VERA User's Meeting
September 24, 25, 2014

The Tian Ma 65-m telescope in the East Asia VLBI

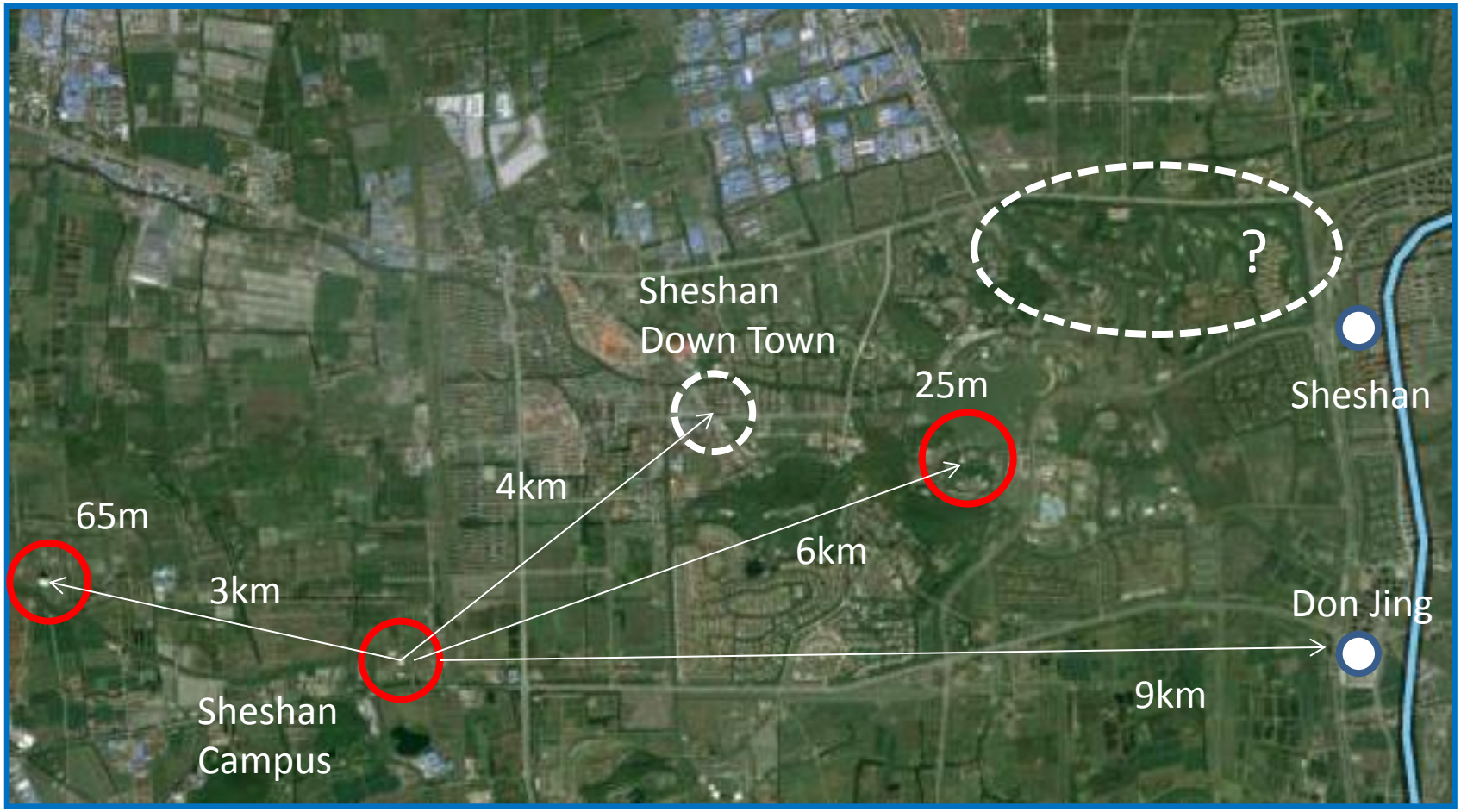
N. Kawaguchi
Shanghai Observatory

Location of the TM65m

I am now working at Sheshan Campus.

