

# EVN Amplitude Calibration

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# Calibration Accuracy

## Session 3/2012

Station	18 cm	6 cm	5 cm
Jb2	0.08 (6)	0.13 (9) *	0.11 (6) *
Ef	0.06 (6) *	0.05 (8)	0.04 (7)
Mc	0.08 (2)	0.03 (9)	0.08 (7)
On	0.06 (4)	0.05 (8)	0.11 (7) *
Tr	0.07 (6)	0.03 (9)	0.04 (7)
Wb	0.03 (6)	0.02 (9)	0.09 (6) *
Ys		0.03 (8)	0.04 (7)
Nt	0.07 (6)	0.10 (8)	0.07 (9)
Hh	0.03 (3)	0.04 (3)	
Ur	0.14 (3) *	0.07 (6)	
Sh	0.10 (4)	0.05 (6)	
Bd	0.07 (3)	0.05 (6)	
Zc	0.06 (3)	0.14 (5) *	
Sv			
Ar	0.05 (2)		
Ro	0.05 (1)		

## Session 2/2012

Station	18 cm	3.6 cm	6 cm
Jb1	0.05 (8)		Failure*
Jb2			
Ef	0.03 (8)	0.03 (3)	0.03 (6)
Mc	0.12 (8)	0.05 (3)	0.05 (6)
On	0.08 (8)	0.04 (3)	0.05 (4)
Tr	0.08 (7)		0.04 (5)
Wb	0.03 (8)	0.08 (3)	0.03 (6)
Ys		0.04 (3)	0.04 (5)
Nt	0.08 (8)	0.10 (3)	0.10 (6)
Hh	0.12 (2)		0.04 (2)
Ur	0.11 (4) *	0.18 (3) *	0.03 (5)
Sh			
Bd	0.07 (4)	0.10 (2) *	0.04 (4)
Sv	0.09 (4)	0.14 (2) *	0.17 (4) *
Zc	0.11 (4)	0.06 (2)	0.07 (4)

## Session 1/2012

Station	18 cm	3.6 cm	6 cm
<b>Jb1</b>	<b>6.23 (2)</b>		<b>0.16 (6) *</b>
Ef	0.06 (2)	0.05 (3)	0.07 (9)
Mc	0.10 (2)	0.10 (3)	0.08 (5)
On	0.05 (2)	0.10 (3)	0.12 (6)
Tr	<b>0.16 (2) *</b>		0.05 (6)
Wb	0.04 (2)	0.06 (3)	0.04 (9)
Ys		0.04 (2)	0.07 (8)
Hh	0.05 (2)	0.09 (2)	0.08 (8)
Ur	0.07 (2)	0.10 (2)	0.05 (4)
Sh		0.09 (2)	0.07 (2)
Bd	0.05 (2)	0.06 (2)	0.05 (6)
Sv	0.04 (2)	0.10 (2)	<b>2.70 (9) *</b>
Zc	0.06 (2)	0.04 (2)	0.08 (9)

Numbers here are the median absolute error in the antenna gain amplitude. This number will be approx half the error in the SEFD and is the same that you see in AIPS gain plots. The number in brackets after each entry is the number of experiments that were used to determine the median error for that entry.

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## **## Effelsberg**

- Not as good as before because DBBC 16 MHz filter caused the over-high correlation amplitude.
- Ways of fixing the problem in AIPS.
  - (1) Run ACCOR to re-normalize the cross-correlation amplitude if the side channels were removed via FITLD.
  - (2) Do not solve/apply bandpass amplitude solutions if the side channels are kept to maximise the sensitivity.

## **## Jodrell Bank 1 and 2**

- Jb2 sensitivity back to normal level,  $T_{\text{sys}} \sim 50$  K at 18/6cm
- Jb2 sensitivity is  $\sim 3600$  Jy at 22 GHz in Session 3/2012
  - No pointing calibration for Jb2.
- Jb1 sensitivity is good at 18cm, while not clear at 6cm
- No reliable rxg files available
- Problem with installing antabfs.pl

## **## Westerbork at 5cm**

- Single-dish was used at 5cm
  - Requesting a correction factor of  $\sim 4$  for  $T_{\text{sys}}$  in ES069 spectral line observations. Likely, there were significant sensitivity loss in the mode (2x2 MHz, RCP and LCP).
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## **## Urumqi**

- Calibration measurements should be checked carefully
- Low correlation amplitude in a certain BBCs.

