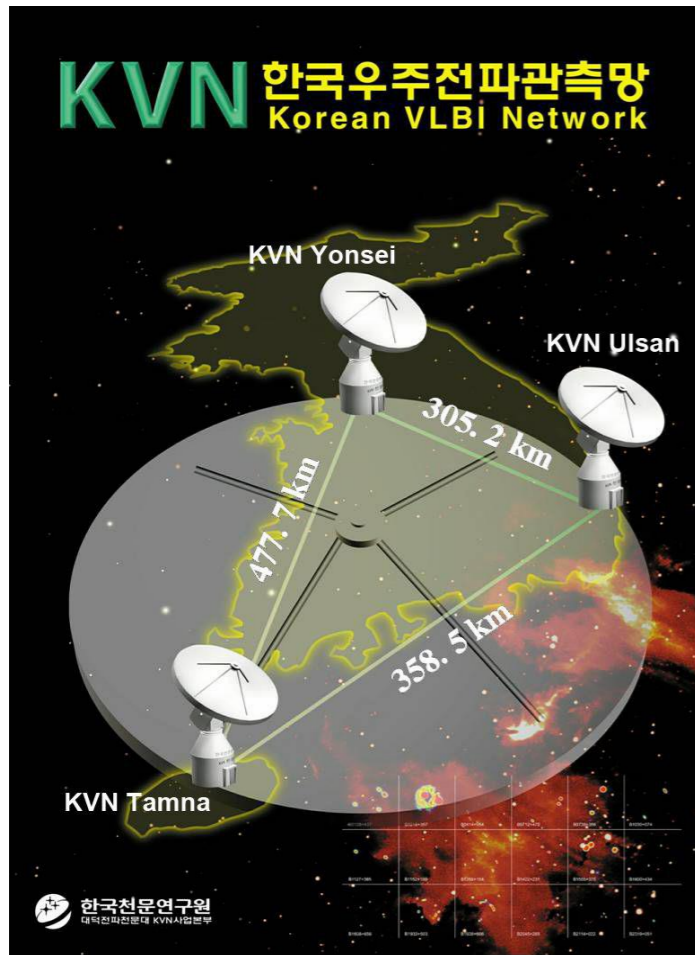


# Recent Activities of the KVN

Chungsik Oh (KASI)  
VERA User's Meeting (2016)

# KVN and KaVA(KVN and VERA Array)



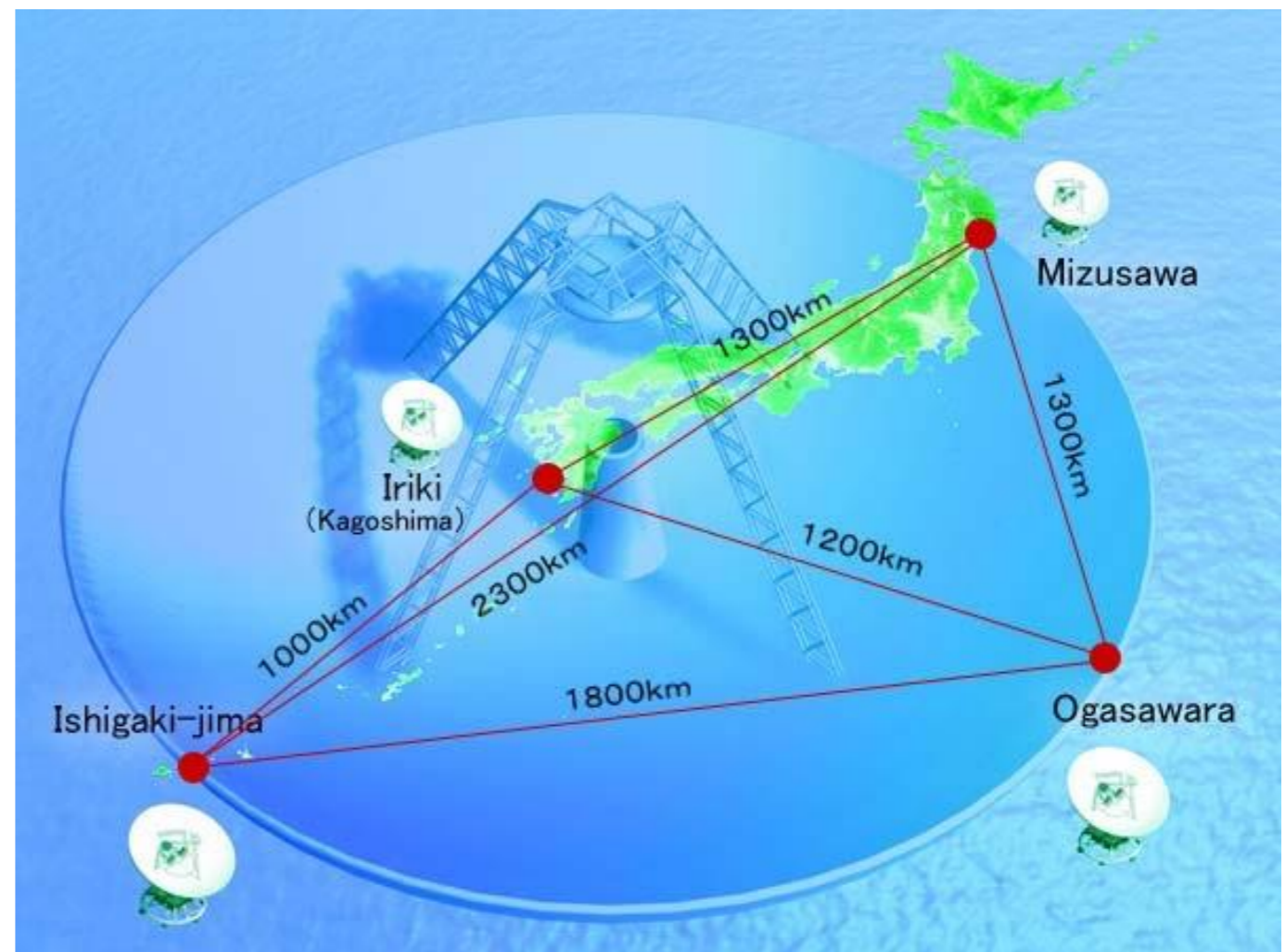
**KVN** Baseline 300- 500 km

**KJCC**

Daejeon HW Correlator for KaVA

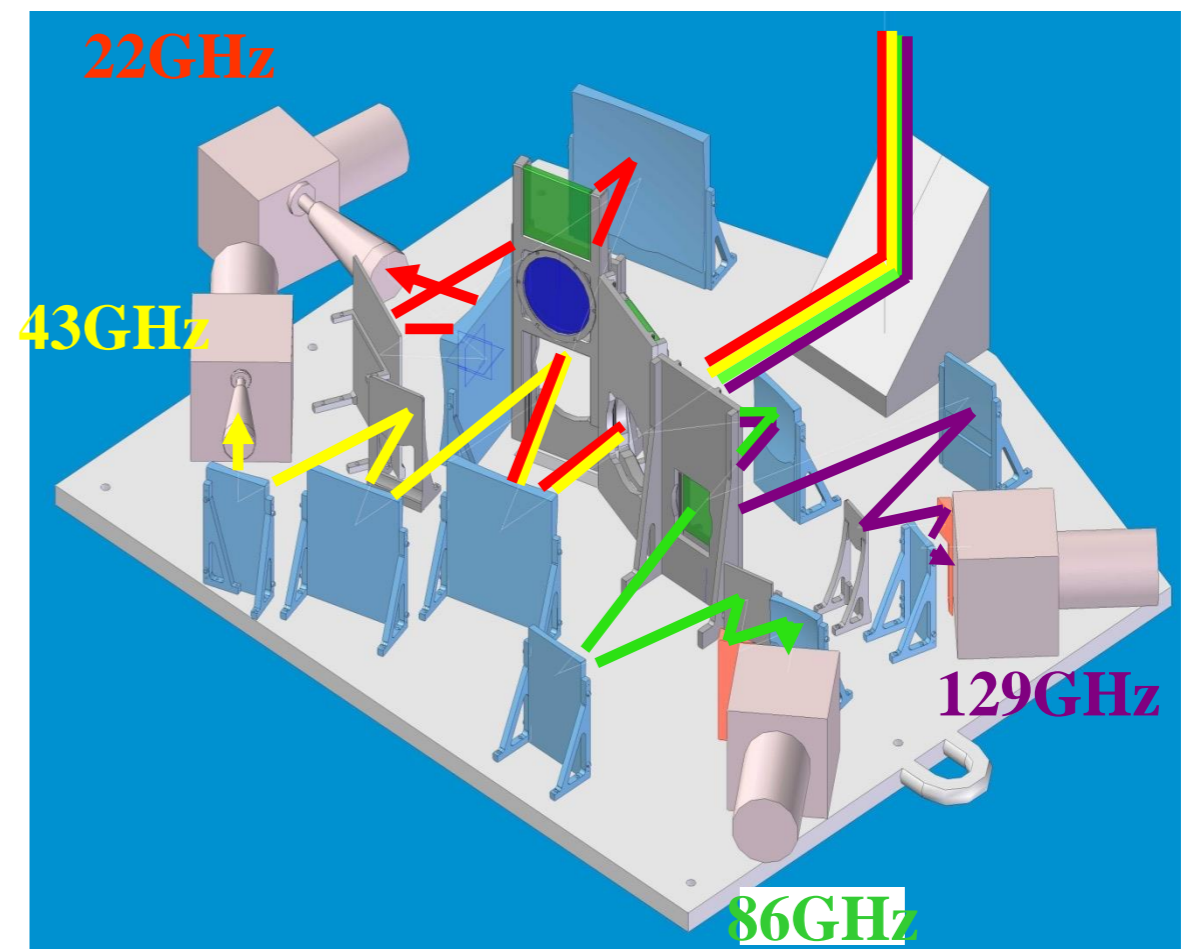
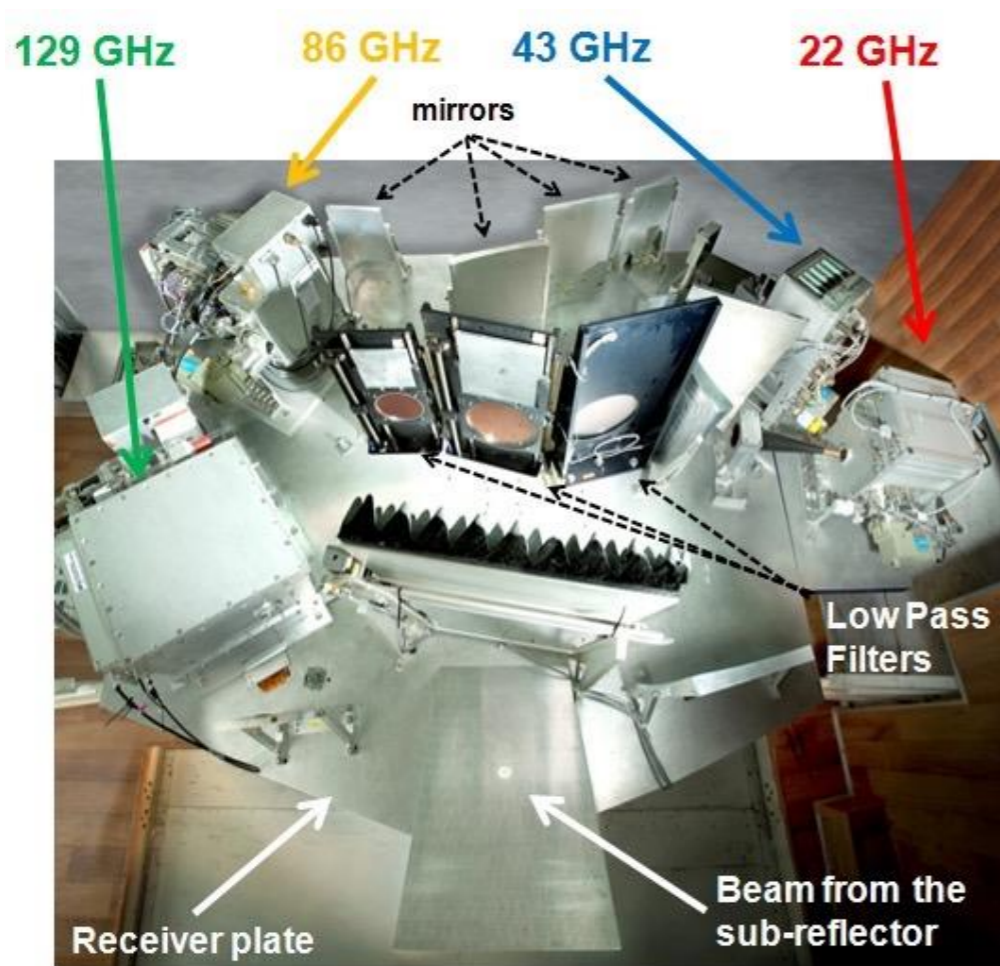
DiFX Software Correlator for KVN