The Sheshan Campus

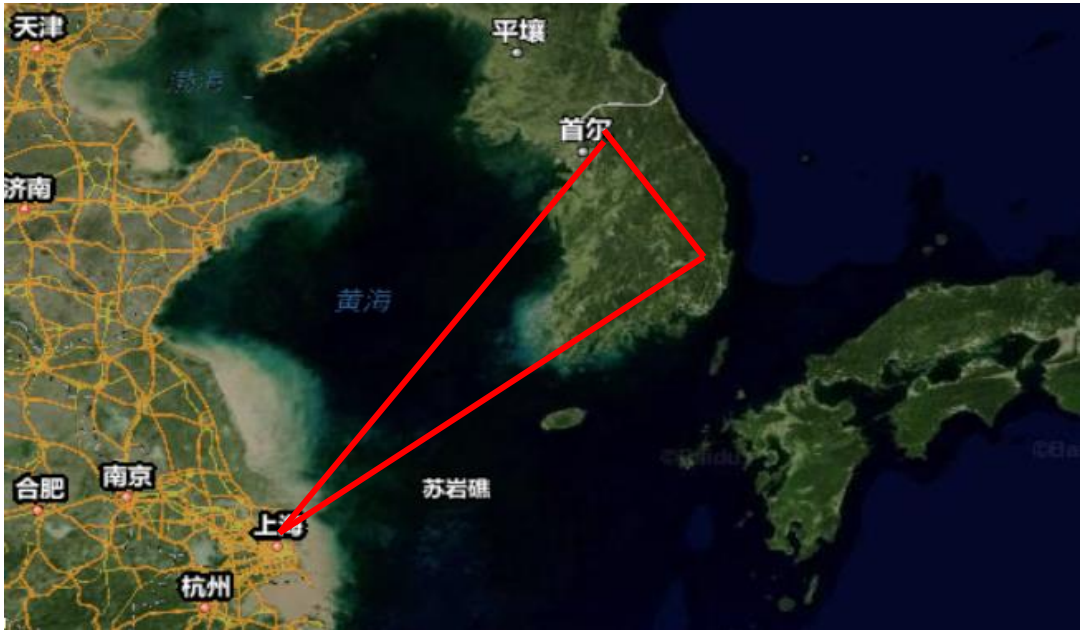
Geometry around Sheshan



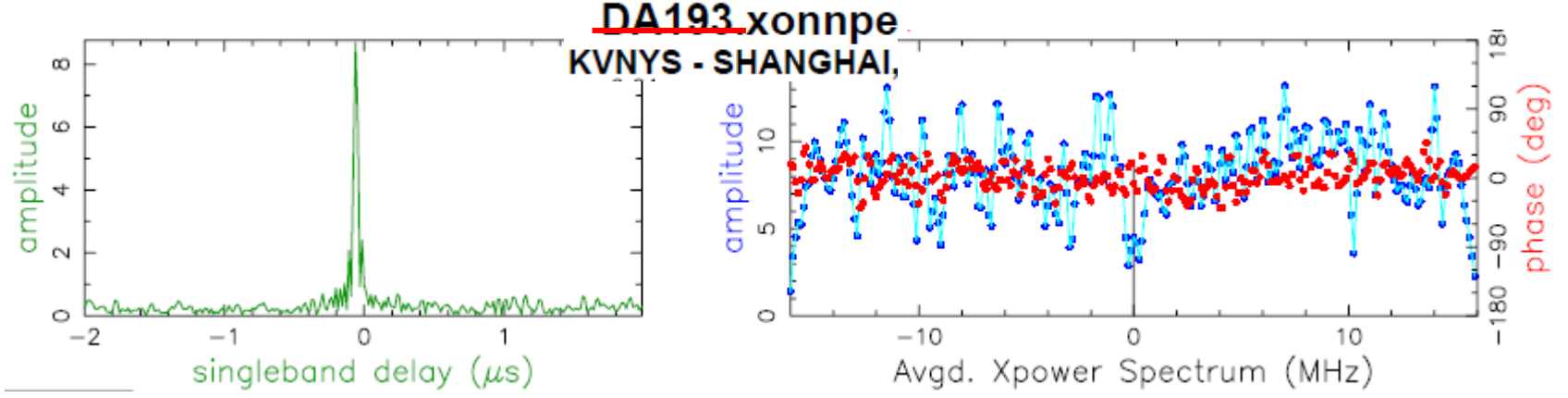
East Asia VLBI Observation on May 27, 2014

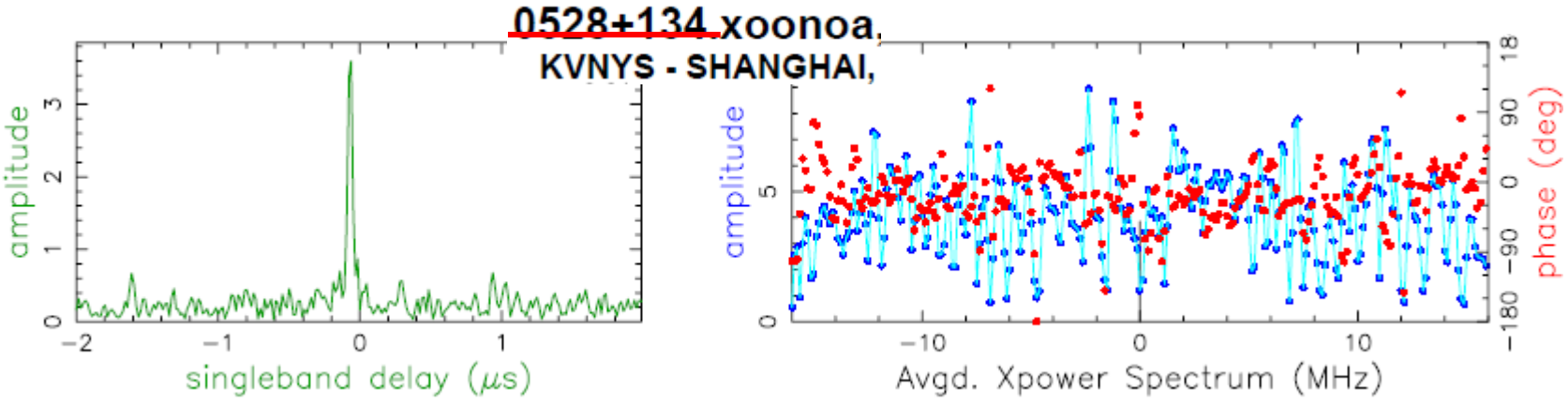
K-band Fringe Test

The Sheshan 25m telescope was participated with the KVN.



K-band fringes detected in Sheshan Correlator





Sensitivities calculated from PCSnr

DA193 is referred as 1.75Jy

Stn Name (Stn index**)	KVNUS(i)	KVNYS(k)	Sh25(j)
PCsnr (Observed)	70.2	69.2	28.7
SEFD Observed (Jy)	1372	1392	**3356**
SEFD Expected (Jy)	1368 (60%) (103K)*	1450 (60%) (114K)*	2700 (50%) (250K)