## **## Sv, Bd, and Zc**

- Nominal SEFD was used in the antabfs file
- Good calibration depends on its system stability.

## **## Torun**

- Good calibration was maintained since Session 2/2012
- Problems with receivers are less seen.

## **## Onsala**

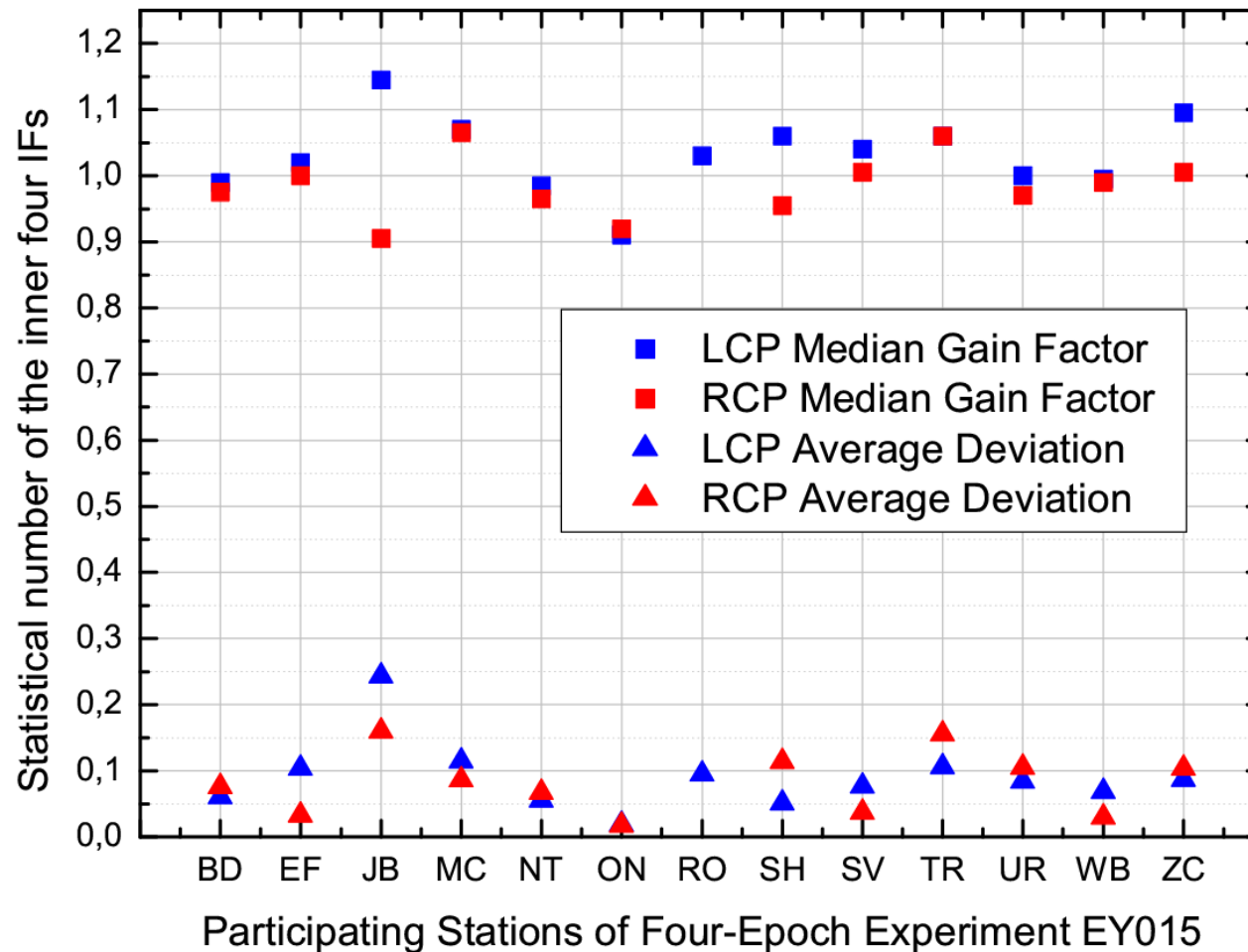
- Tsys was slightly (~10%) higher at 5cm in Session 3/2012
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# AIPS gain factors in EY015

