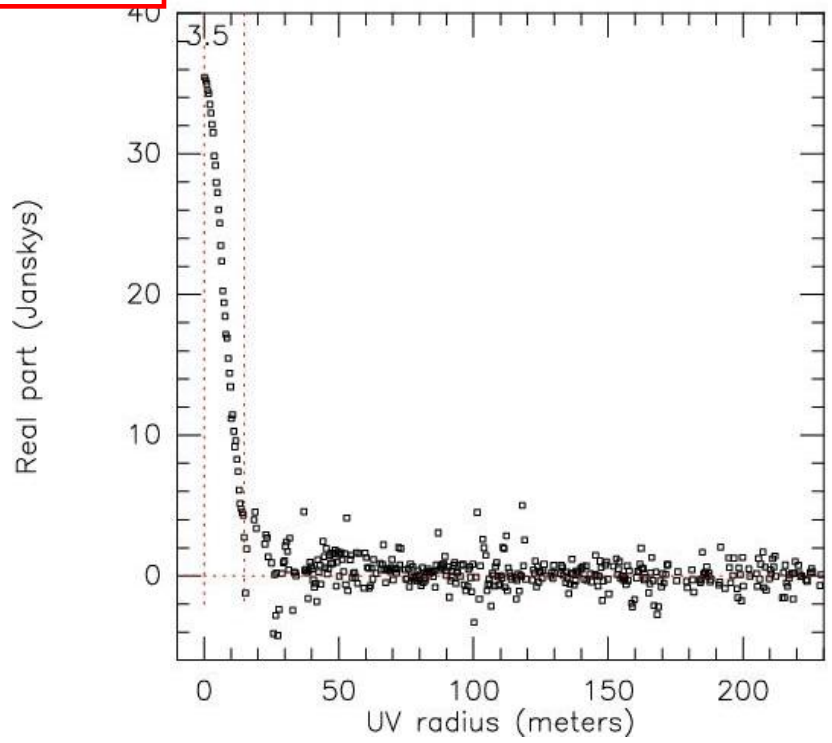
CLIC> 255

CLIC> store quality 9

(2) Passing directly from hpb → mapping

When short-spacing data, check that the relative calibration is ok

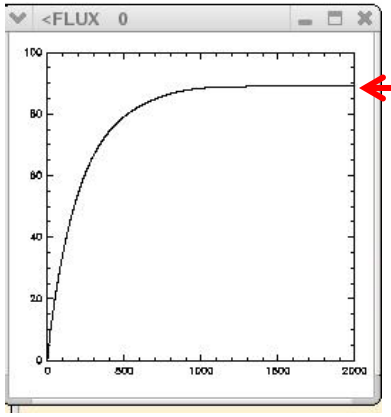




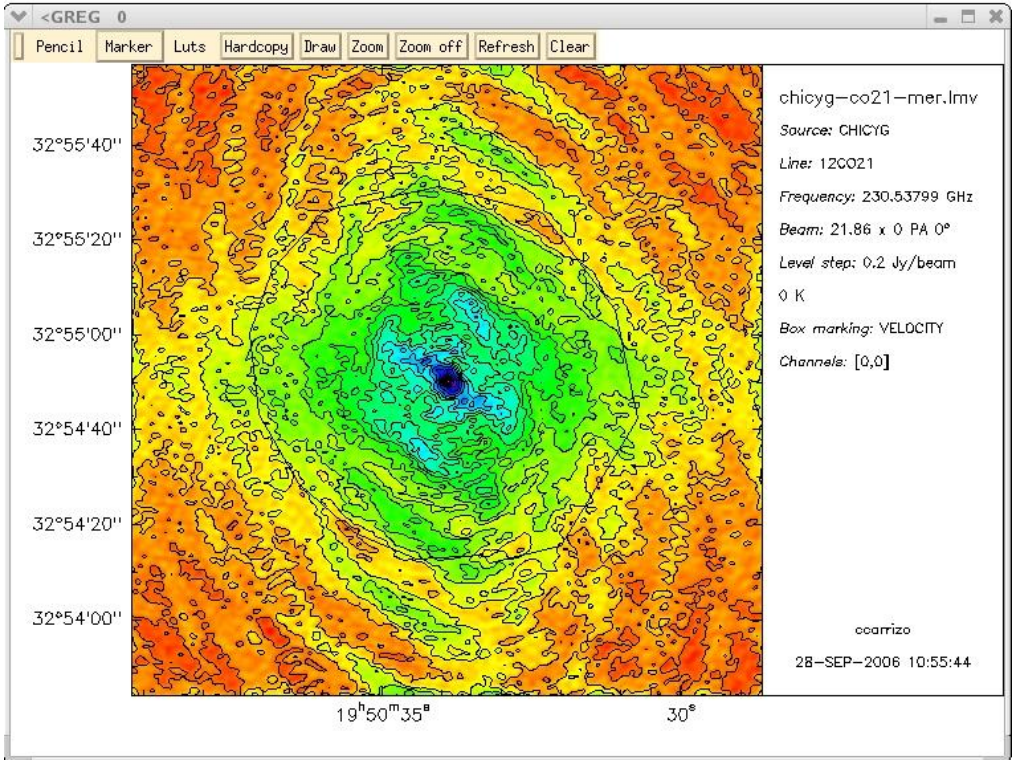
+ Short-spacing data

(3) Passing directly from hpb → mapping

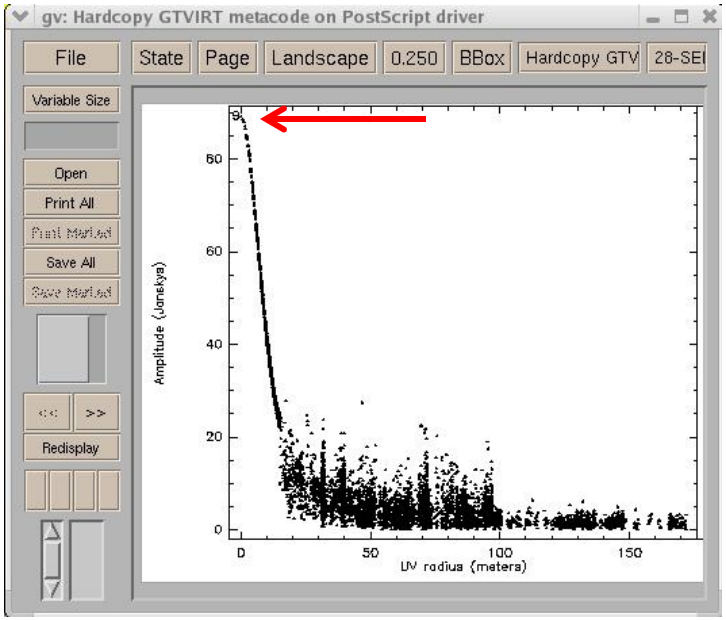
Good practice: When cleaning (extended sources)…



