KVN

Introduction of KVN

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한국우주전파관측망
KOREAN VLBI NETWORK · KASI

KASI 한국천문연구원
Korea Astronomy & Space Science Institute

1st Radio Facility in Korea

- Taeduk Radio Astronomy Observatory
  - 14 m Radio Telescope Enclosed by Radome
  - First Light in 1987

TRAO 14 m Radio Telescope

- Observations
  - Dark Clouds & Star Forming Regions
  - Late Type Stars
  - Comet etc

- System Developments
  - 100 GHz Schottky Diode Mixer Receiver
  - 40 GHz Schottky Diode Mixer Receiver
  - 100 GHz SIS Receivers
  - 100/150 GHz Dual Beam SIS Receivers
  - 250 kHz & 1 MHz Filter Banks
  - VLBI Test Observations with NAOJ
  - Multi-Beam (5 x 3) Receiving System

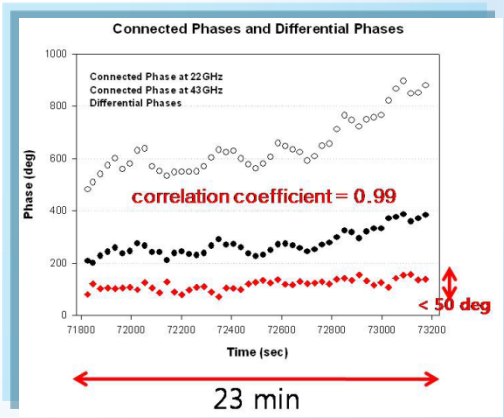
2nd Radio Facility of Korea

- KVN (Korean VLBI Network)
  - Start from 2001
  - 3 × 21m Antennas
  - 4 Frequencies (22, 43, 86, 129 GHz)

    Simultaneous Observing System
  - Multi-Channel

    Phase Correction System
  - Korea & Japan Correlator

    with 16 Recorders for EAVN



VERA 22/43GHz phase ref. test (Jung et al.) r 0.99

Telescopes

- Mount : ALT-Az Type
- Surface : Shaped Cassegrain type
- Install : Dec. 1, 2008
- pointing accuracy ≤ 4"