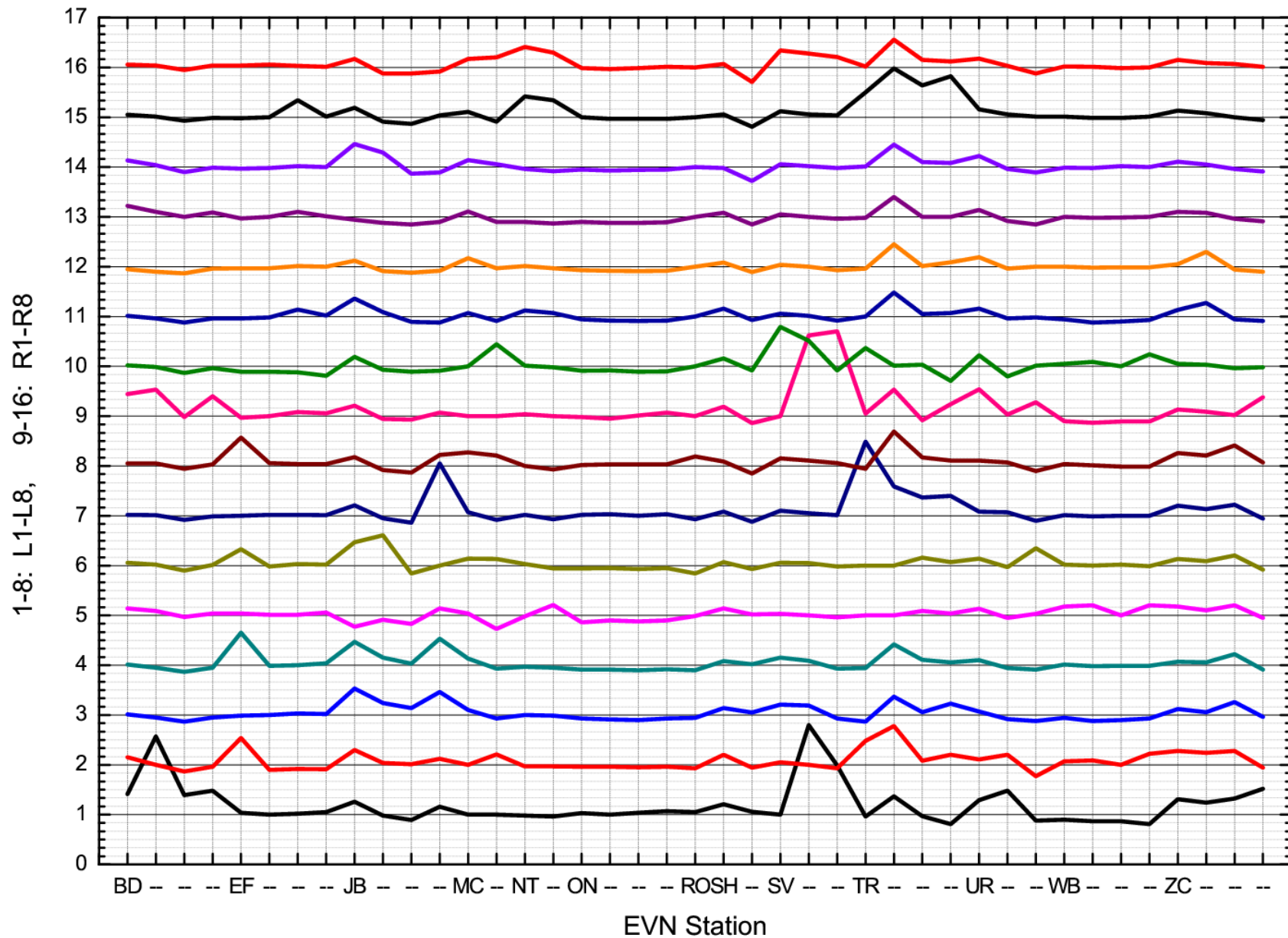
## 1.6 GHz, 1024 Mbps (8 subbands, dual polarisations), 4 epochs.