**VERA** (VLBI Exploration of Radio Astrometry)  
Four 20m antennas , Baseline 1000- 2300 km



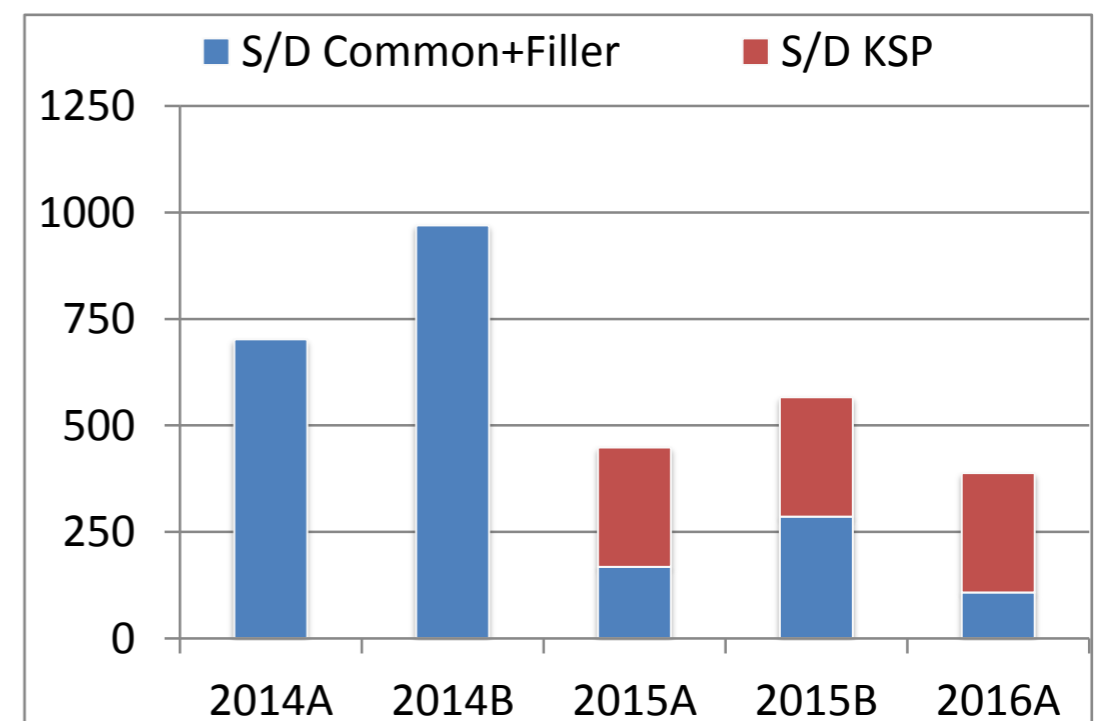
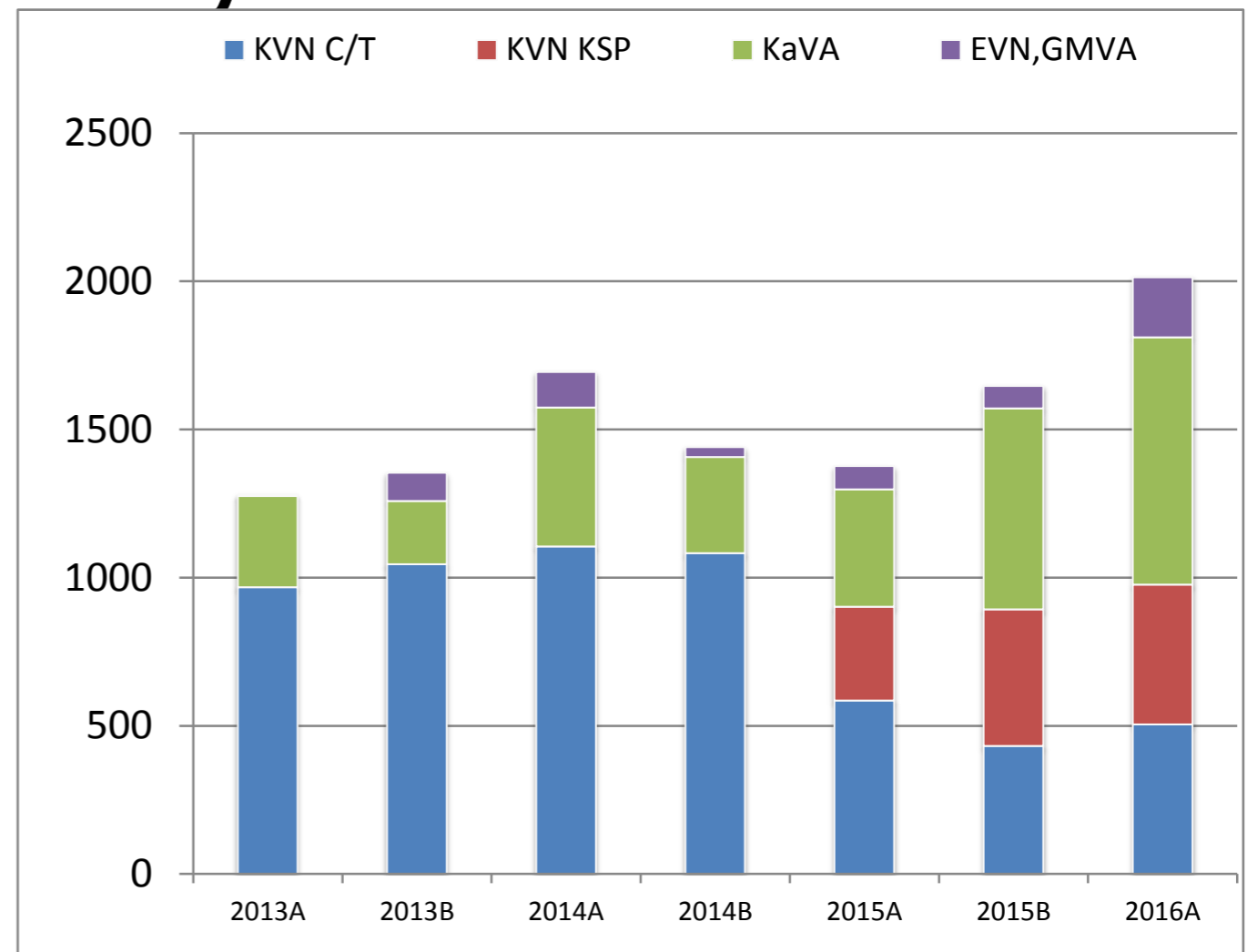
# Multi-Frequency Receiving System of KVN

- Simultaneous Multi-frequency Observation
  - @ 22/43/86/129GHz (Aperture Efficiencies: 60 – 30%)
- Dual Pol : LCP & RCP
  - Simultaneous 2 freq bands w/ full stokes



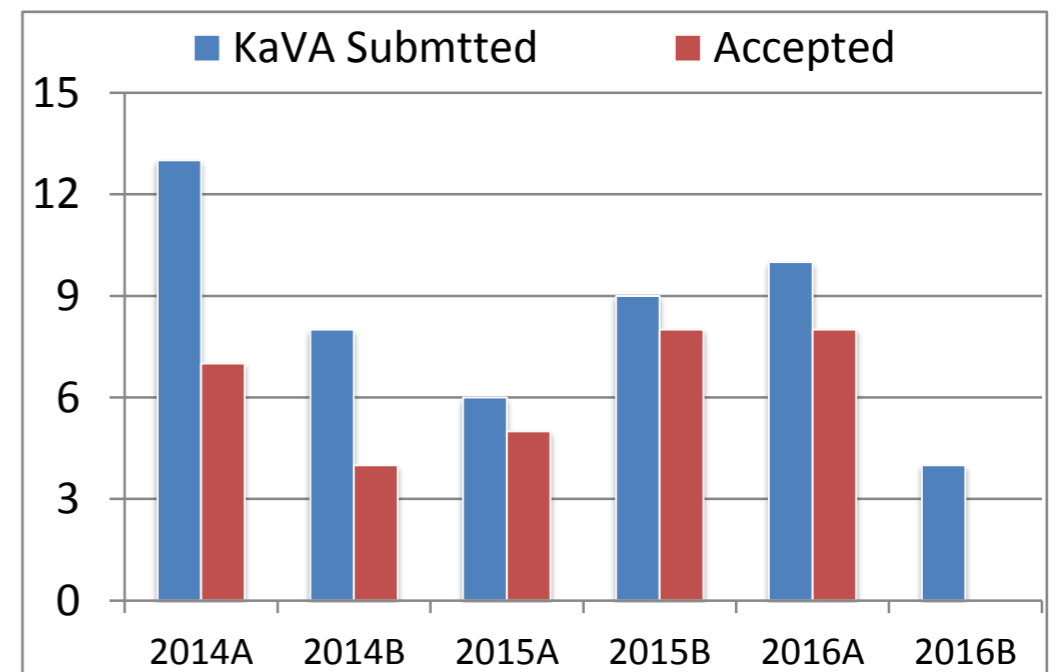
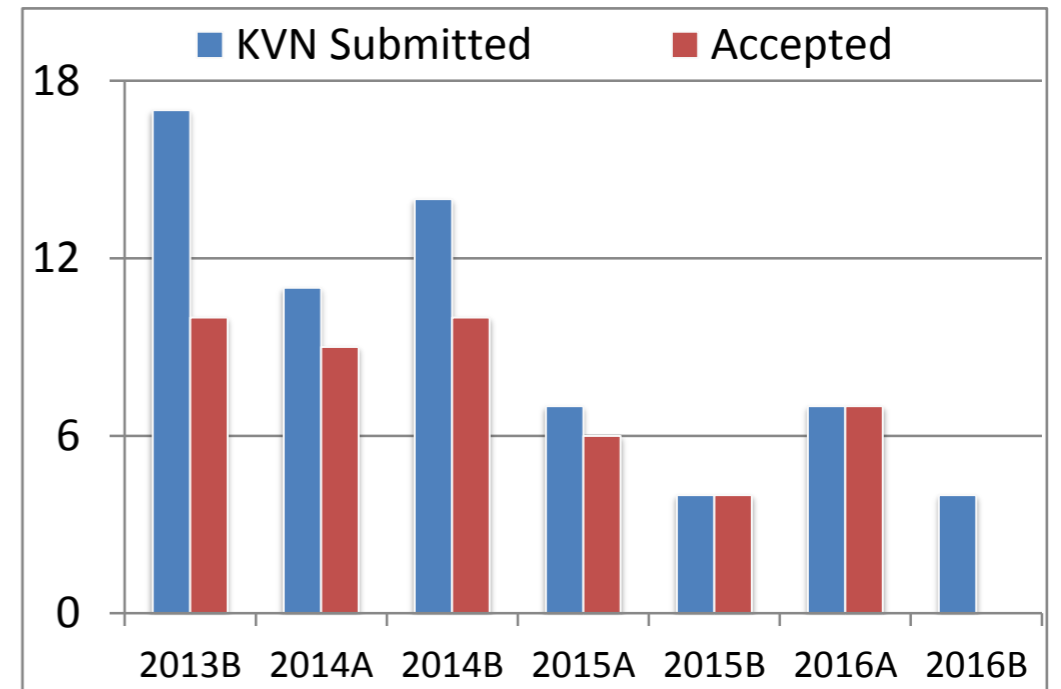
# Operation Summary in 15B & 16A

- VLBI : ~3500h /yr
  - KSP from 15A
  - KaVA L/P from 15B
- Single-Dish
  - KSP SD ~ 1000h/yr
- EVN associated member
  - 22/43GHz
  - RadioAstron
- GMVA member : 86GHz
- EAVN : Test Observations (8/22GHz)