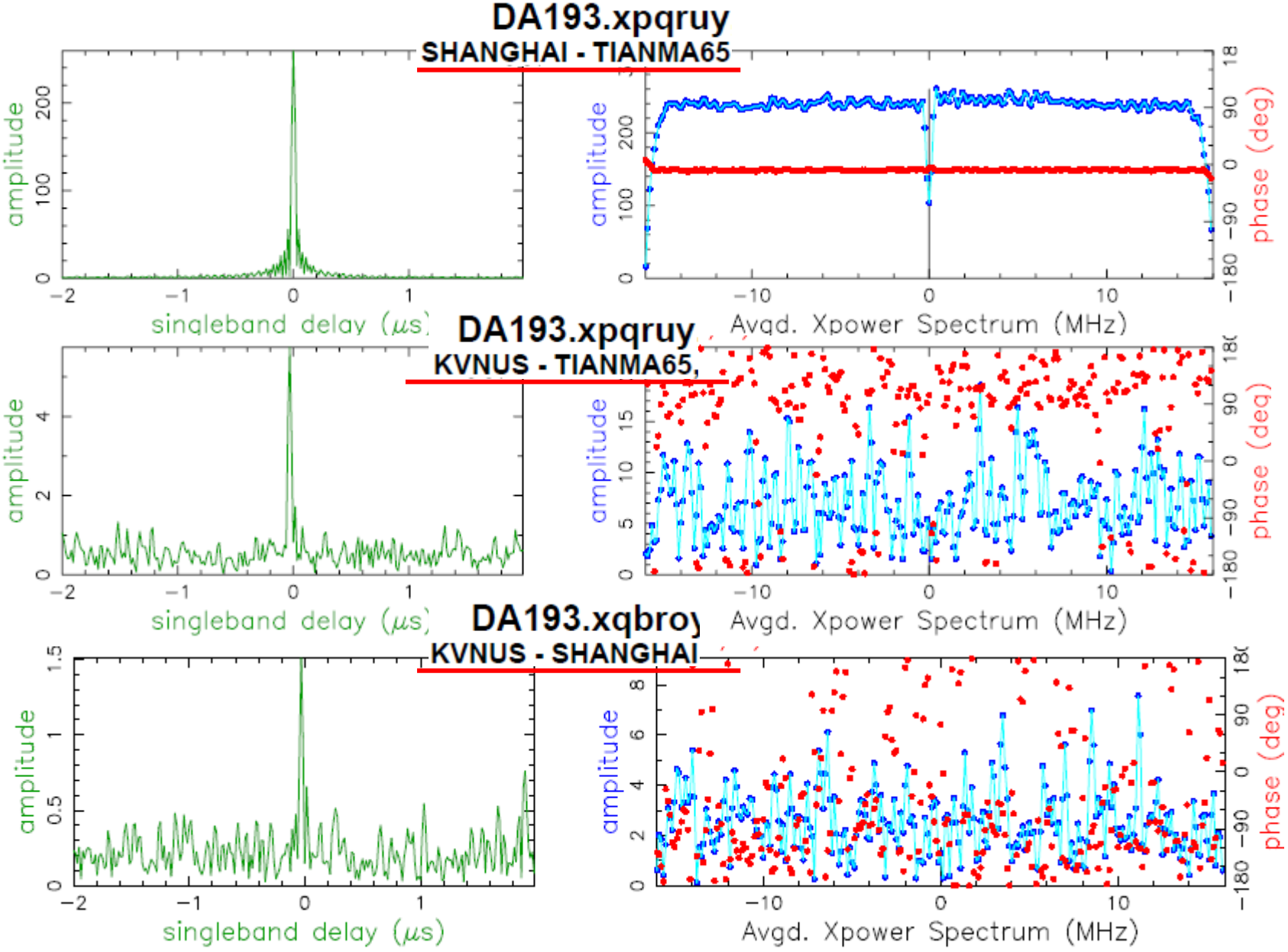
0528+134 is referred as 2.01Jy, 80% resolved

Stn Name (Stn index)	KVNUS(i)	KVNYS(k)	Sh25(j)
PCsnr (Observed)	45.2	36.3	10.7
SEFD Observed (Jy)	1242	1546	**3360**
SEFD Expected (Jy)	1222 (60%) (92K)*	1328 (60%) (100K)*	2700 (50%) (250K)

X-band Fringe Test

The 6-km baseline between Sh25m and Tm65m was connected with an optical fiber and possible to do near-real-time fringe detection.

X-band fringes

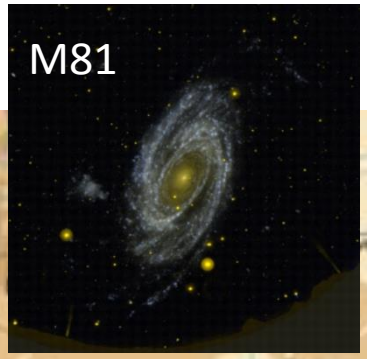


Sensitivities in X-band analyzed on the PCA, Pseudo Closure Amplitude

Station	Code	PCA	SEFD (Jy)	Prev. Result
KVNUS	U	3.322×10^{-6}	2.17×10^{6}	----------
Shanghai 25m	S	6.854×10^{-3}	**1050**	900
TianMa 65m	T	9.865×10^{-2}	**73**	77
Shanghai 25m – TianMa 65m	ST	----------	277	273 (DA193) 254 (0518+134)

M81 with three CVN stations

Feb. 14, 2014

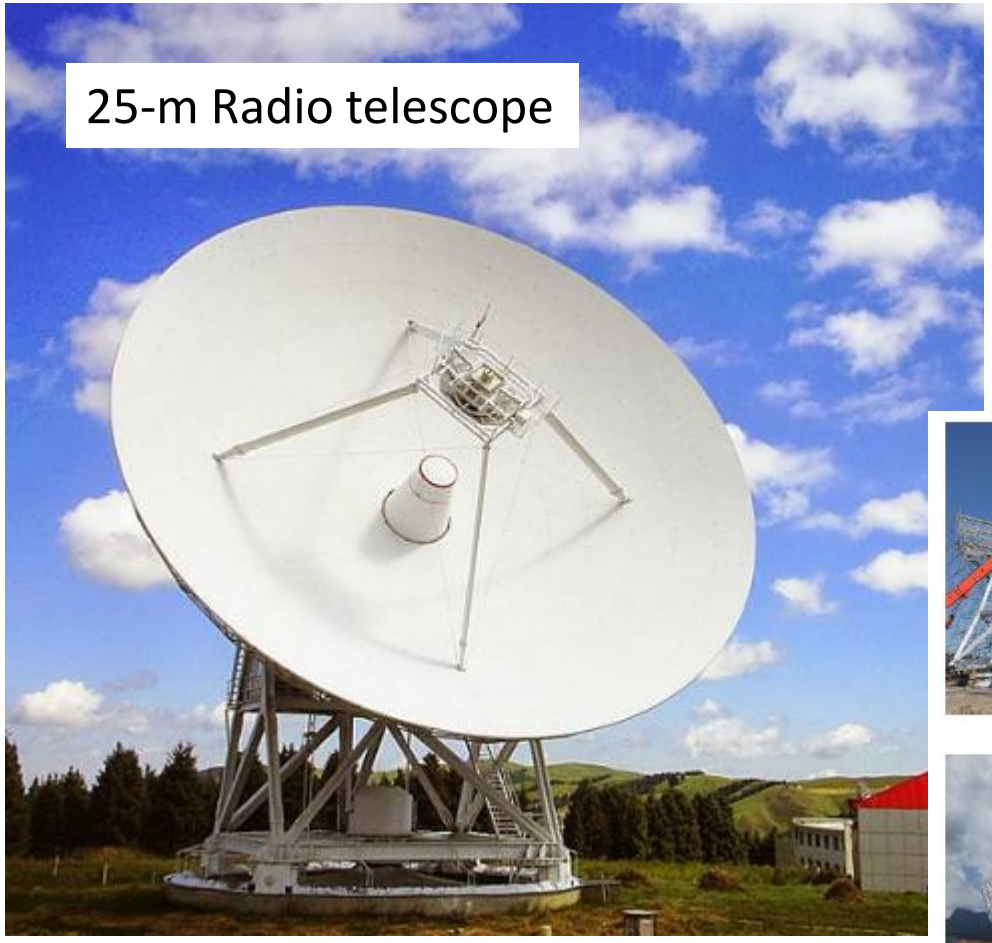


Sheshan 25m

Tian Ma 65m

The Sheshan-TianMa Baseline is unique for the short baseline and the connection by an optical fiber cable, which is good for a near realtime fringe detection and a PCA analysis.