## Determined manually in Difmap via gscale.

## Only the inner 4 IFs were used in the statistics.



# IF-dependent AIPS gain factor in EY015





# EVN 22 GHz status

Stations	SEFD	Frequency Range	Gain Curve	DPFU	Tsys	2Gbps
(Jy)	(MHz, R&L)	(Opacity-free)	(K/Jy)	(K)	(Y/N)	
1	Ef	90   21700 - 24300	Yes	0.94	130	Yes
2	Ro	83   18000 - 26000	Not yet?			?
3	Ys	200   18000 - 26000	Yes	0.29	50	Yes
4	On	1380   19000 - 26000	Yes	0.06	150	Yes
5	Nt	800   21950 - 22325	Not yet?			Yes
6	Hh	3000   21400 - 24100	No	0.07	300	Yes
7	Mh	2600   21980 - 22480	No	0.03	100	Yes
8	Tr	500   22000 - 22500	Not yet?			?
9	Mc	900?   18000 - 26000	Not yet?	0.07	65?	Yes
10	Jb2		No Tsys data			?
11	Ur	850   22100 - 24000	Not yet?	0.07	60	Yes
12	Sh	1700   22100 - 22600	Yes	0.085	220	Yes
13	Sv	1143   22020 - 22520	No Tsys data			Yes
14	Zc	700   22020 - 22520	No Tsys data			Yes
15	Bd		No Tsys data			Yes
16	KU	934   21250 - 23250	Yes	0.08	~70	5B+
17	KT	934   21250 - 23250	Yes	0.08	~70	5B+
18	KY	934   21250 - 23250	Yes	0.08	~70	5B+

Note

(1) Only RCP available at Noto.

(2) Tsys data includes opacity correction at Onsala via the chopper wheel calibration.