# Common Use Proposals

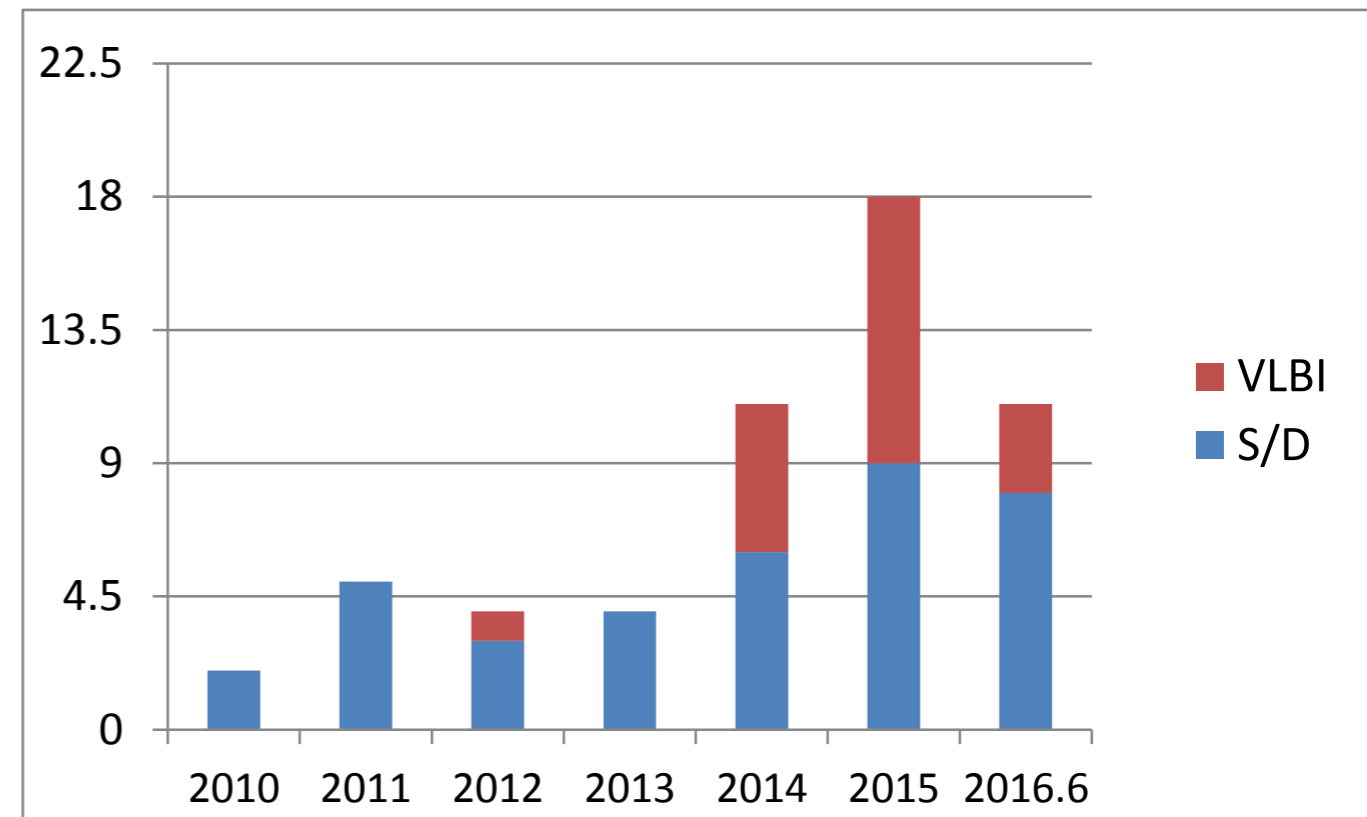
- KVN Common Use
  - Global Open from 15B
  - ~600 h/yr
  - 1Gbps recording mode (256MHz BW)
  
- KaVA Common Use
  - Global Open from 16A
  - ~500 h/yr
  - KVN Multifrequency + VERA Single Beam
  - 1Gbps recording mode (256MHz BW)



# Publications

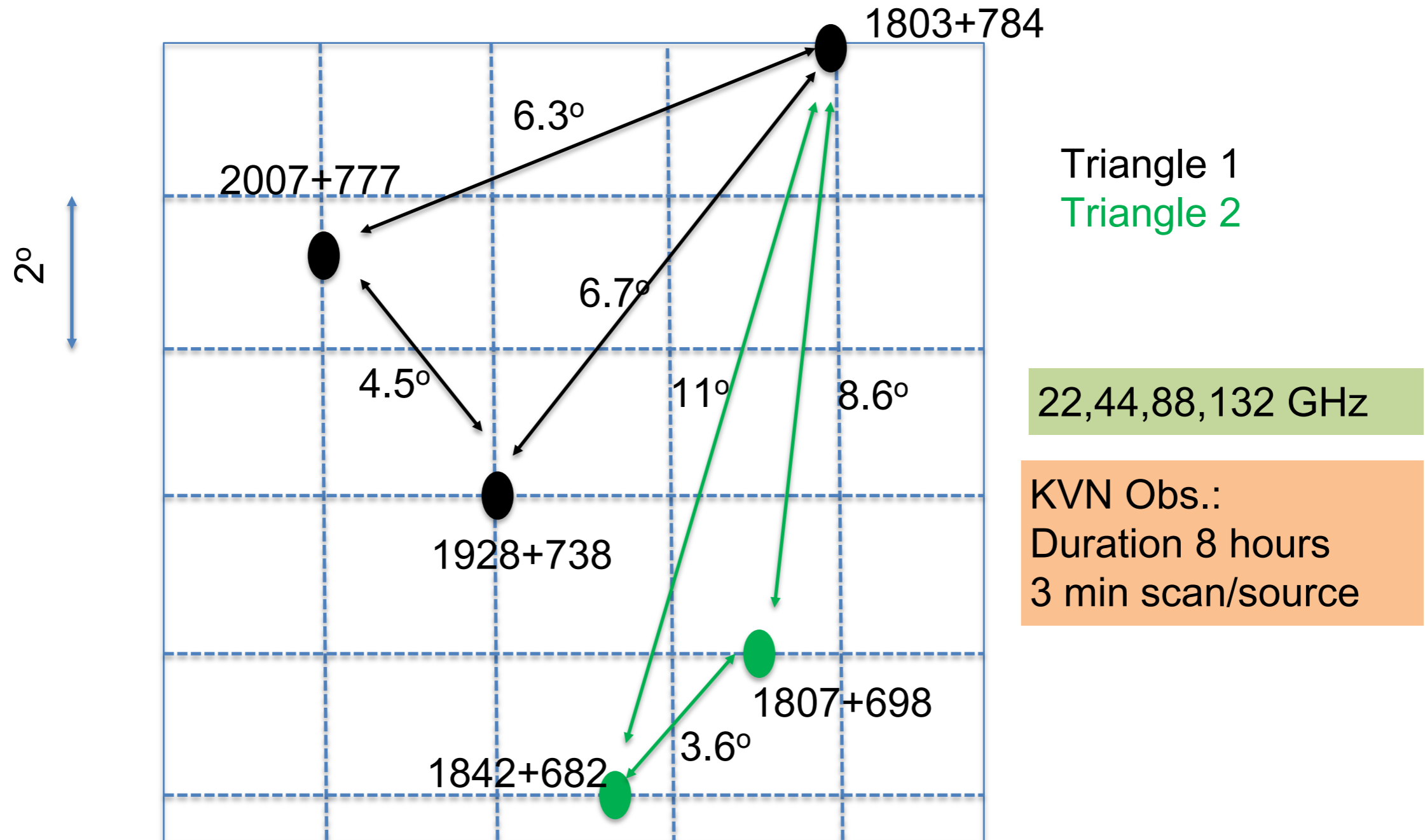
- 2015
  - 18 papers (9 VLBI)
  - 11 in JKAS Special Issue

- ~ 2016.6
  - 3 VLBI among 11



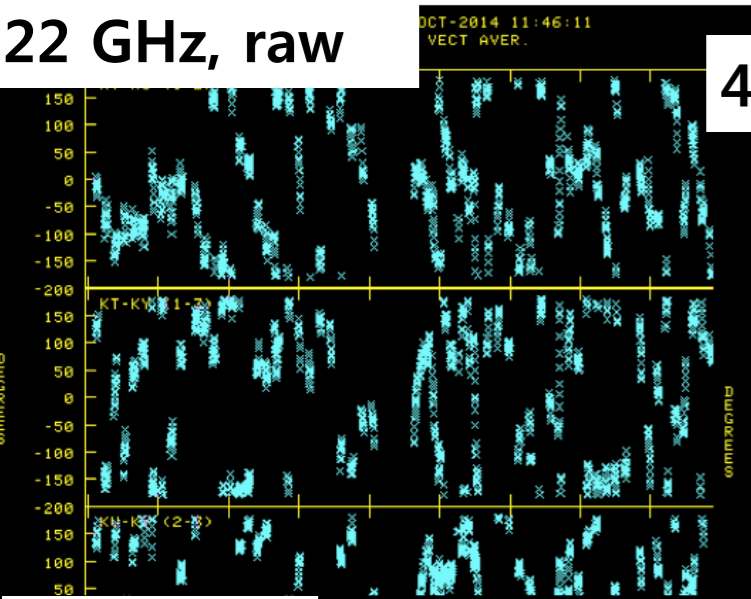
- 3 New KaVA papers in 2015 & 16
  - Wx PSC Image (Yun+ 16) from KaVA Evolved Star WG
  - PaGANII (Oh+ 15), HFP (Jeong + 16) from KaVA Common Use