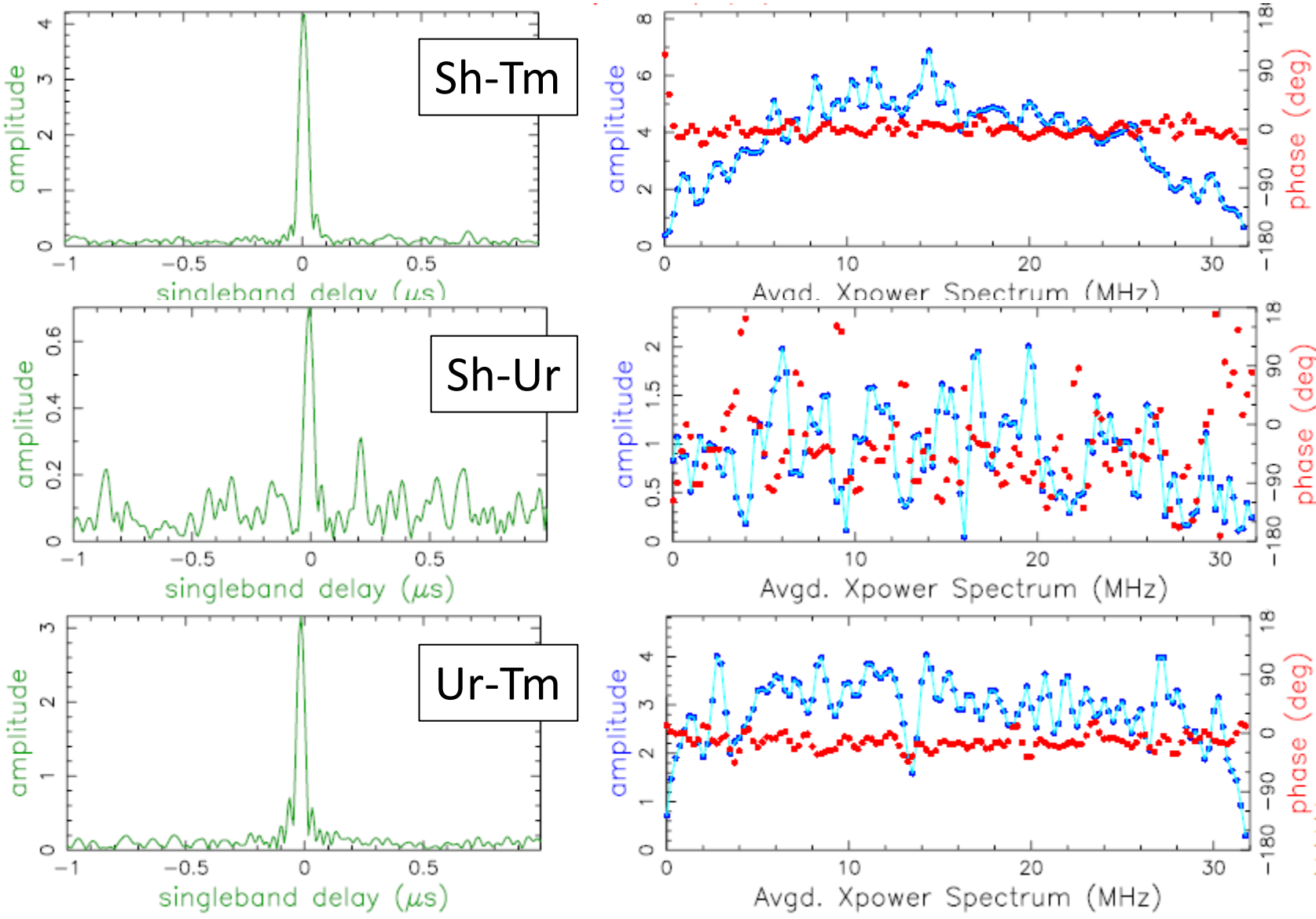
Nanshan 25-m, Urmqi



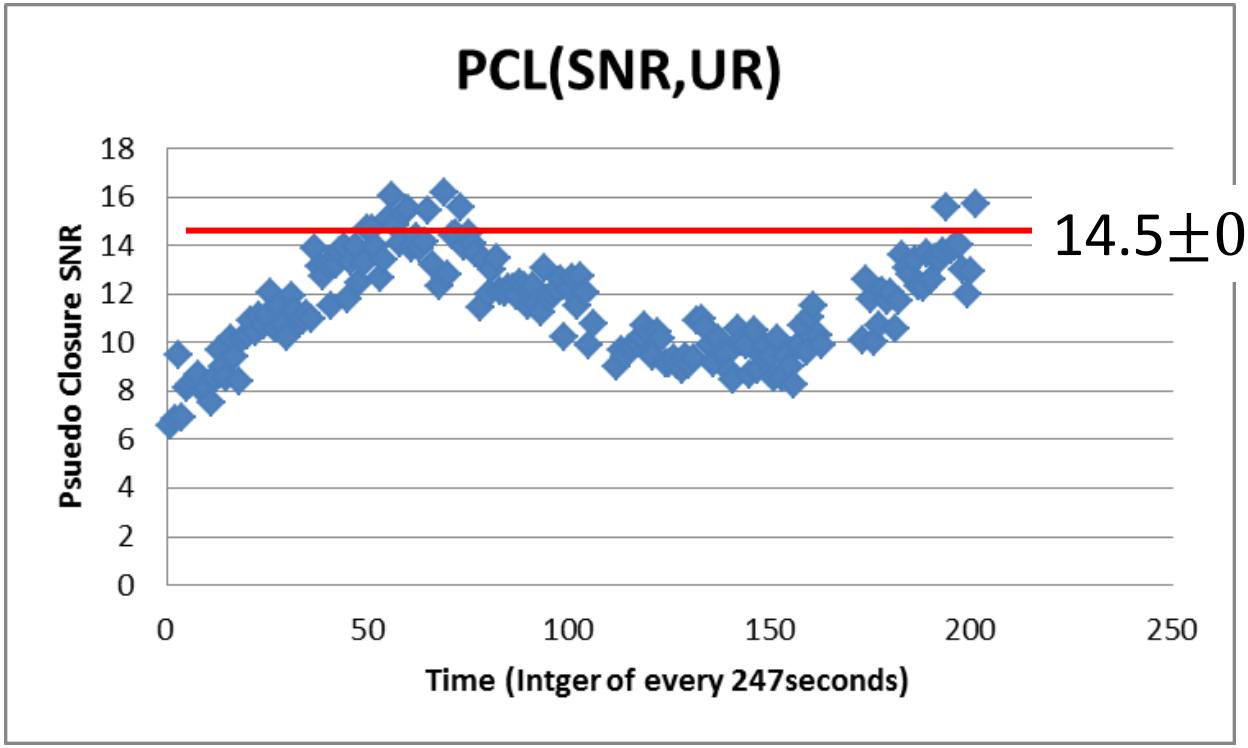
X=228310.3726m
Y=4631922.7697m
Z=4367064.0425m