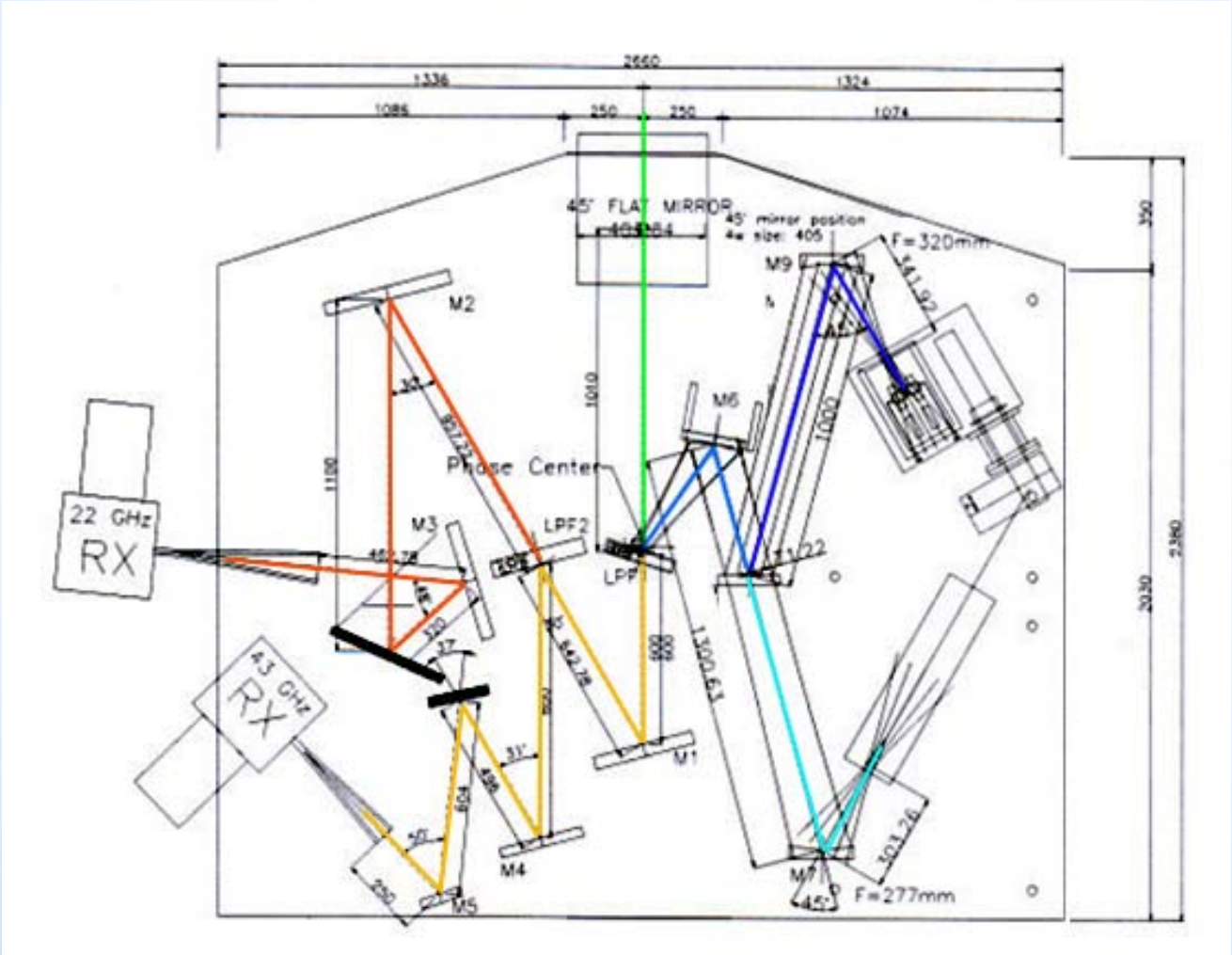
Telescopes

❖ Aperture Efficiency

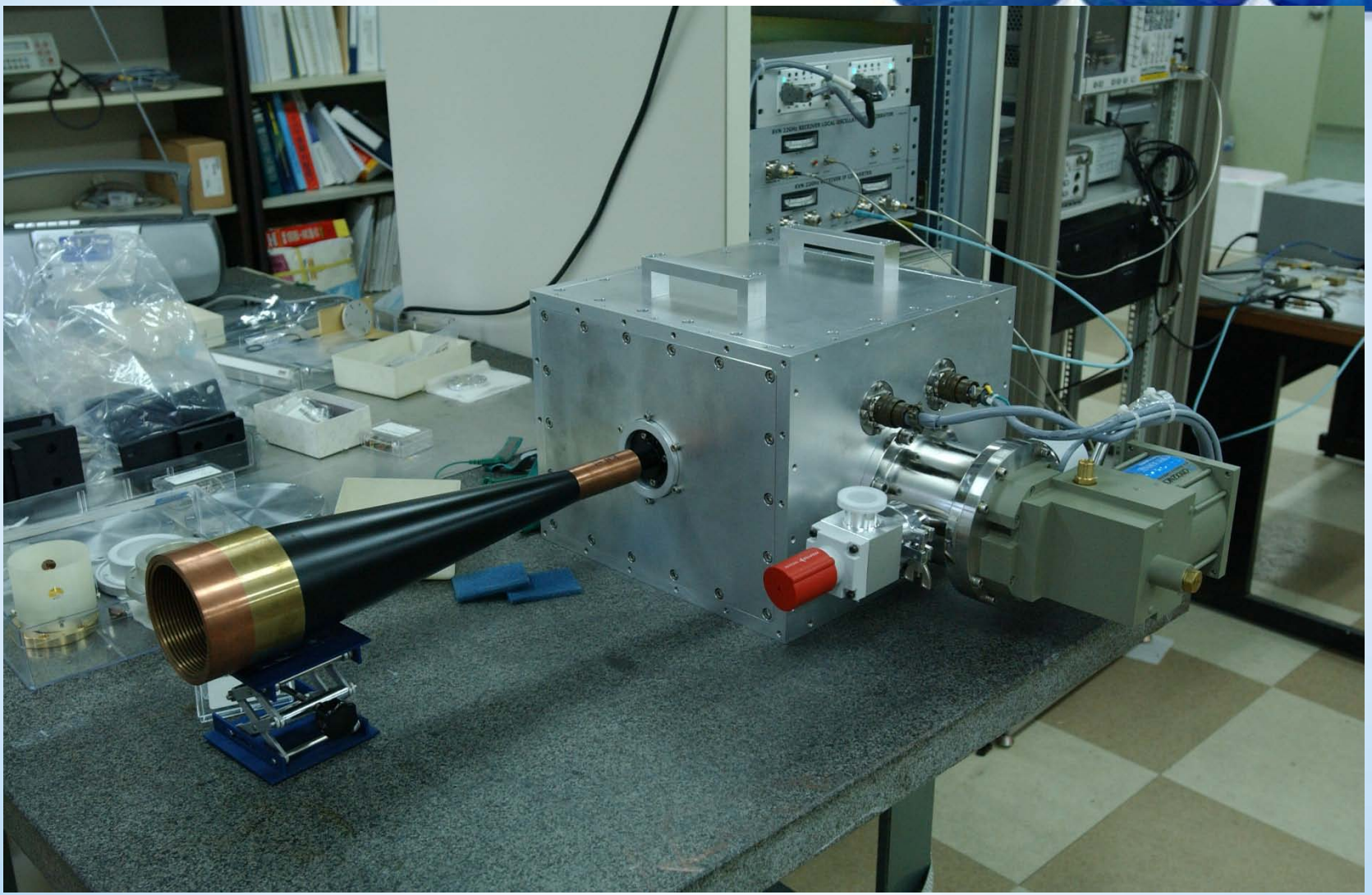
	Telescope	Base line	22 GHz	43 GHz	100 GHz
KVN	21m x 3	470 km	69%	72%	51%(55%)
VERA	20m x 4	2,300 km	50%	40%	-
VLBA	25m x 10	8,611 km	60%	51%	-
EAVN	x 19	6,000 km	-	-	
VSOP2	-	30,000km	-	-	