# KVN SFPR Demonstration using Polar Cap samples (Rioja et al. AJ 2015)

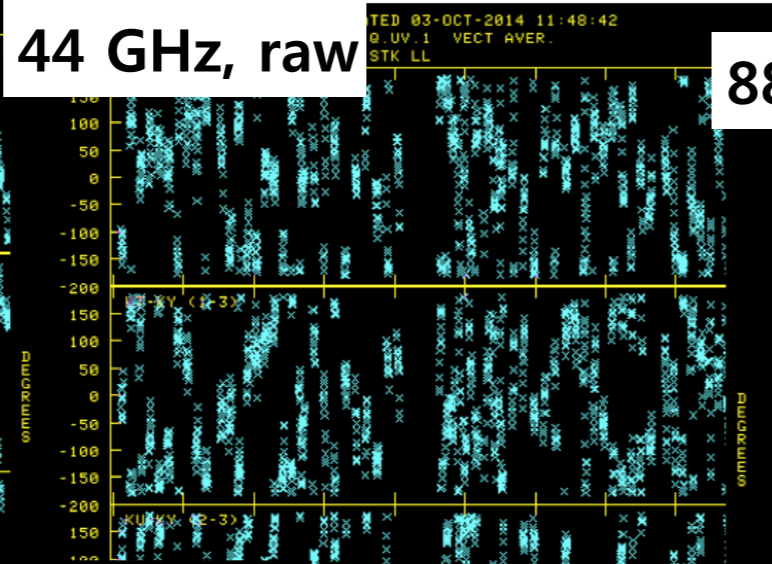


# Frequency Phase Transfer

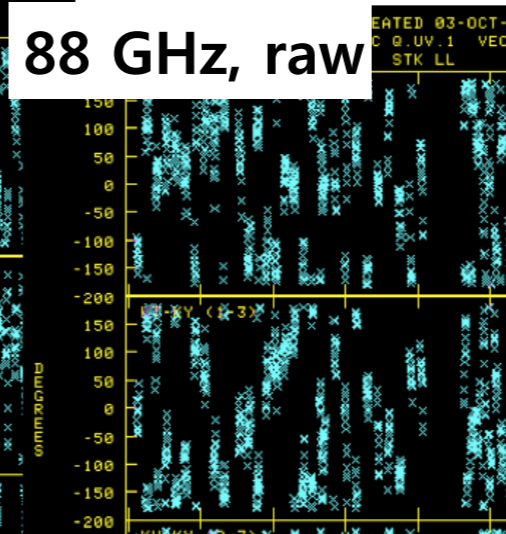
22 GHz, raw



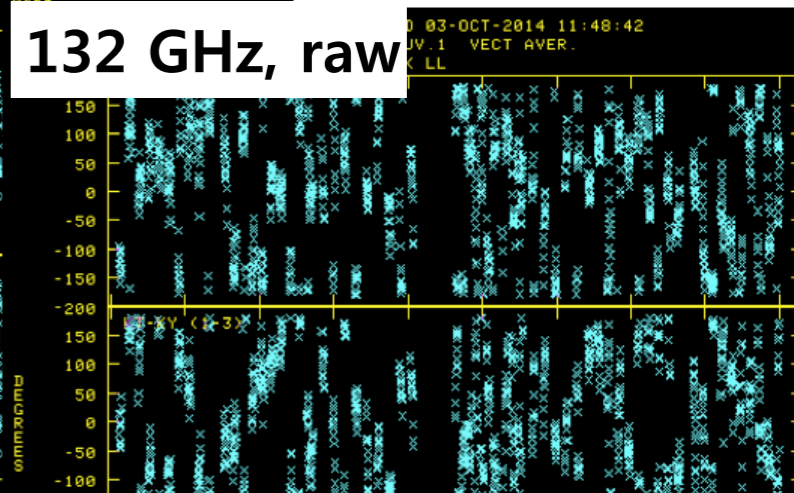
44 GHz, raw



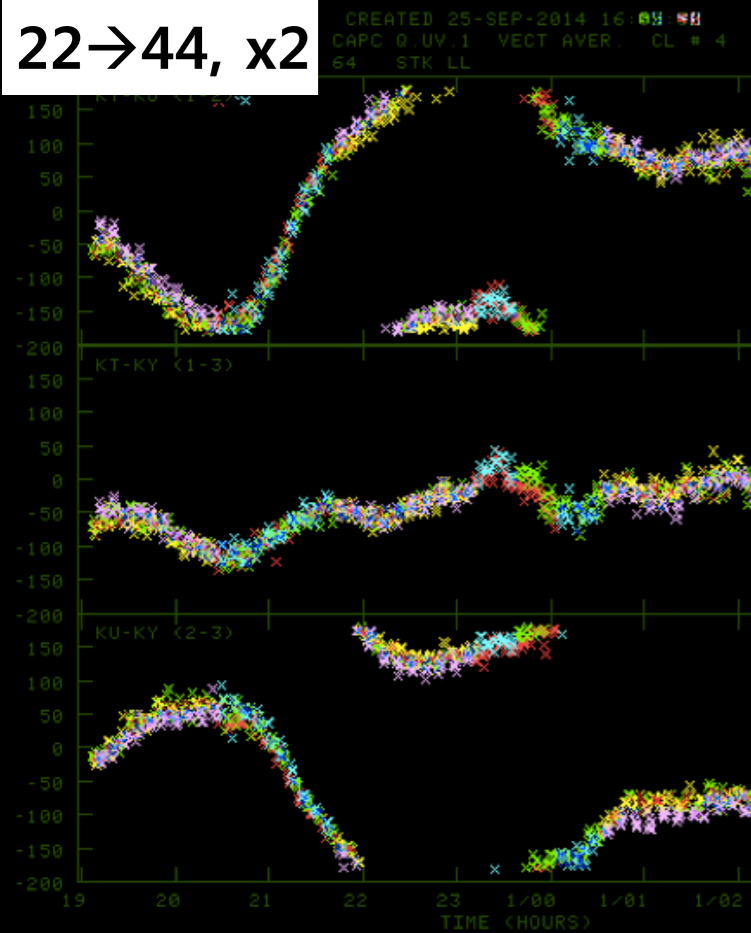
88 GHz, raw



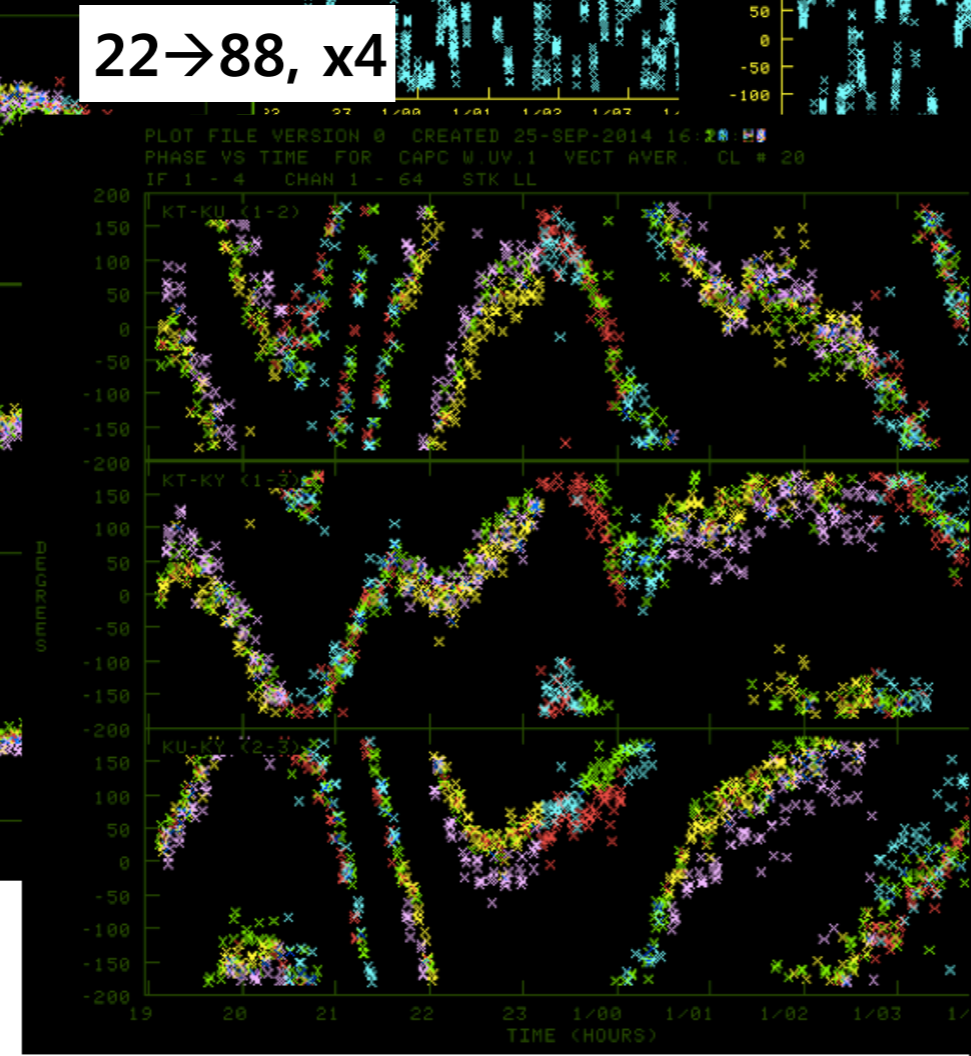
132 GHz, raw



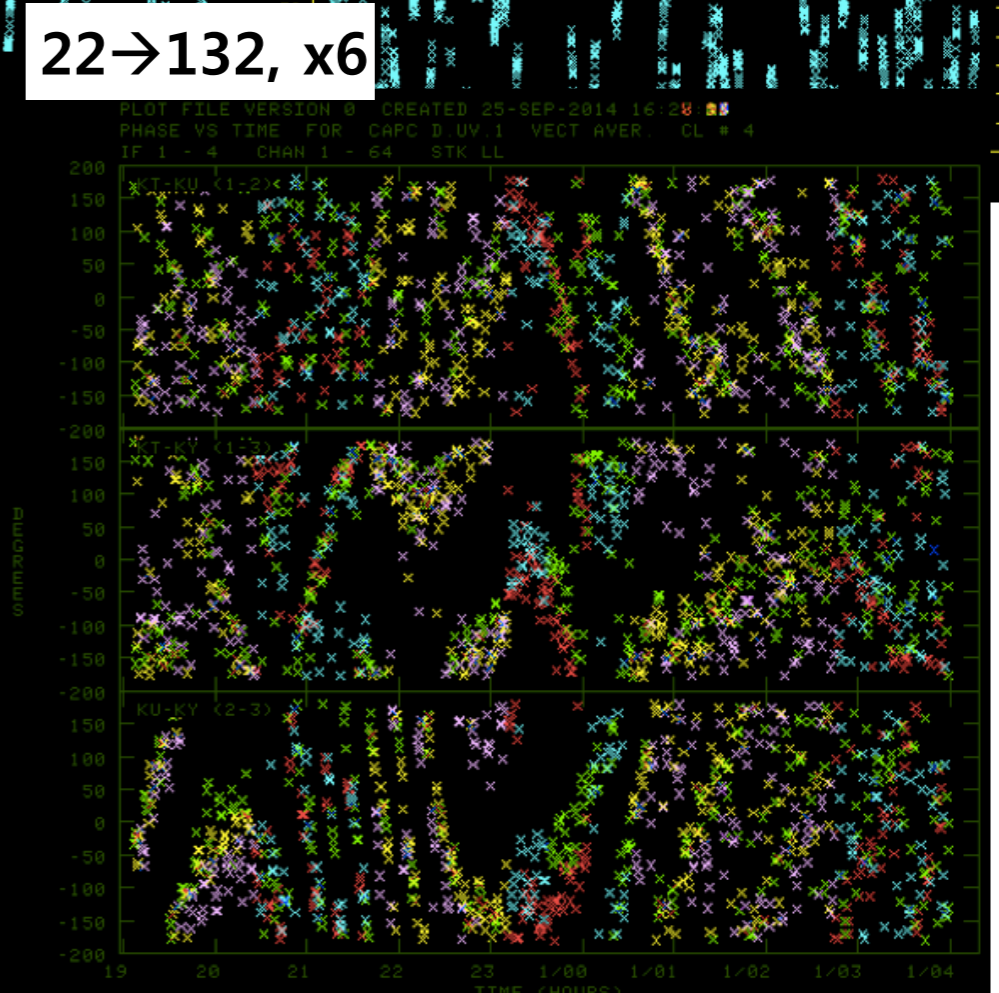
22→44, x2



22→88, x4



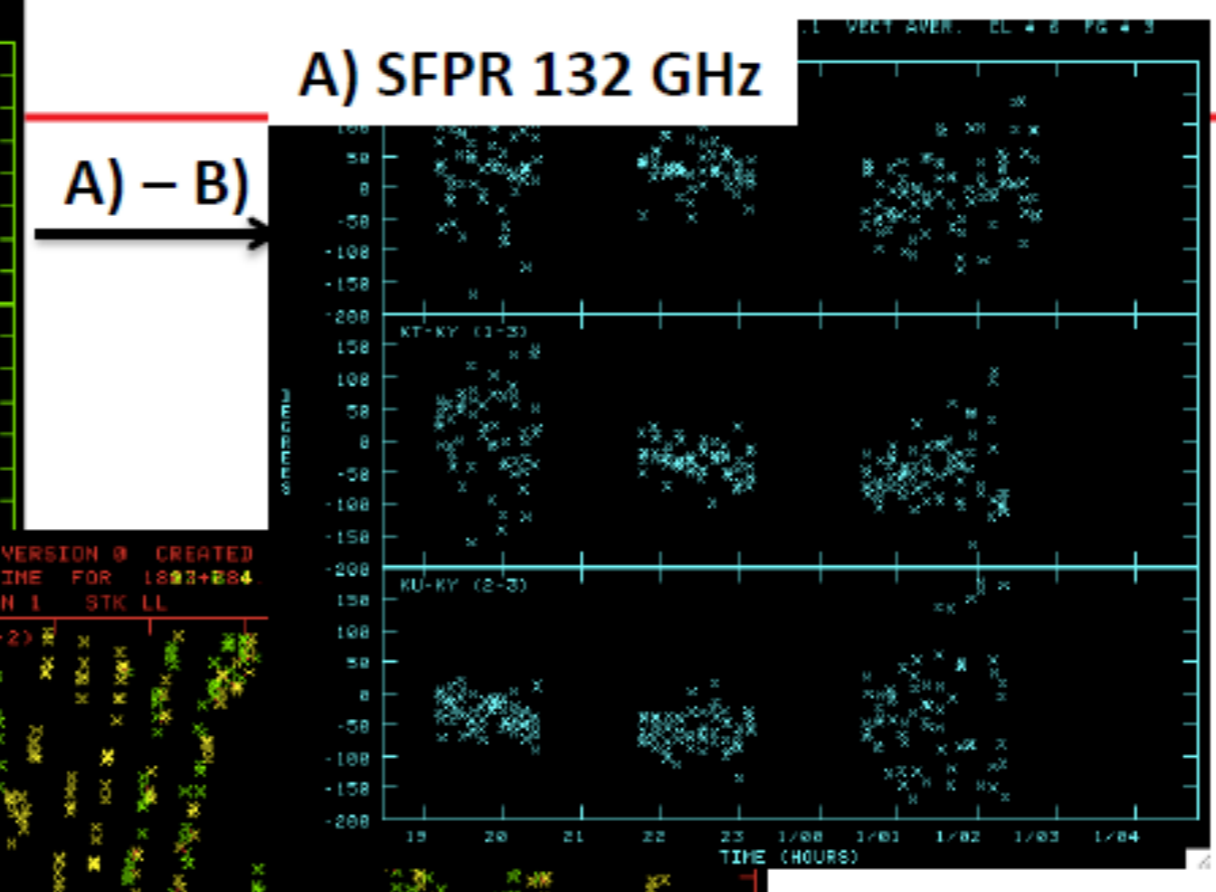
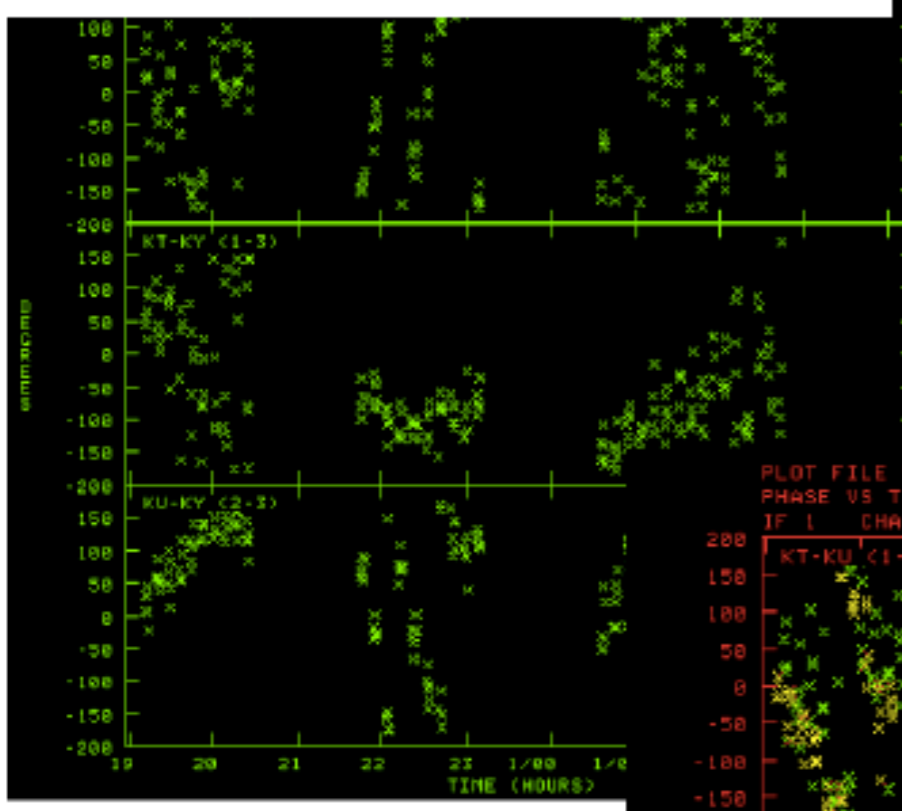