Under reforming to 26-m diameter

M81 Observation on Sh25, Tm65, Ur25



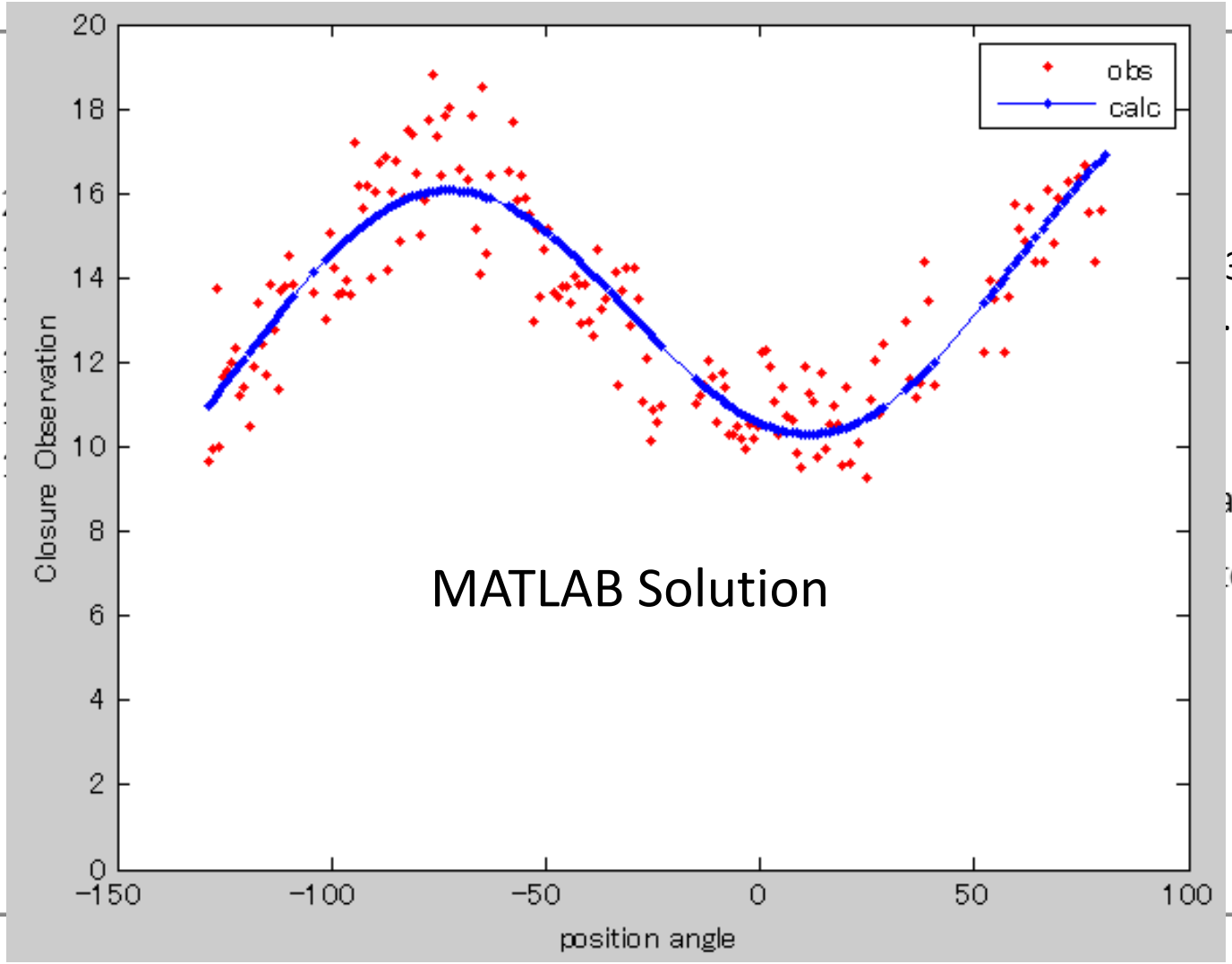
Pseudo Closure Analysis and Sensitivity of Ur25m



