Test of the Implementation of polrotation the the BBS Beam-Model

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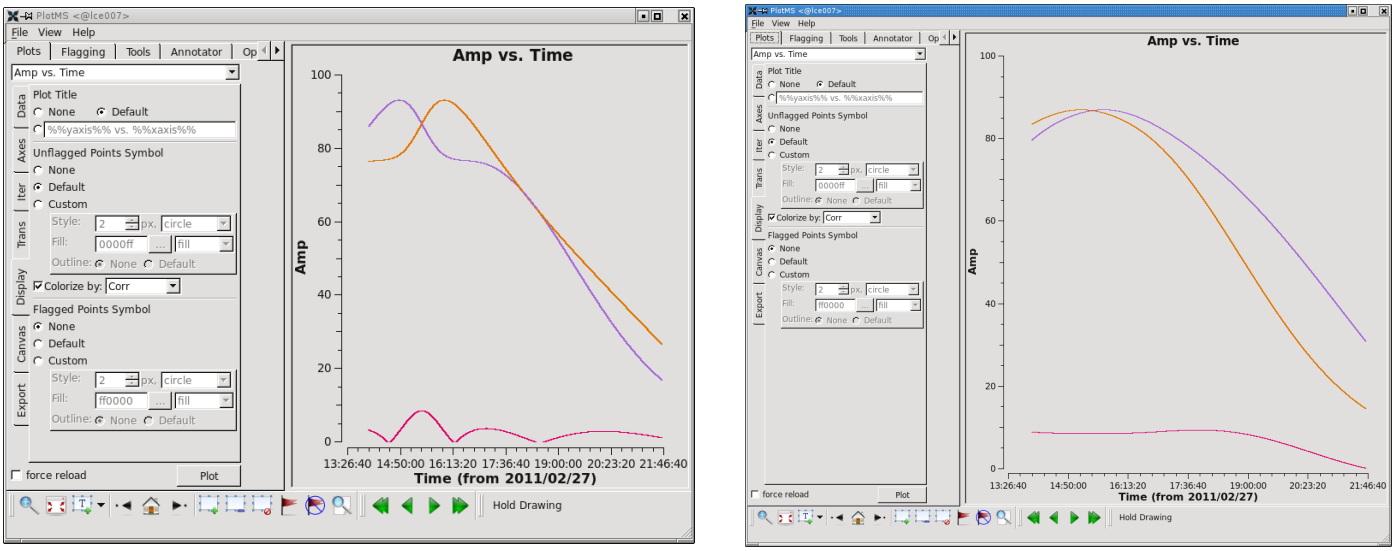
1) Simulated Data

I simulated data of a single point source with 90 Jy Stokes I and 10 Jy Stokes Q flux in the center of the beam.
As template (for UV-coverage direction etc.) I took one subband of observation L2011_23648: "`L23648_SB042_uv.MS.dppp`" (an observation of PSR J0218+42 with 3C66 and 3C65 in the FOV).
The resulting visibilities can be seen in these two plots:

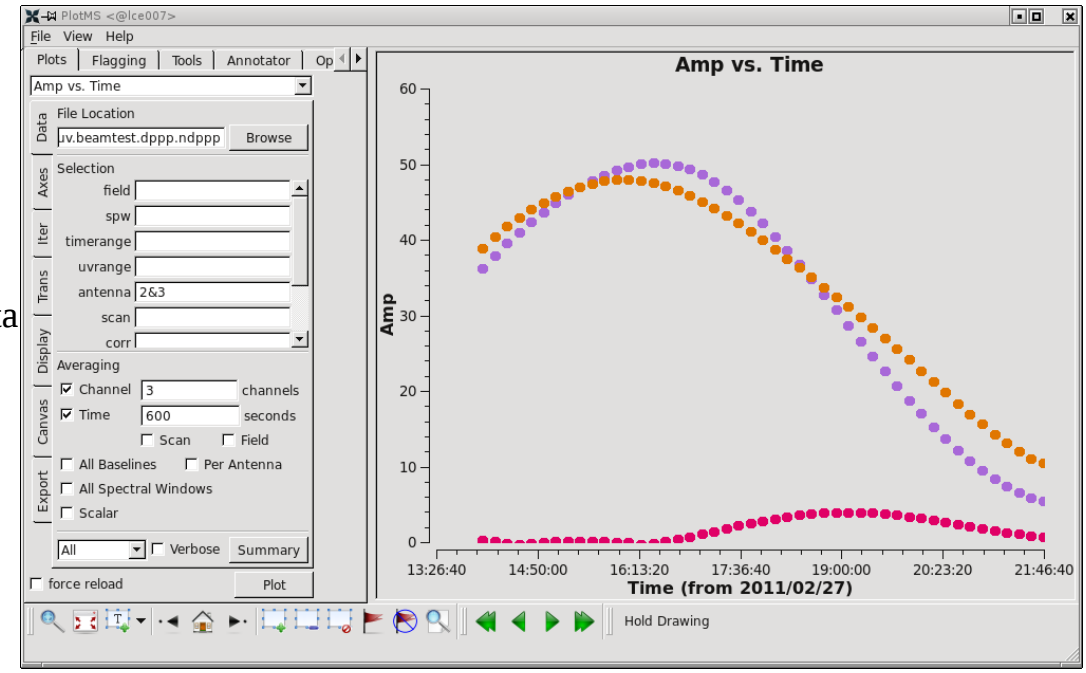


Left: Old beam-model, Right: new beam-model

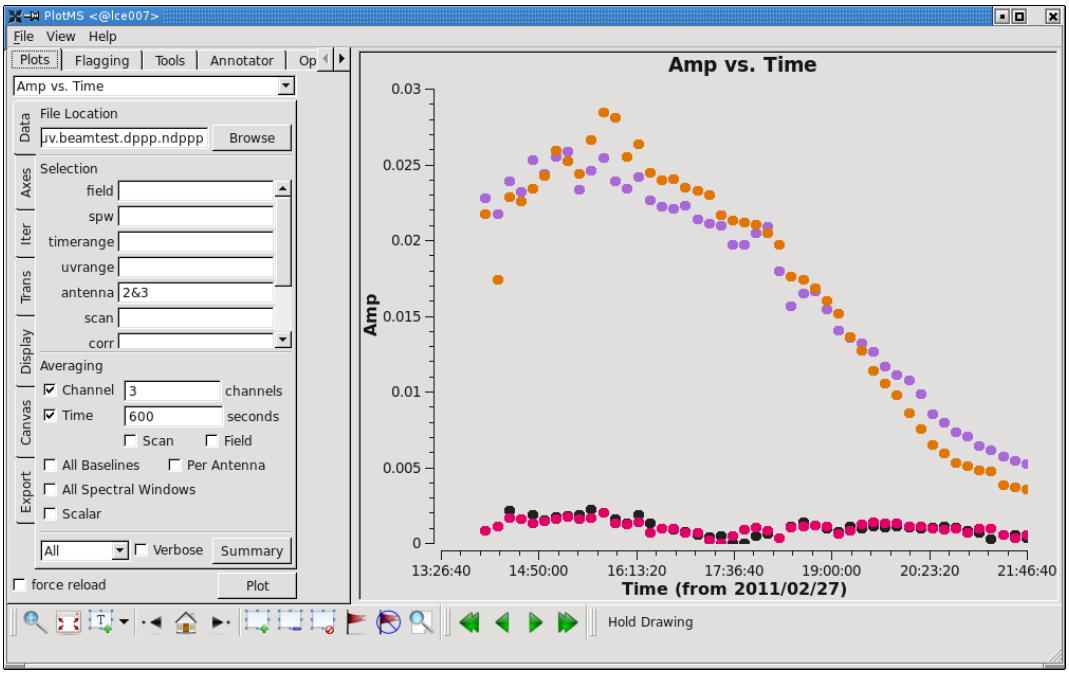
2) Comparison with real Data

To compare the beam-models with real data I generated simulated data with BBS for the observation used as a template before, but now using the sky-model used for calibration of the data ((clean-)component list of a WSRT map of the same region). Then I compared the simulated visibilities for the two simulations with the uncalibrated data. To reduce the noise the data was heavily averaged (all 3 frequency channels and 600 second into one data point).
On short baselines an eyeball-check gives a better correlation with the new beam-model than with the old. On long baselines the noise is too high to draw a conclusion.