# **New antabfs program**

**## Supporting DBBC on-off Tsys measurement and 80Hz radiometry**

**## Supporting mix-mode wide-band VLBI observations**

**-- Parsing vex file as well to get the default frequency setup information**

**## Adding scan-dependent smoothing or curve fitting to reduce the noise.**

**-- Requesting data editing as less as possible**

**## Trying to use wide-band Tsys measurement and Tsys-frequency curve to derive Tsys for each subband**

**-- Less affected by RFI**

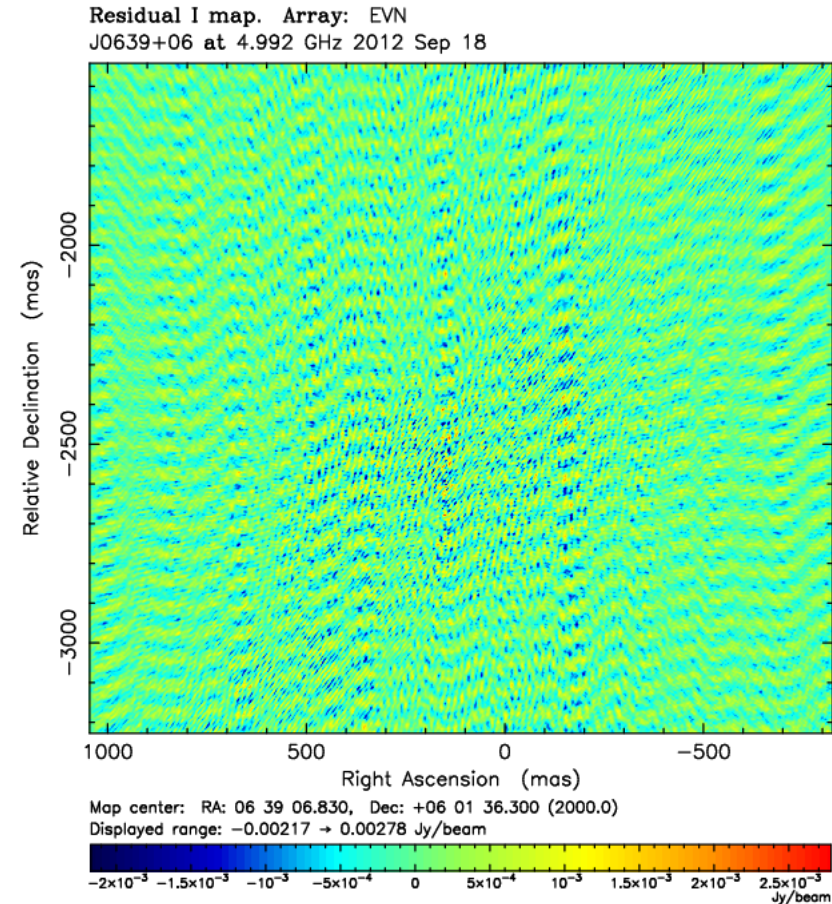
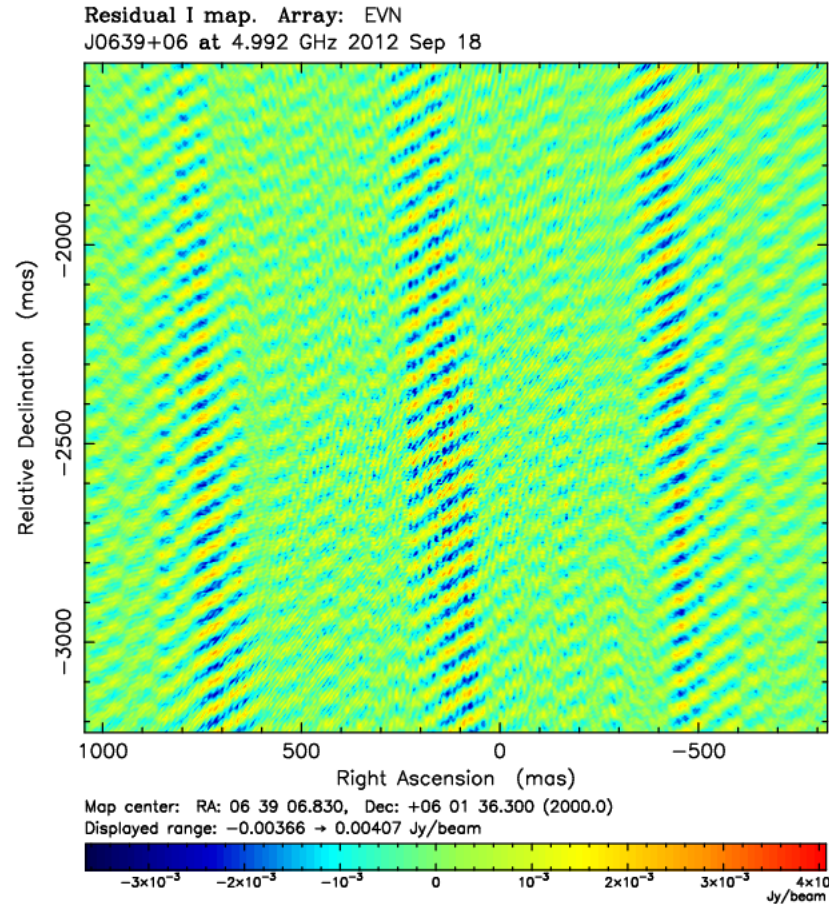
**-- More sensitive for small telescopes**