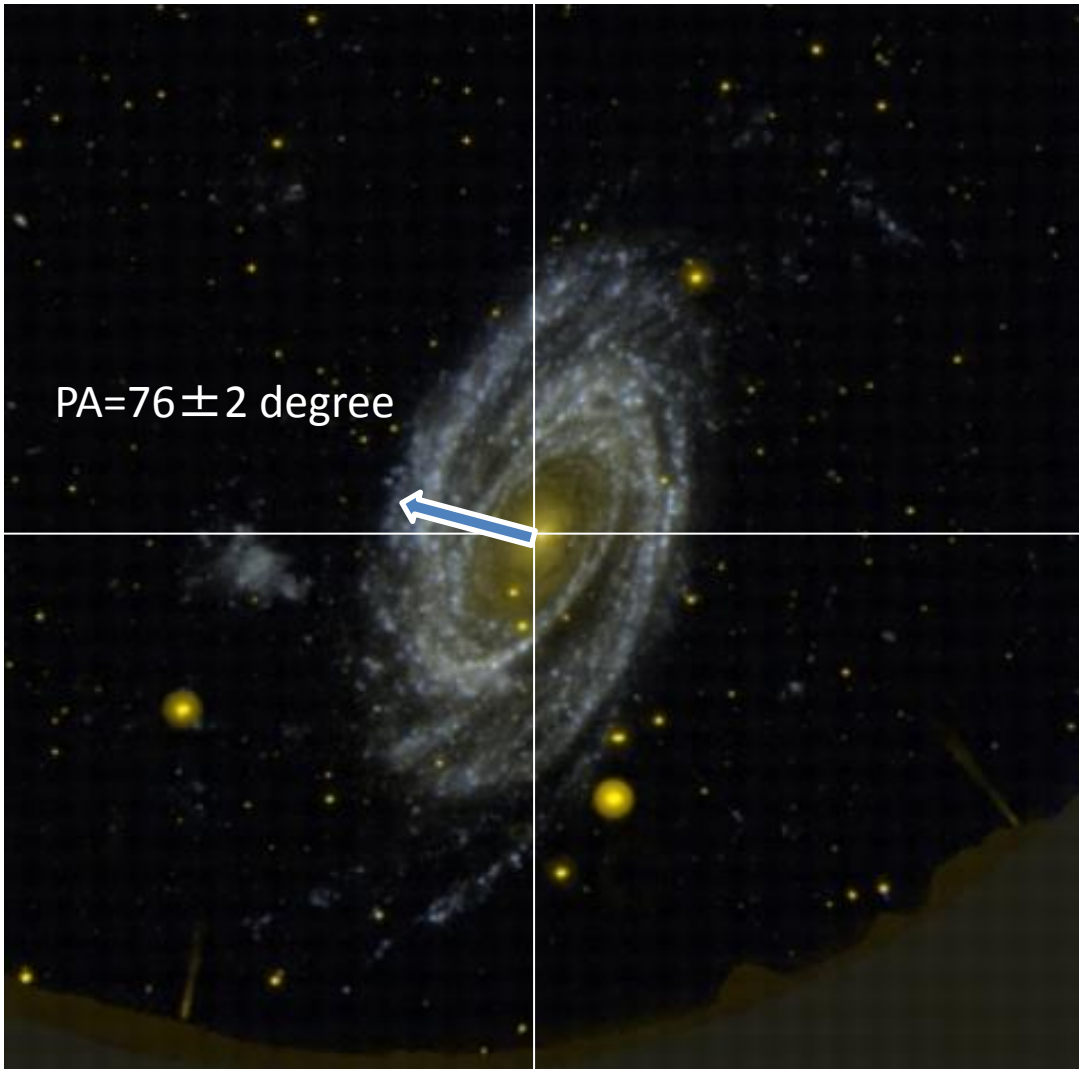
$$SEFD(Ur) = \frac{q \cdot S(M81)\sqrt{2BT}}{PCA(SNR, Ur)} = \frac{0.86 \times 0.17 \times (1.07 \times 10^5)}{(14.5 \pm 0.9)} = \mathbf{1078 \pm 70\ [Jy]}$$

(The SEFD(Sh) is 1050 Jy obtained in the EAVN fringe test in May, 2014)

Two point source model



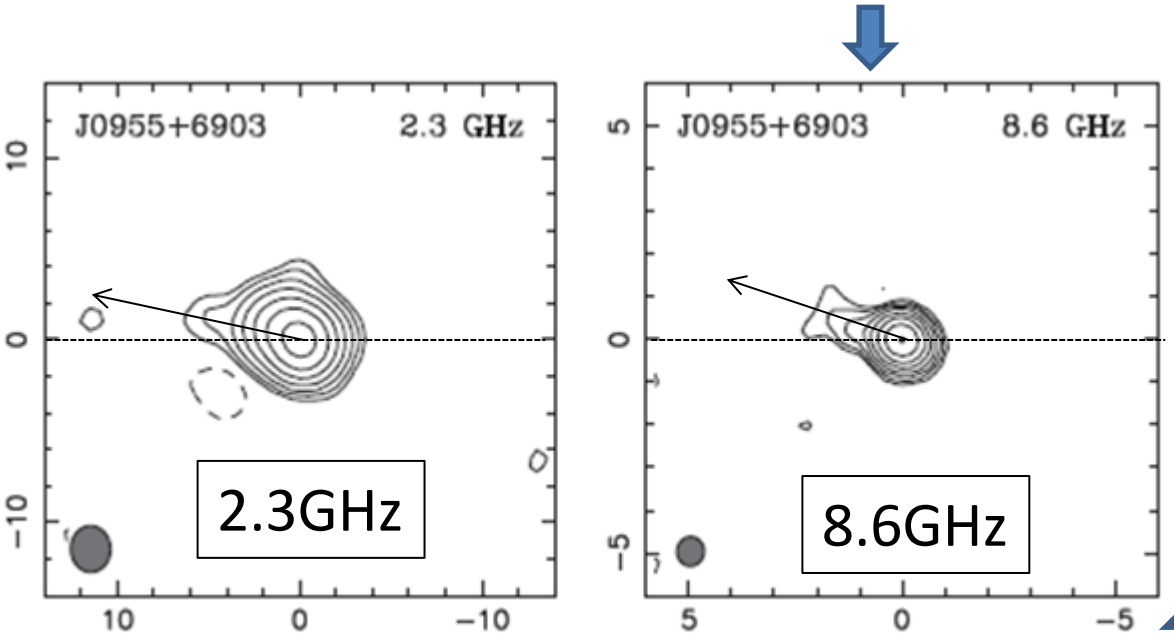
Jet Direction

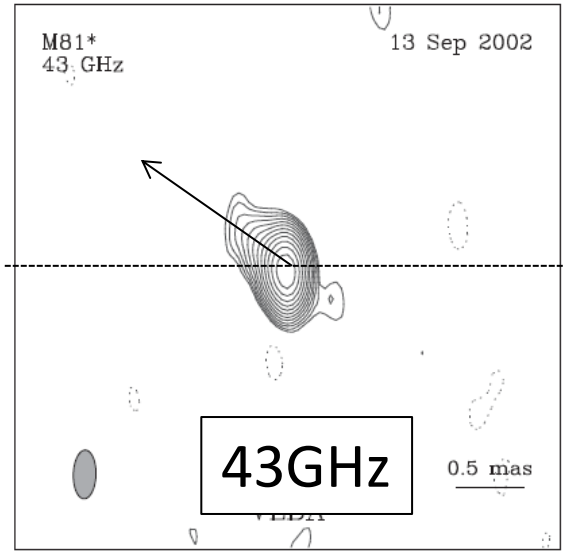


- We can give a two-point-component model to the change of PCA with the correlation coefficient of 99% as seen in the previous slide.
- We got peak PCA at the position angle of 75 degree.
- The Jet component is located at almost perpendicular to the galactic plane.