CCT



Dirty image



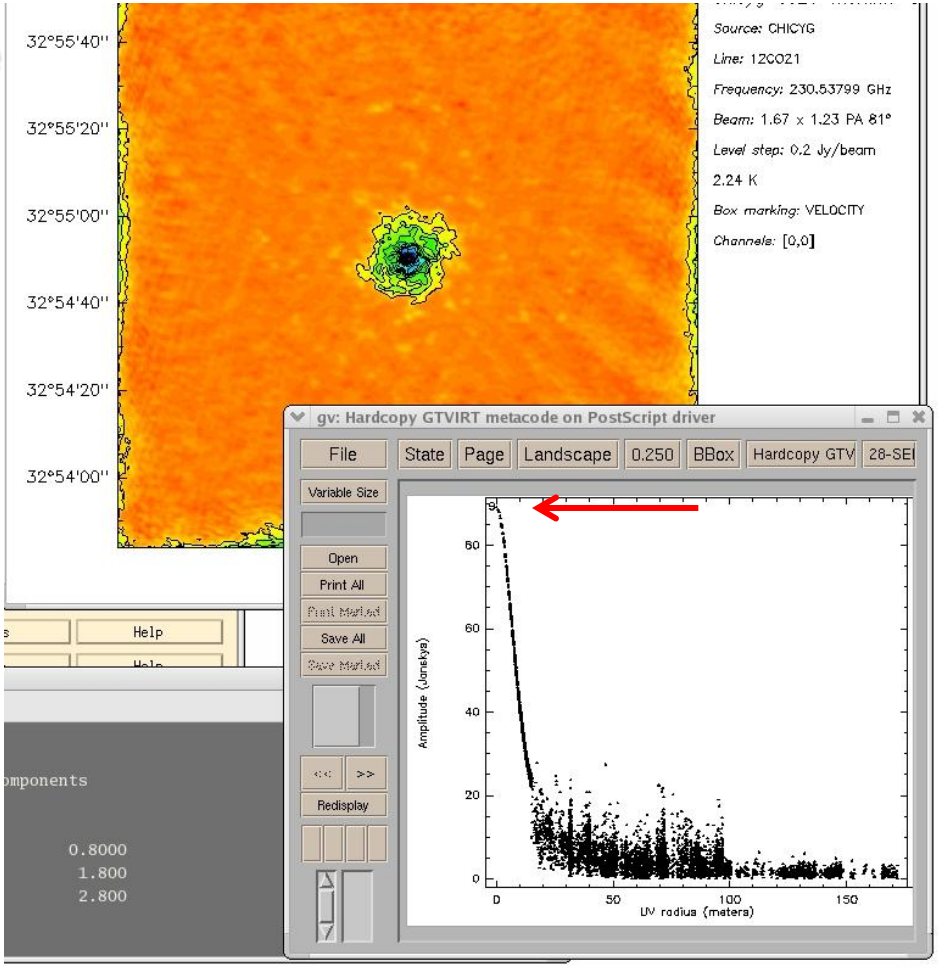
Uvradius vs Amp

(3) Passing directly from hpb → mapping

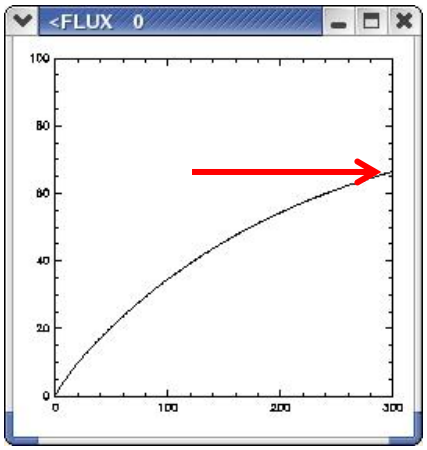
Good practice: When cleaning (extended sources)

verify that the flux obtained in the image plane coincides with that at the zero-spacing

Clean image

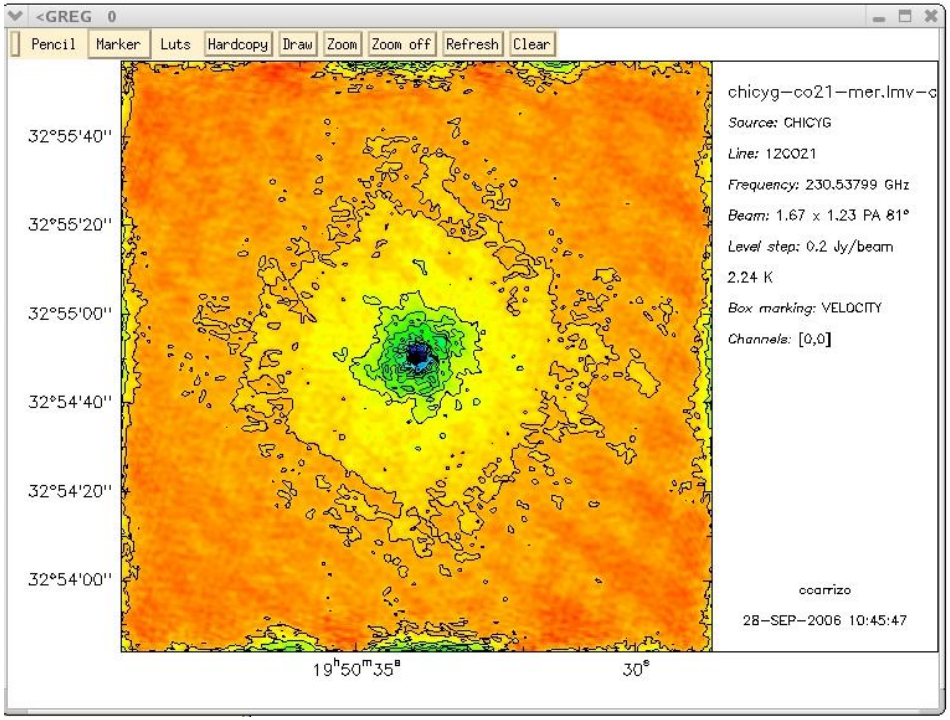


(3) Passing directly from hpb → mapping