22→132, x6



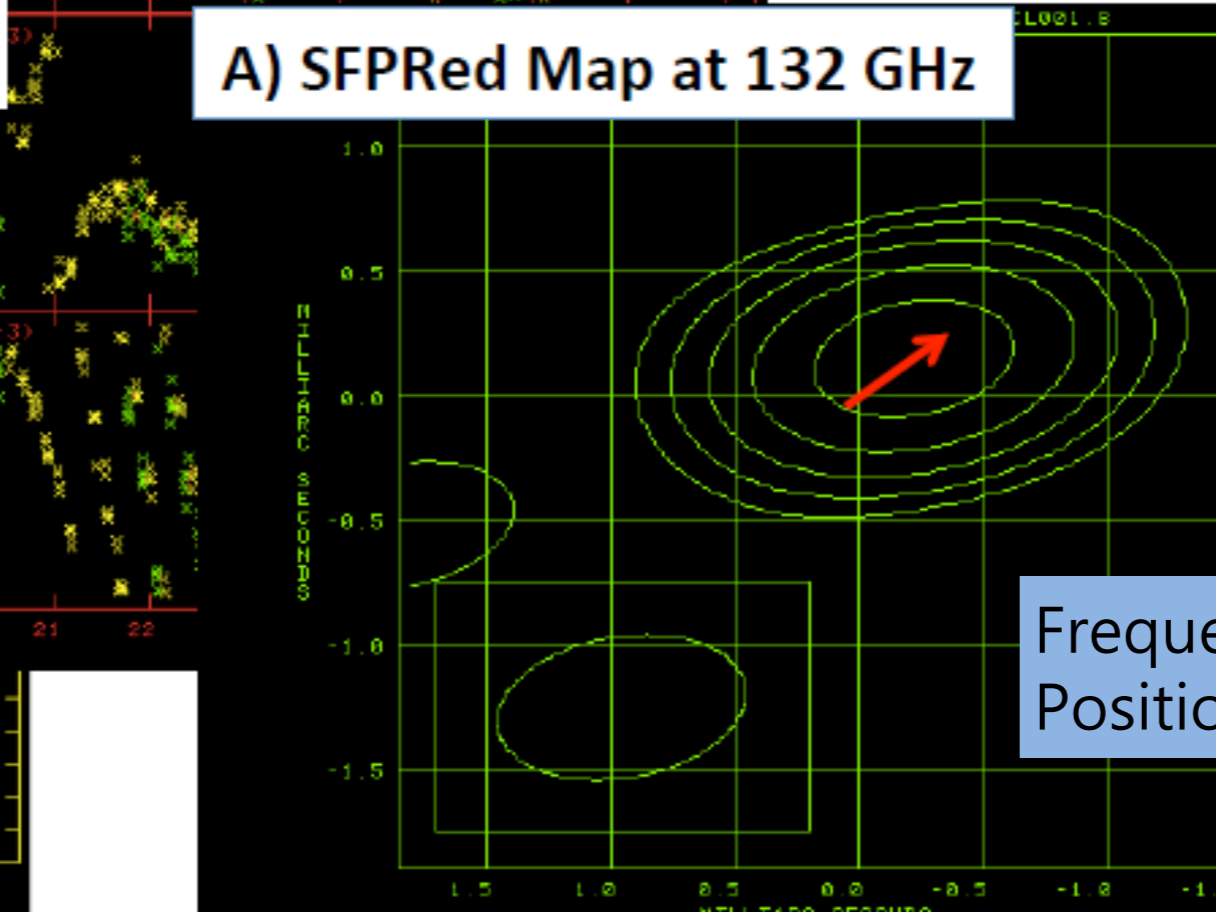
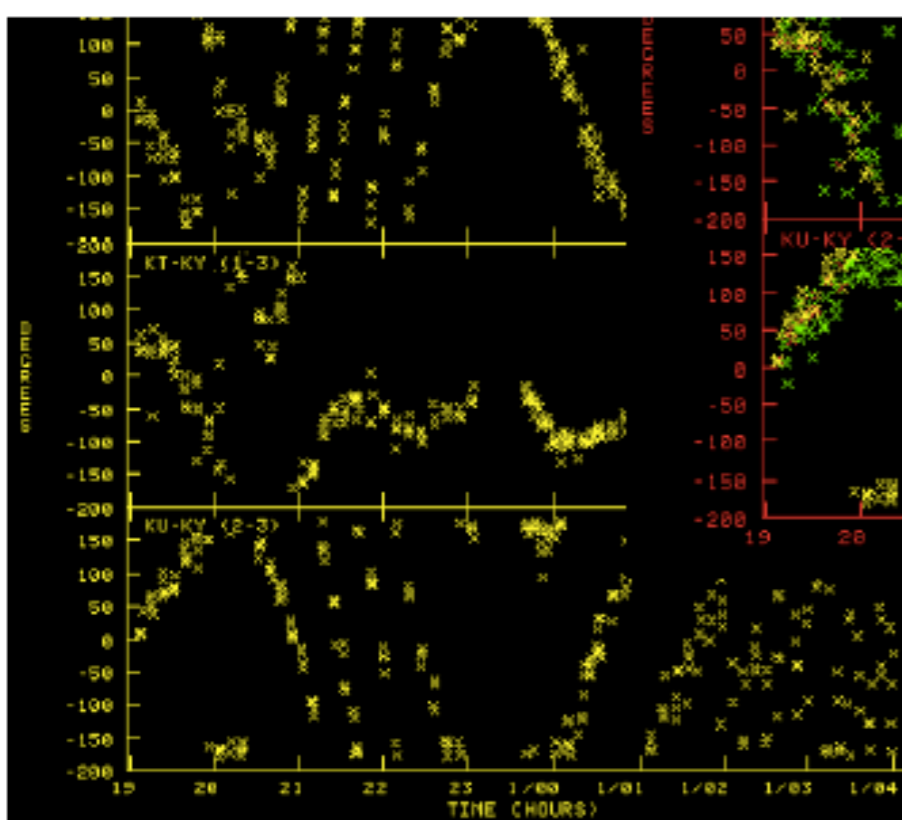


# SFPR analysis – 132 GHz with 43GHz: 1842+681 (ref. 11° away)

A) 1842+681 FPT,44→132, x3



B) 1803+784, FPT,44→132, x3

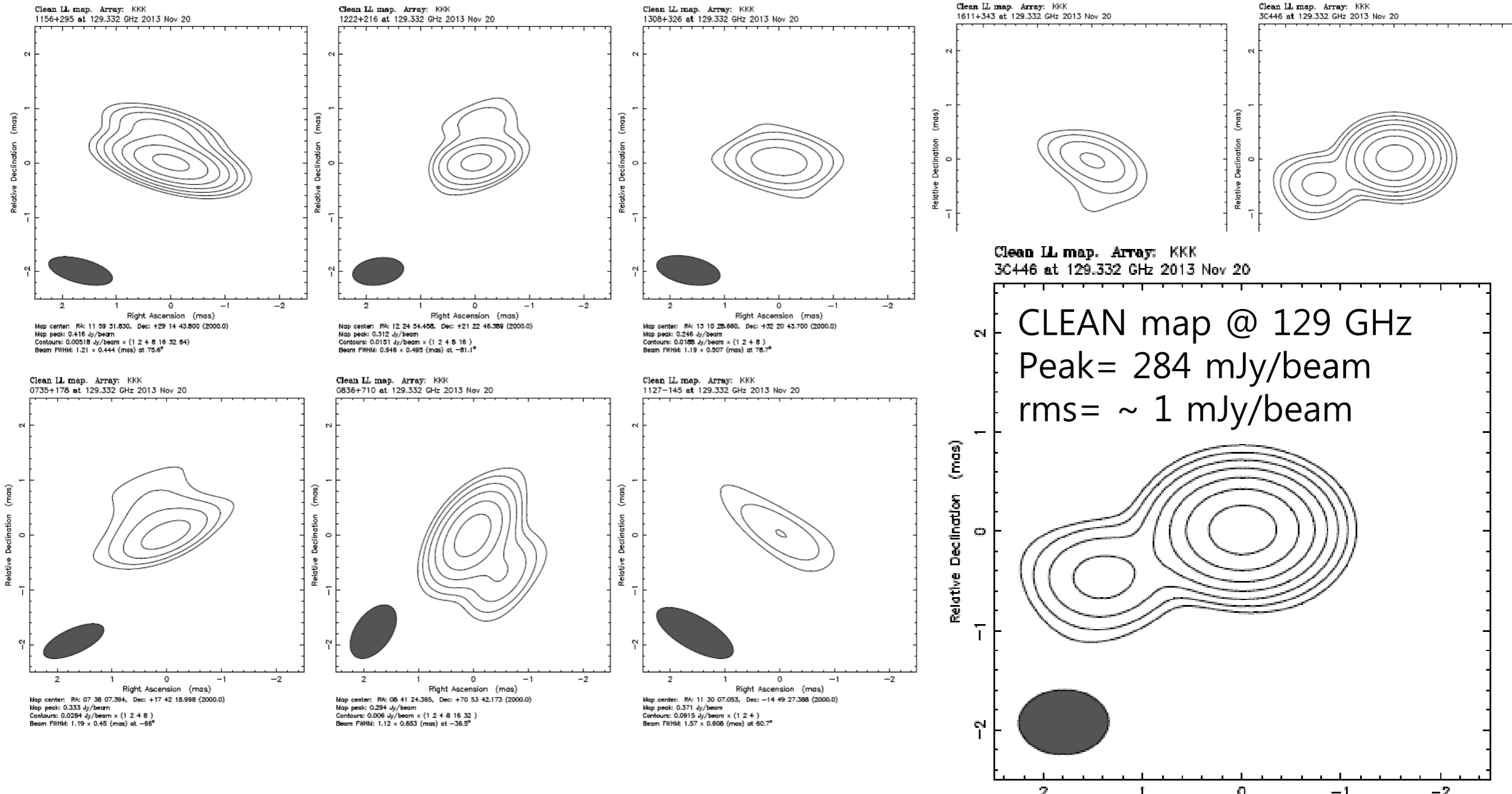


Peak Flux ~ 100 mJy  
rms ~ 5 mJy/beam  
87% Flux Recovery

Frequency Dependent  
Position Shift

# 129GHz Images using FPT

- FPT Results of iMOGABA ( Algaba+ JKAS 2015 )
- Images for 8 among 12 faint sources failed in conventional method.