Is the position angle changing with frequency?

Our observation confirms this in X-band.

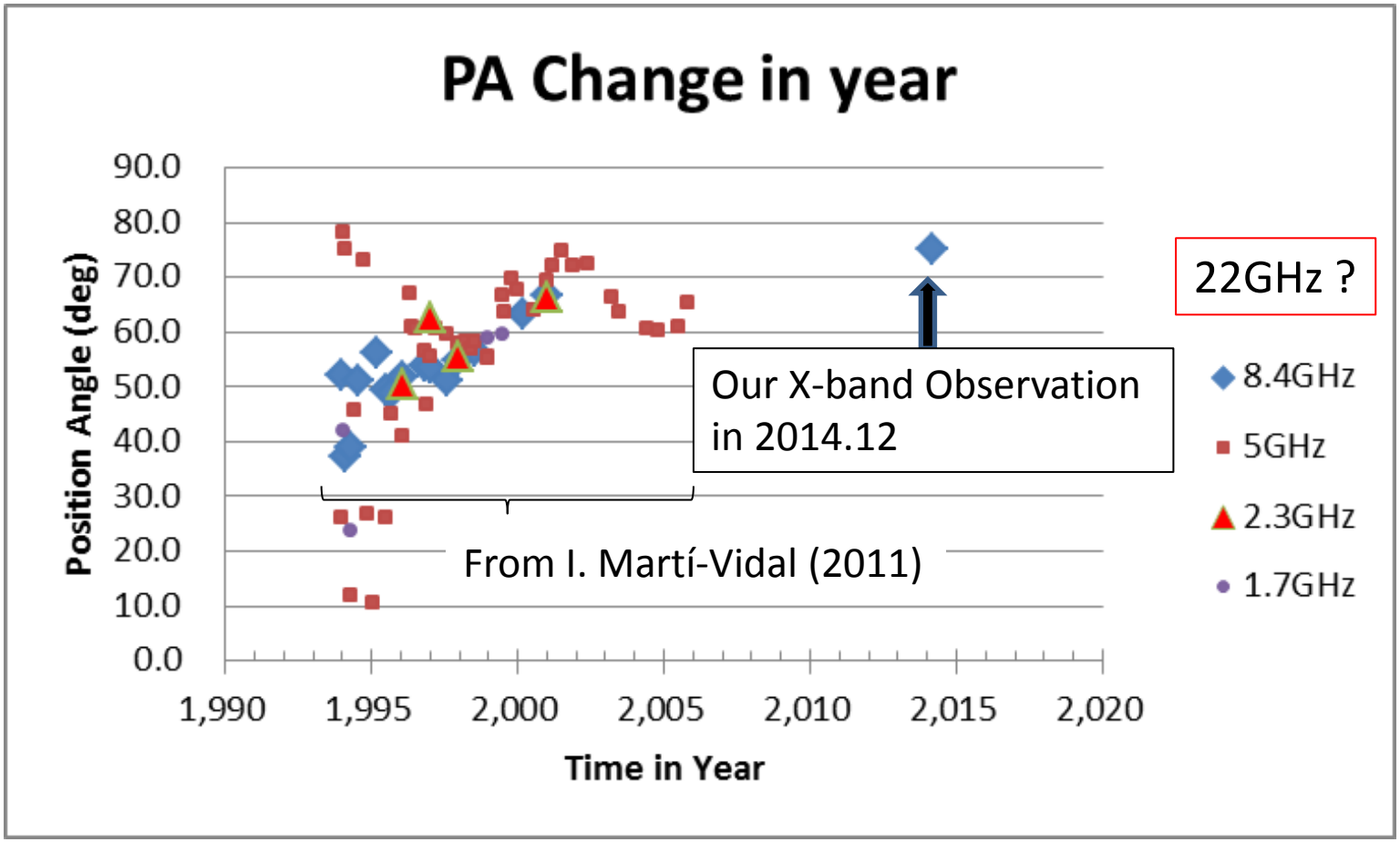




22GHz?

g. 1. Contour image of M 81* obtained by hybrid mapping on the lf-calibrated data set. Contours are logarithmic, separated by a fac- $\sqrt{2}$, with the lowest level set at 1.8 mJy/beam, that is, three times the root-mean-square noise of the image. The peak of brightness is n. The interferometric beam, shown in the bottom left cor- of 0.361 × 0.168 mas and a position angle −1.6°.

Jet Precession?