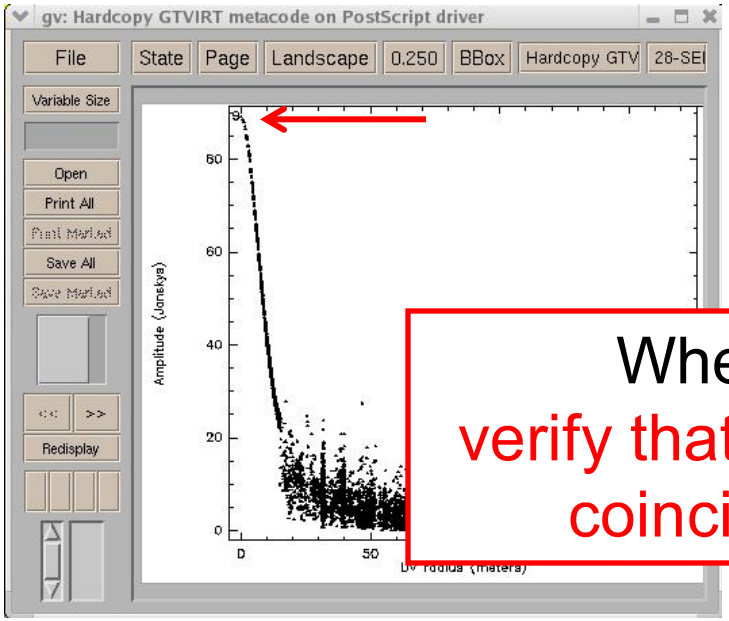


CCT

If not, it may happen…



Clean image



When cleaning (extended sources)
verify that the flux obtained in the image plane coincides with that at the zero-spacing

To conclude:

- An inspection of data in the *uv*-plane is recommended for all the projects

- A detailed analysis in the *uv*-plane: detection, modeling of simple shapes, to check relative calibration, etc…