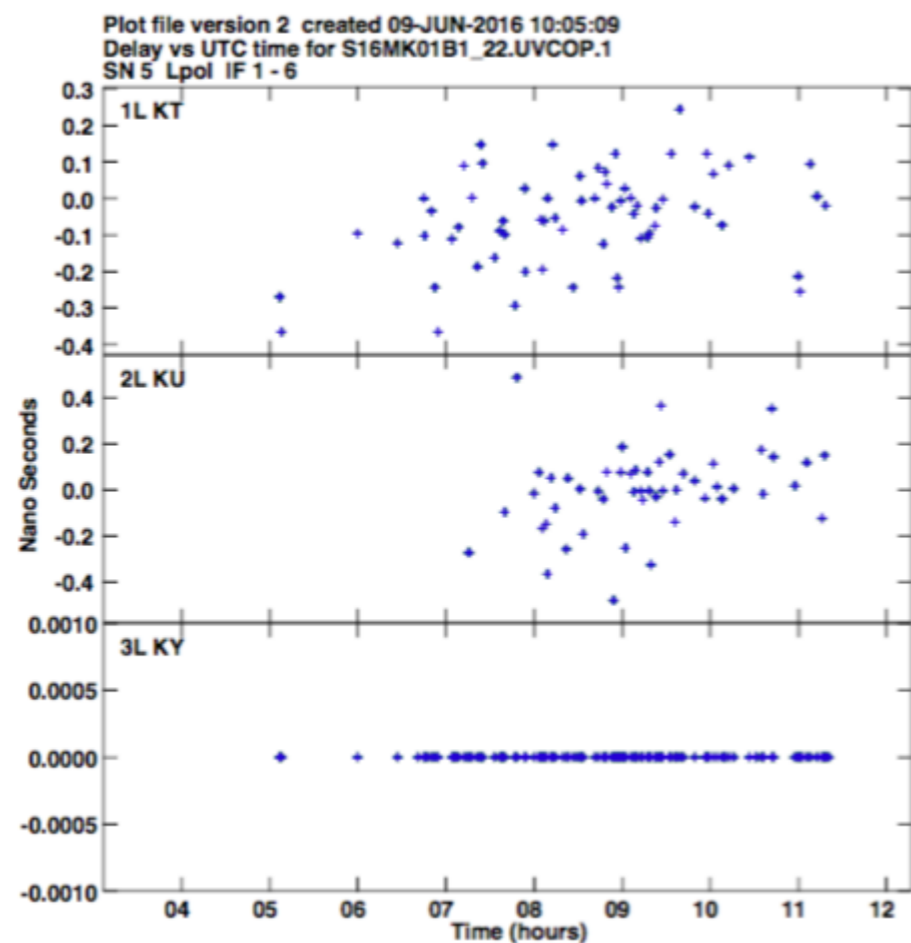


# KVN Pipeline (Parseltongue)

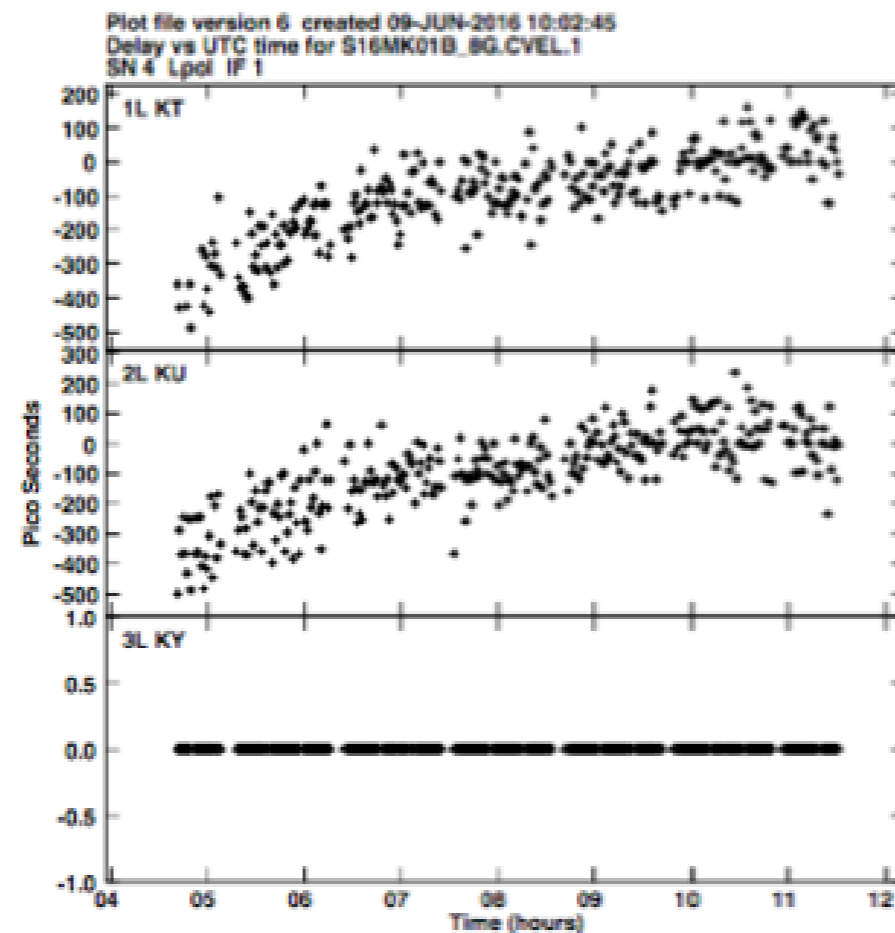
- Jeffrey A. Hodgson +, (JKAS submitted)
  - New Postdoc in KVN
- Parseltongue : Python Interface to AIPS
- Basic Calibrations + FPT
  - (FITLD, ACCOR, APCAL, FRING) + FPT
- Identical results with manually analyzed data of iMOGABA
- Not yet include imaging & spectral line analysis
- Extend to KaVA, GMVA, etc

# 8Gbps (512MHz x 4 IF) Operation

- Mark6 recorder (+ Fila10G)
- 11 experiments (~90h) from March
- Better Sensitivity & Delay Solution from 8Gbps data



16MHz x 6 IF = 96MHz

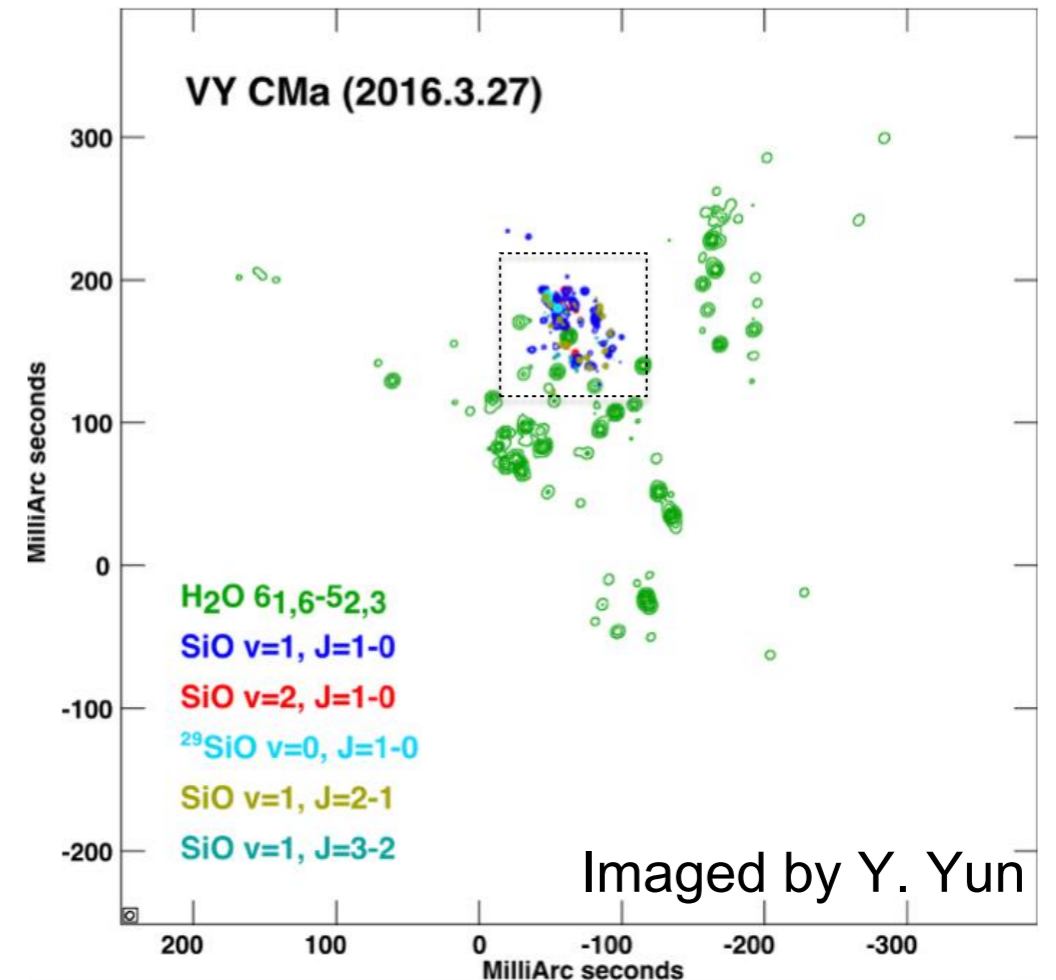
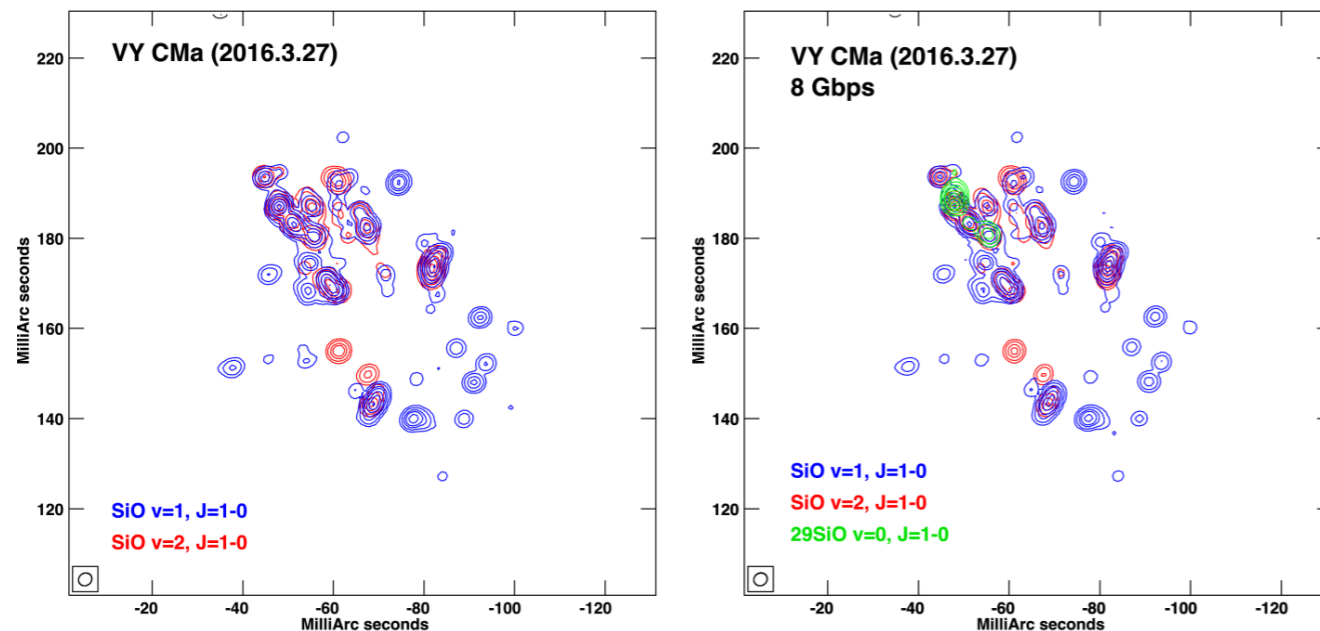