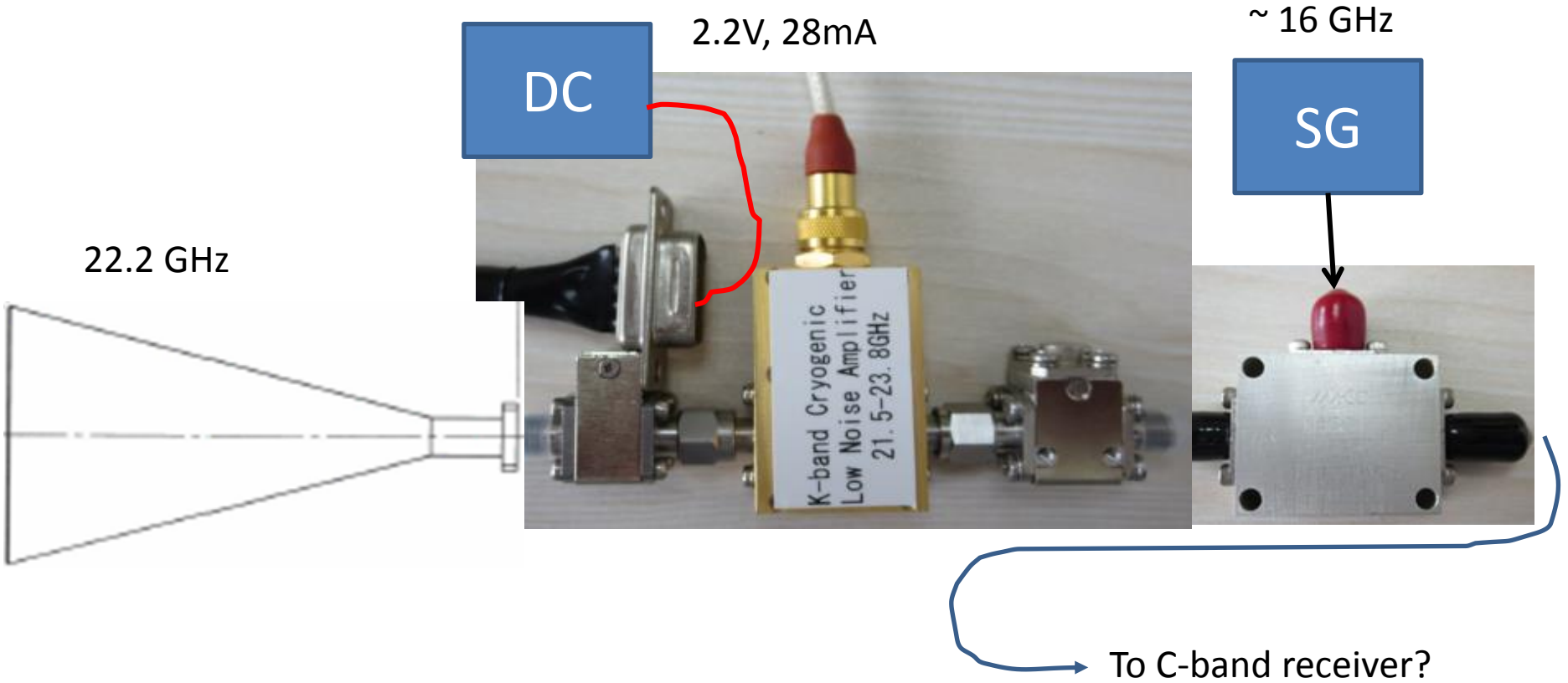


Holography test on a 65-m main reflector

TOWARD 22GHZ

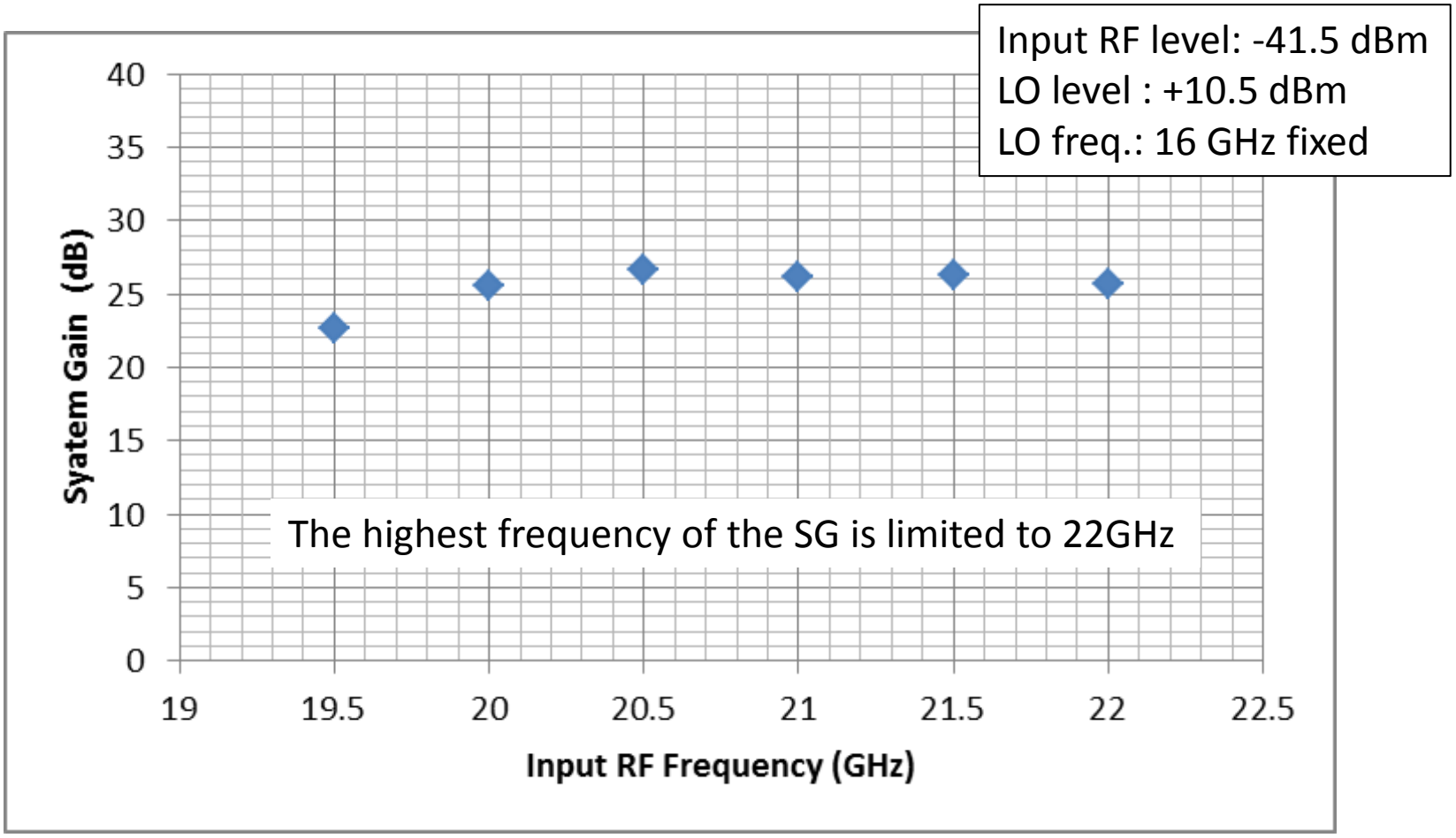
22-GHz test receiver set up

A test 22-GHz receiver only for the use in the holographic surface measurement.



Frequency Response

A system gain of the LNA and the Mixer is 25.5 dB.



Test Staffs

Chen Ying-san (Left) and Liang Zhan Gang-san (Right)

Kawaguchi

Concluding Remarks

- The Tian Ma 65-m telescope is a powerful telescope which improves the sensitivity of the EAVN much more.
- The 65-m will soon be equipped with a 22-GHz receiver which enables us to use in the major frequency band of the VERA and KVN.
- The 65-m already has a 6-GHz receiver which is quite effective to use in the Methanol observations with JVN.

Sheshan Campus guide, Holography Test etc.

SUPPLEMENTS

Sheshan Campus

Main Building

Sheshan Campus

Research Building

My Office in Sheshan

Sheshan Campus

Dormitory

Sheshan Campus

Dining Hall

A water channel in the campus

65-m View from Campus

Electric Motor Cycle

Sight Seeing around Sheshan

Classical houses sunk under water

SongJian City