

# VLBI Tutorial

Enno will have us working on a VLBI dataset. LOFAR is fundamentally a VLBI instrument, so it will be useful to explore how VLBI is different from connected-element interferometry.

## Testing

### J Eisloeffel's notes

```
load the data, get FITS files from
```

```
http://www.astro.rub.de/middelberg/tmp/v211a_calib.fits  
http://www.astro.rub.de/middelberg/tmp/v211b_calib.fits
```

```
chdir to directory where FITS files are, then start Aips
```

```
load the data
```

```
=====
```

```
tget fitld (or use "task 'fitld'")  
default  
datain 'PWD:v211a_calib.fits'  
outname 'v211a'  
go
```

```
Do the same with the other file
```

```
=====
```

```
tget fitld  
default  
datain 'PWD:v211b_calib.fits'  
outname 'v211b'  
go
```

```
make sure the new files have catalog numbers 1 and 2!
```

```
Take a look at the scans
```

```
=====
```

```
tget listr  
default
```

```
getn 1
optype 'SCAN
go

plot spectra
=====

tget possm      * or    task 'possm'
default
getn 1
dotv 1
flagver -1
nplots 4
aparm (9) 1
solint 1
aparm 0, 1, 0, 0, -180, 180, 0, 0, 1, 0
go

* stop possm by clicking into the window and then pressing d like "done"
```

\* where do the slopes and offsets across the band come from?  
\* how would one fix it?

```
plot the spectra with first calibration
=====
```

```
tget possm
default
getn 1
dotv 1
docalib 1
gainuse 2
flagver -1
nplots 4
aparm (9) 1
solint 1
aparm 0, 1, 0, 0, -180, 180, 0, 0, 1, 0
go
```

the edges of the passband have low amplitudes, flag them:
=====

```
tget possm
default
getn 1
dotv 1
```

```
docalib 1
gainuse 2
flagver 1
nplots 4
aparm (9) 1
solint 1
aparm 0, 1, 0, 0, -180, 180, 0, 0, 1, 0
go
```

Now we can average the data across the band and have a look at the phases as a function of time

```
=====
tget vplot * or task 'vplot'
tvinit
default
getn 1
nplots 6
docalib 1
gainuse 2
dotv 1
flagver 1
bchan 1
echan 64
avgif 1
bparm 0 2
go
```

Hmmm, that was a bit messy, zoom into a short section

```
=====
tget vplot
tvinit
default
getn 1
nplots 6
docalib 1
gainuse 2
dotv 1
flagver 1
bchan 1
echan 64
avgif 1
bparm 0 2
timerang 1 0 0 0 1 2 0 0
go
```

```
*** some tests done on the spot
```

```
timerang 1,0,0,0,1,2,0,0
bparm 0
go
timerang 0
go
```

Look at the uv plane coverage

```
=====
tget uvplt * or task 'uvplt'
tvinit
default
getn 1
bparm 6 7
bif 1
eif 1
bchan 30
echan 30
dotv 1
go
```

Compare that to the uv plane coverage of the v211b file (after above commands, just "getn 2" and "go" again).

```
tget imagr * or task 'imagr'
default
getn 1
sources '0022-423'
docalib 1
gainuse 6
bchan 1
echan 64
bif 1
eif 4
nchav 64
flagver 1
outname 'DEMO'
cellsi 0.002 0.002
imsize 1024
niter 100
dotv 1
go
```

```
dowait 1
go

* set a box around the dirty image using tvbox, click a, resize box, exit d
* clean with a small clean window
* continue cleaning (wait for 30sec)
* stop cleaning

tvzoom
* d for done

tvfiddle * a to change colour, b/c to zoom in/out, d for done

* make a contour map
task 'kntr'
pcat
getn 4

* help

docont 1
dogrey 1
dovect 0
blc 450,450
trc 560,560
clev = 8.5503E-03
levs = -2,2,4,8,16,32,64
dowedge = 1
cbplot = 1 * cbplot = 2 to set beam plot to lower right
dotv = 1

tvinit
go

dogrey = 1
go

* draw to plot file
tget kntr
dotv = -1
go

* make a postscript file

task 'lwpla'
inp
outfile = 'PWD:demo.ps'
go
```

```
* make a fits-file

task 'fittp'
inp
dataout = 'PWD:demo_enno.fits'           * final ' to capitalise
go

getn 1
task 'listr'
optyp = 'scan'
go
```

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