512MHz x 1 IF

by M.-K. Kim

# Image of 8Gbps mode data

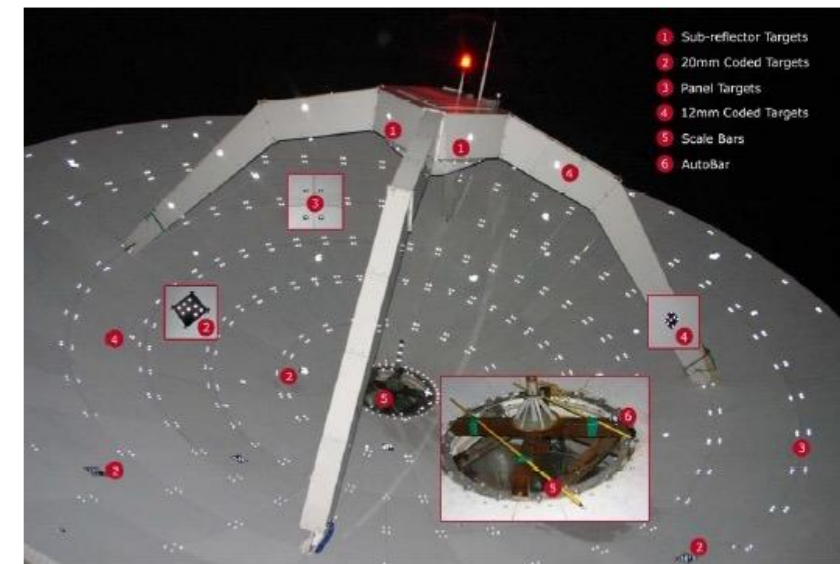
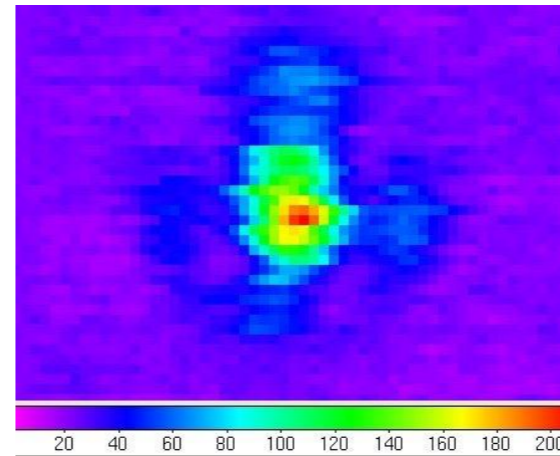
- Same spot distribution but different flux ( $\sim 0.6$ )
- 29 SiO  $v=0, J=1-0$  maser in 8Gbps mode



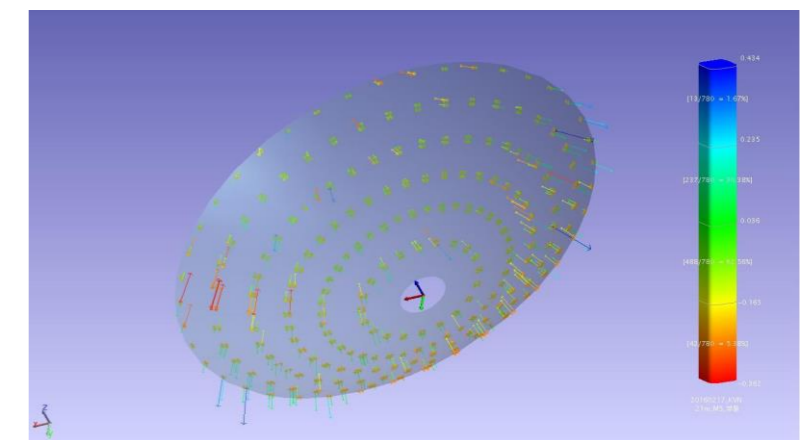
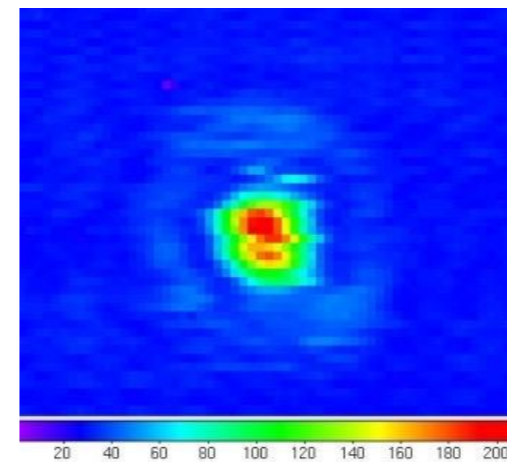
- More Test in 16B
  - flux scale / operation
- Open Use from 17A

# Aperture Efficiency of Ulsan Antenna

- Low Aeff at Ulsan
  - 46 / 24% @ 86 / 129GHz
  - Weird Beam Pattern
  - Max Gain at low elevation



- Panel Re-Alignment (Feb 18-20)
  - Photogrammetric Measurements
  - 55 / 45% @ 86 / 129GHz
  - Improved Beam Pattern



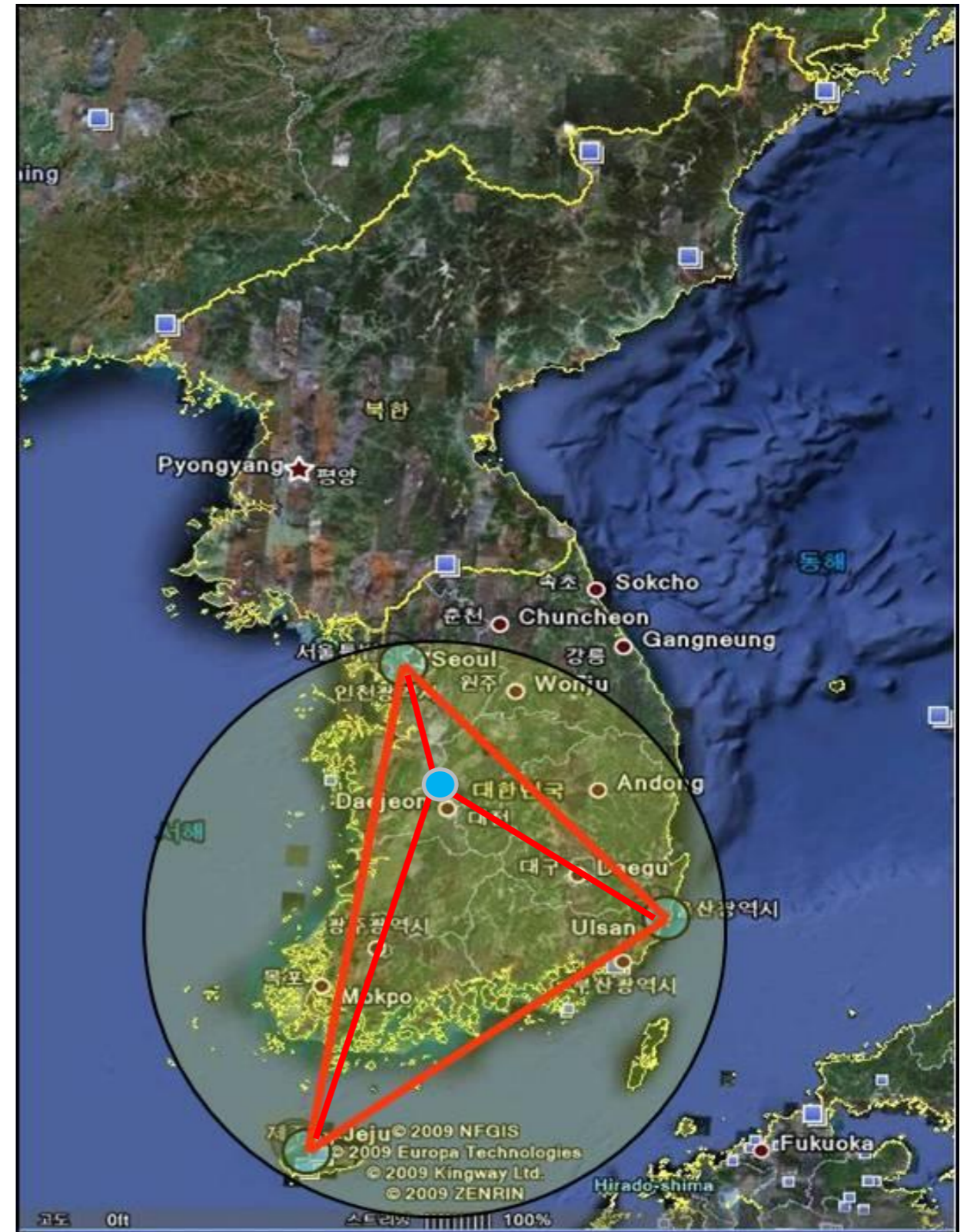
- Plan
  - Tamna in Autumn 2016
  - Yonsei in Feb/March 2017

# Sejong Geodesy Station

- 22-m Diameter
- Frequency : 2/8/22/43GHz
- Location: ~20km North from Daejeon
- Baselines between SJ-KVN

	YS	US	TN	SJ
YS	-	305	477	120
US	305	-	358	206
TN	477	305	-	367
SJ	120	206	367	-

- Recorder : K5 + Mark6
- 22/43 Simultaneous Quasi-Optics
- Trx : 50K / 80K @ K/Q
- Aeff : 59% / 53% @ K/Q