**## Adding an input file for the EVN pipeline to easily correct the residual amplitude errors of each subband**

**-- Very useful for the rapid e-VLBI observations**

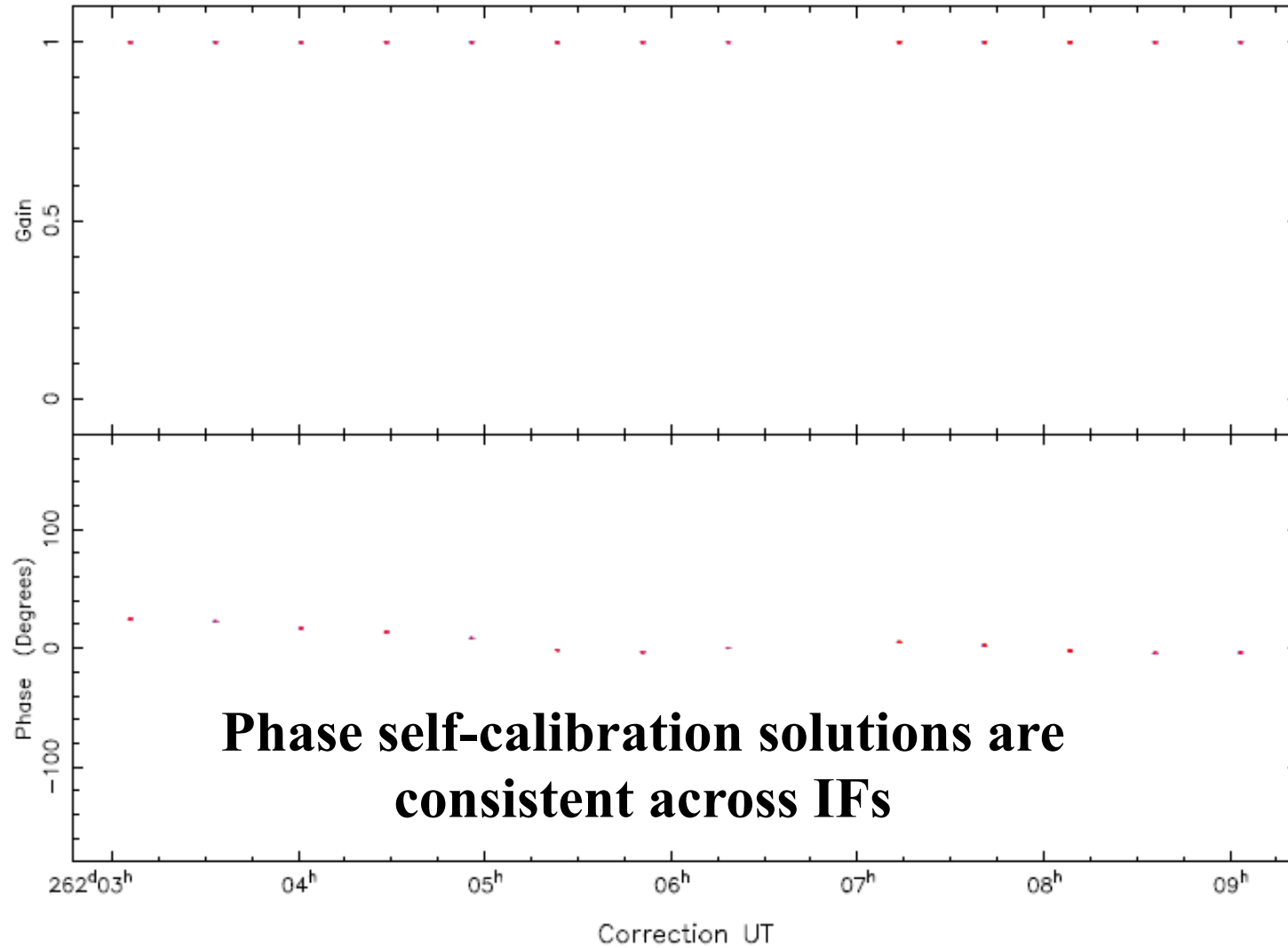
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# Phase error related to WSRT digital beam?



## J0639+0601 is a 30 mJy point-like source and **2.6 arcsec away from the phase center**. These stripes in the left residual map can be removed by the phase self-calibration of Wb data. See the right panel.

## These stripes are not seen any more in the residual map of phase-referencing observations in the later epochs when the source position error was corrected.



# Timely delivery of data

- 🕒 Timely delivery can significantly speed up the correlation, post review, and pipeline processes and make more disk packs be available in the upcoming session.
  - 🕒 Feedbacks, **rxg**, and **antab** files should be delivered **within 2 weeks after the end of a session and ASAP in the case of e-VLBI experiments.**
  - 🕒 Automatically **uploading log files** and gps data are very welcome.
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