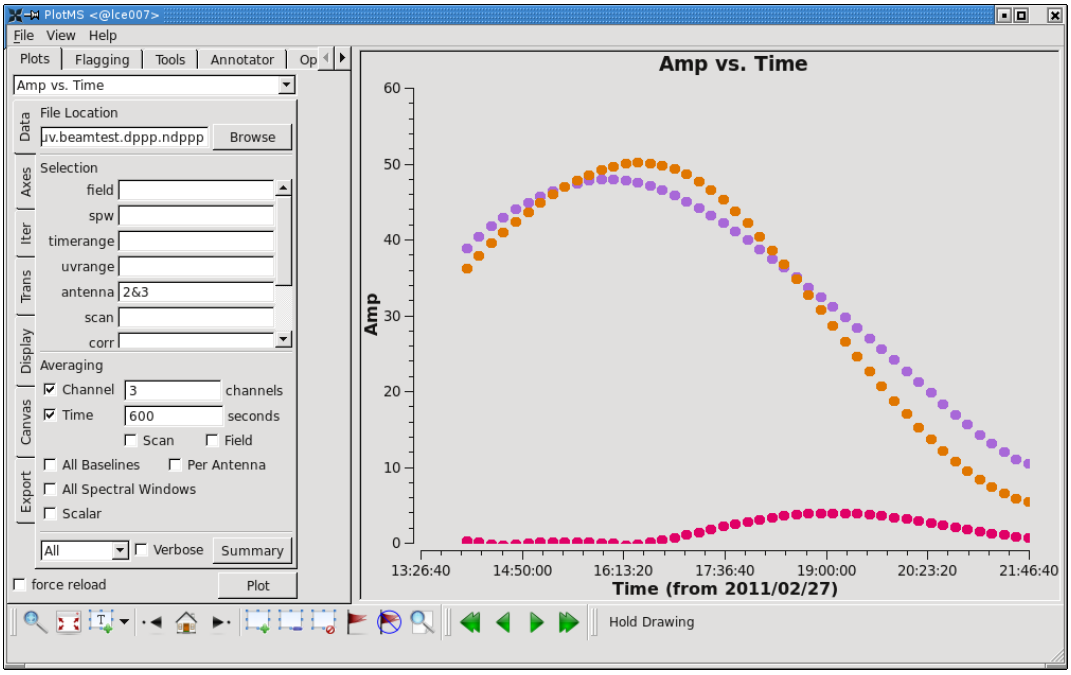
Top: Simulated data with old beam-model.



Middel: Uncalibrated data.



Bottom: Simulated data with new beam-model.



3) Calibrating and imaging data

PSR J0218+42 is highly polarized, in a correct calibration (including ionospheric effects) the position angle of the pulsar should stay constant during the whole observation. (6.5 usable hours)
I calibrated the data on the already mentioned sky-model and imaged the calibrated visibilities with the awimager in 1 hour steps.
The results are not conclusive, the position angle of the polarized emission changed between beam-models, but in both cases it changes from time-step to time-step. To me it is unclear if this is a problem of the awimager, changes in the ionosphere or something else.
The peak fluxes of PSR J0218+42 in I, Q and U and from that calculated the fraction of polarization and position angle for the first 6 hours of the observation are listed below.

#Stunde	Old I	Old Q	Old U	Old %	Old PA	New I	New Q	New U	New %	New PA
1	0.34	-0.24	0.24	99%	315	0.35	0.34	-0.16	107%	115
2	0.26	0.28	0.12	117%	67	0.27	0.33	-0.19	141%	120
3	0.57	0.34	-0.21	70%	122	0.57	+/-0	-0.37	65%	180
4	0.61	0.38	-0.07	63%	100	0.59	-0.33	0.09	58%	285
5	0.65	0.4	+/-0	61%	90	0.68	-0.15	0.37	58%	337
6	0.92	0.35	0.2	43%	60	0.9	0.28	0.24	41%	49

The awimager call used was:

```
awimager
  ms=L23648_SB042_uv.beamtest-imaging-new.dppp.ndppp.ndppp
  image=L23648_SB042_uv-new-aw-image-6thh wprojplanes=64
  npix=1024 cellsize=10arcsec data=DATA padding=1. niter=500
  stokes=IQUV mode=channel operation=csclean timewindow=500
  threshold=0. displayprogress=True
  select='TIME>2011/02/27/18:59:00.000 and
  TIME<2011/02/27/19:59:00.000'
```