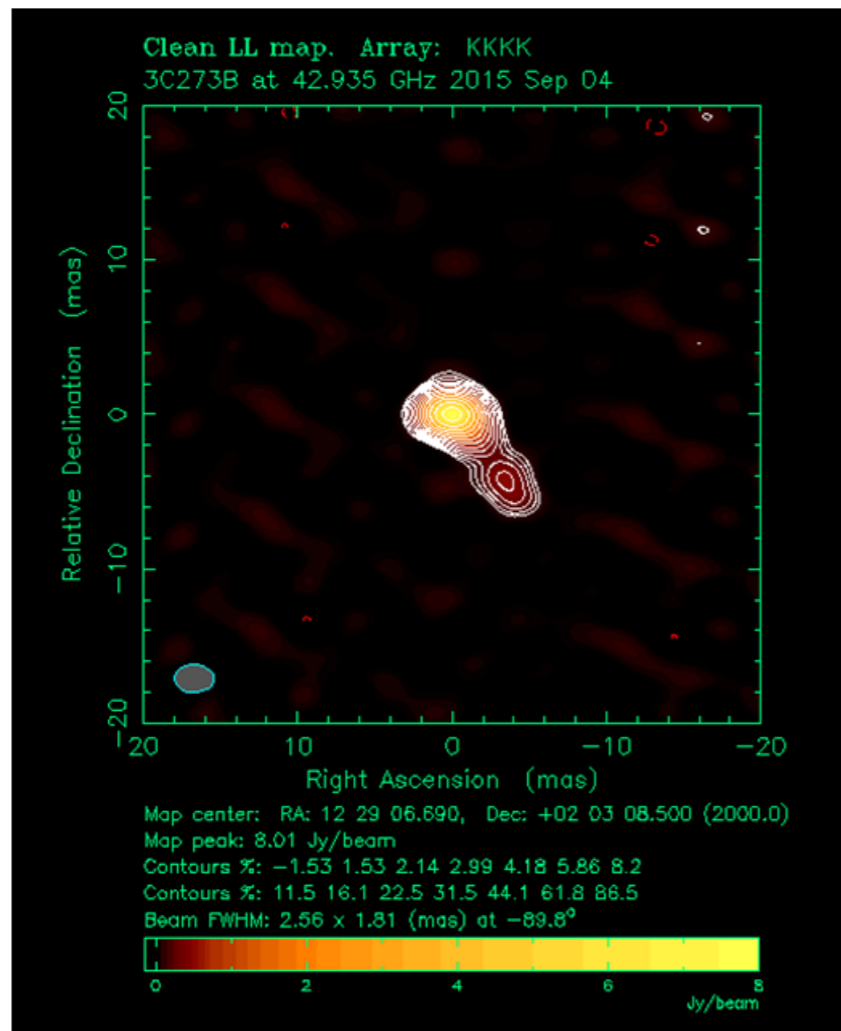


# Image between Sejong and KVN @ 43 GHz

- 3C273B

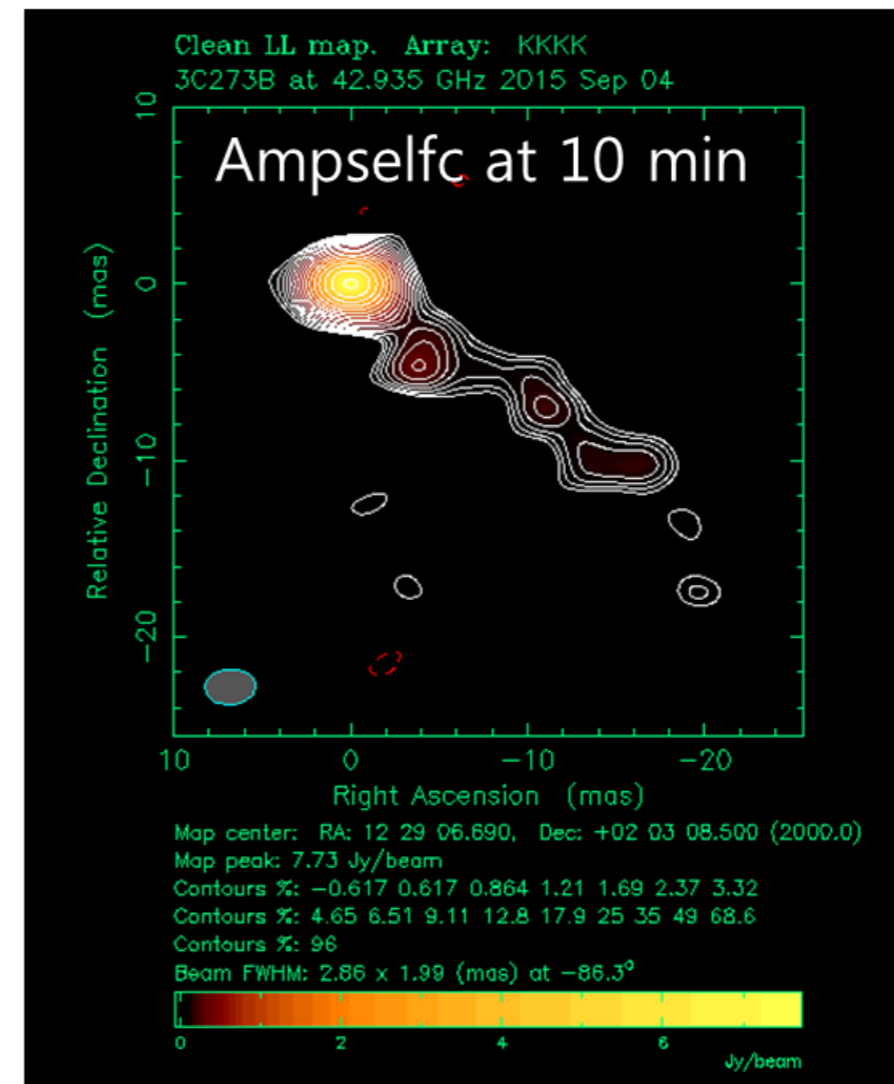
- KVN

- P: 8.01 Jy/bm
    - rms: 0.04 Jy/bm (DR: 196)



- KVN-Sejong

- P: 7.73 Jy/bm
    - rms: 0.02 Jy/bm (DR: 485)



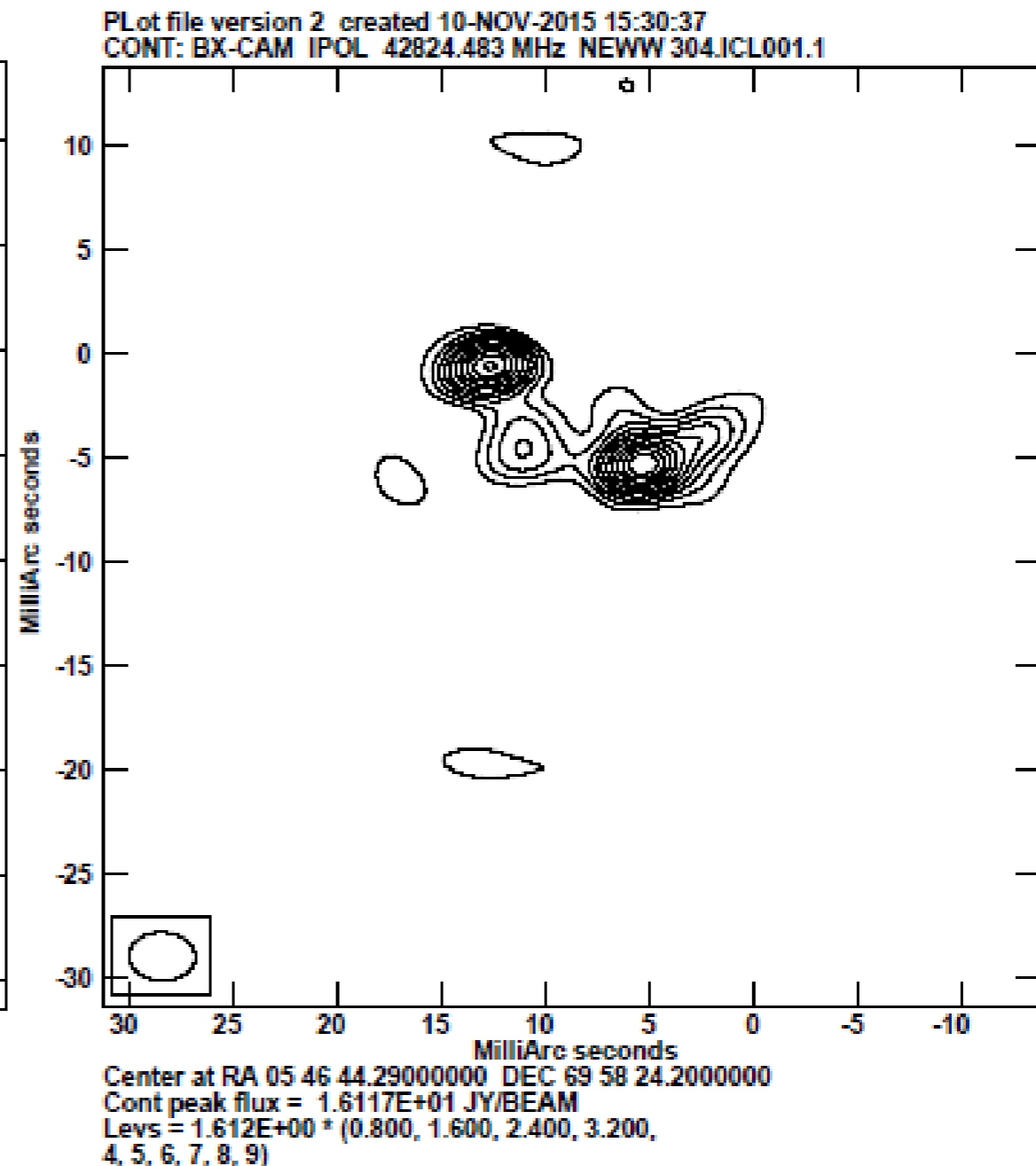
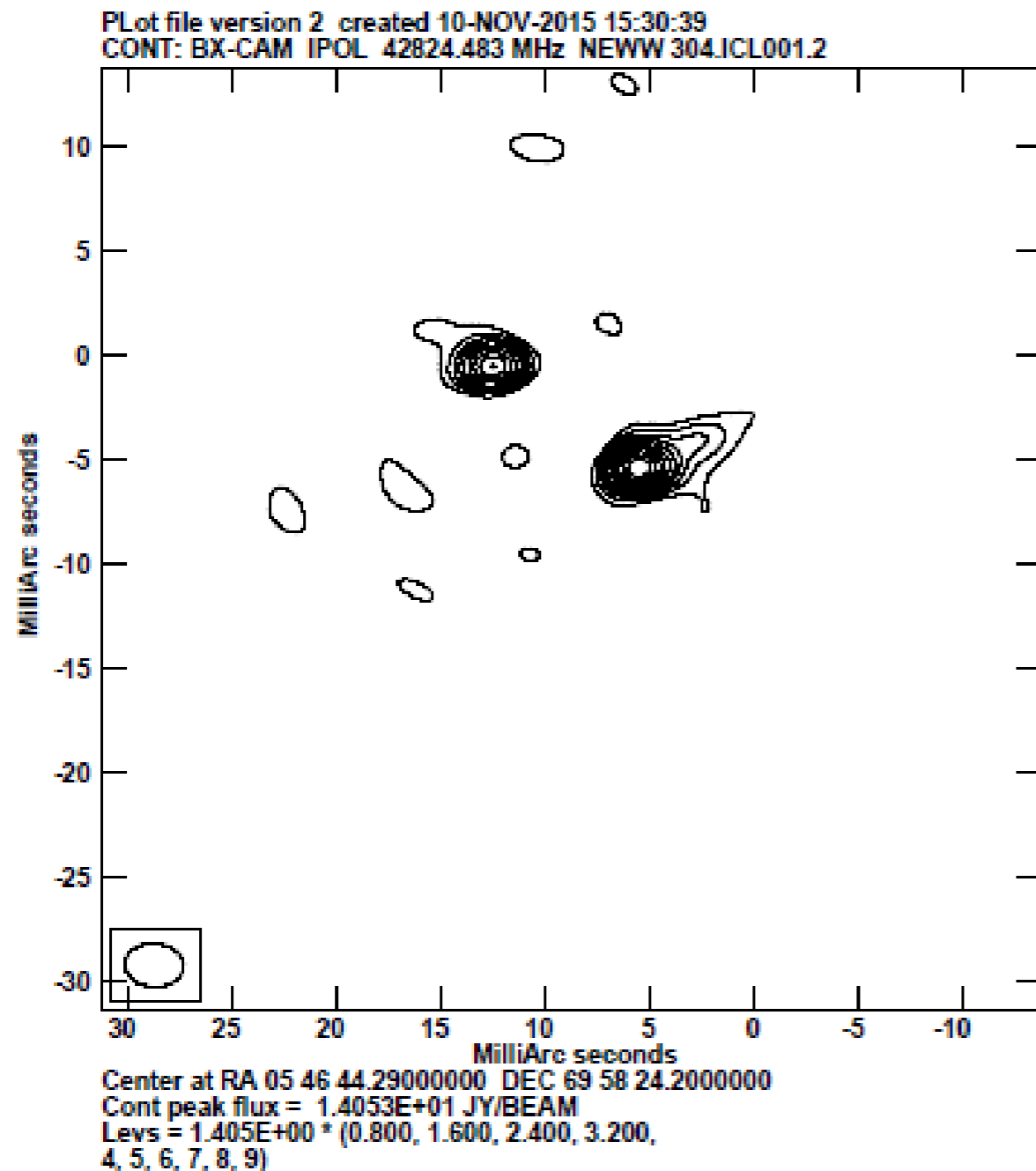


# Result : imaging @ 43 GHz

- BX-CAM**

KVN only  
D/R ~ 85

KVN-Sejong  
D/R ~ 310



Thank you