VLBI with Asian Countries, VSOP2, etc

Receiving System



22 GHz Receiver



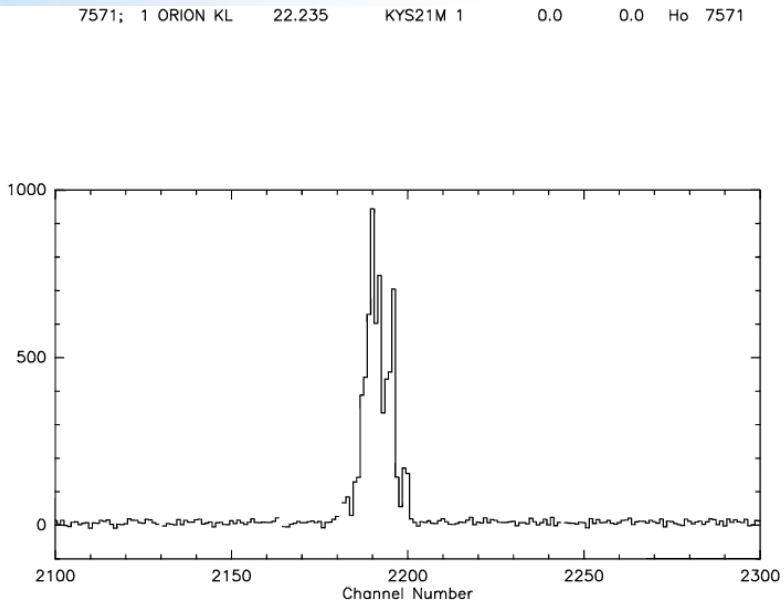
43 GHz Receiver

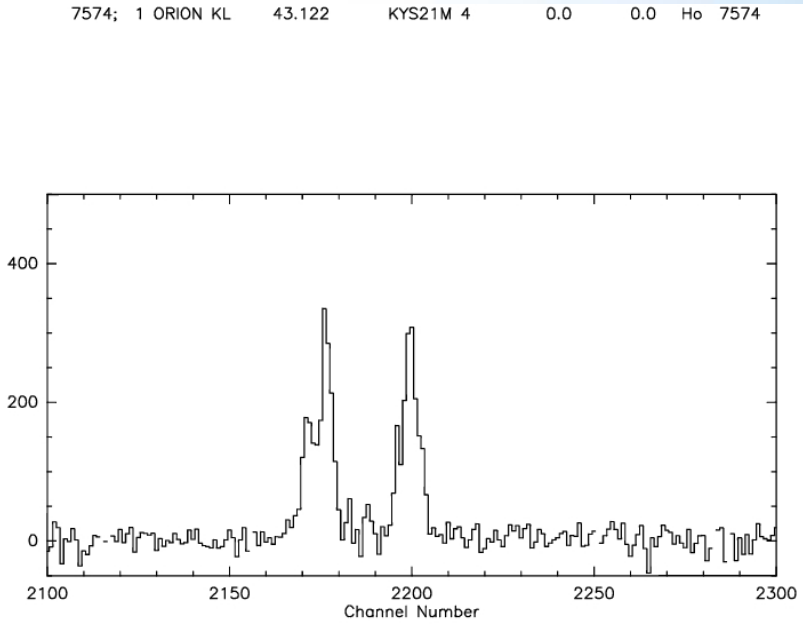
22/43 GHz Receiver

- 22/43 GHz Rx : Installed on 3 Telescopes in 2009
- 86/129 GHz Rx : Will be installed within 2011

22/43 GHz Test Observations

Orion-KL, H2O and SiO Maser Line

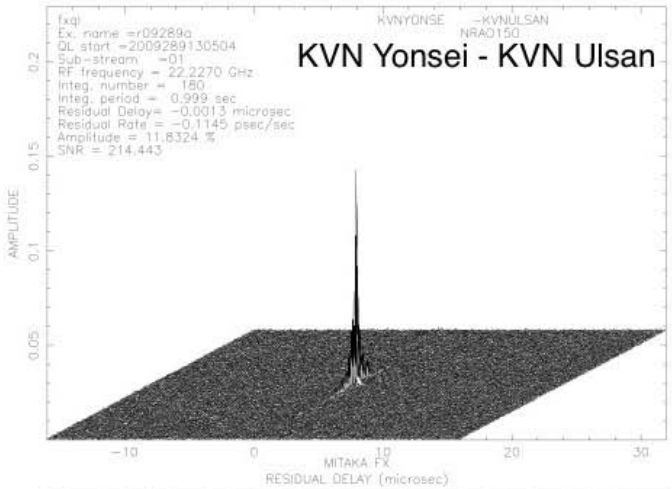


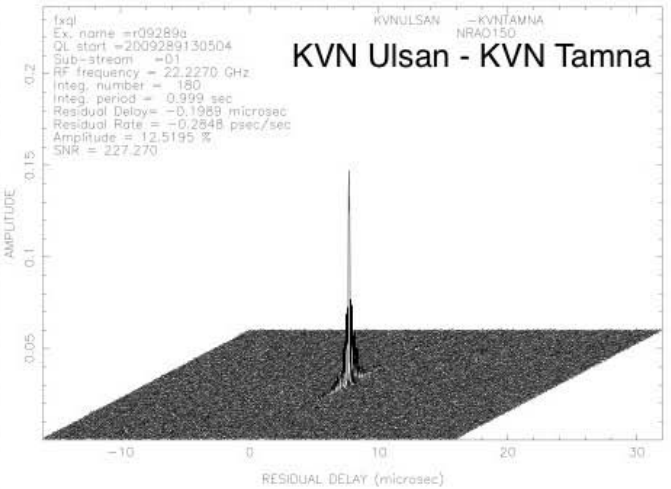


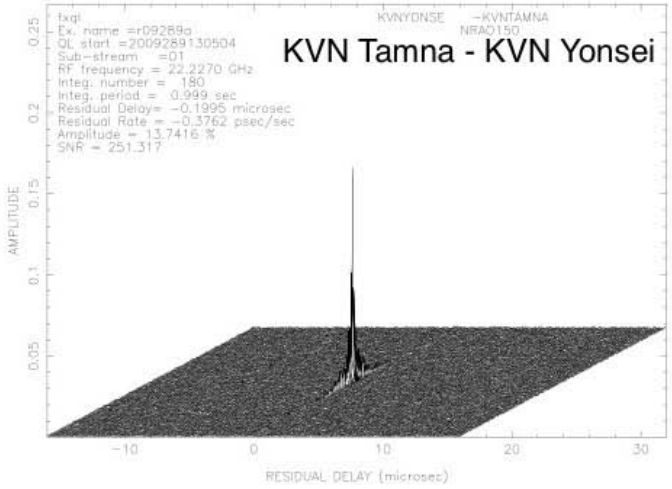
Simultaneous Observation Results !!!!!
on October 28th 2008

VLBI Test Observations

Fringes of KVN baselines in the K-band

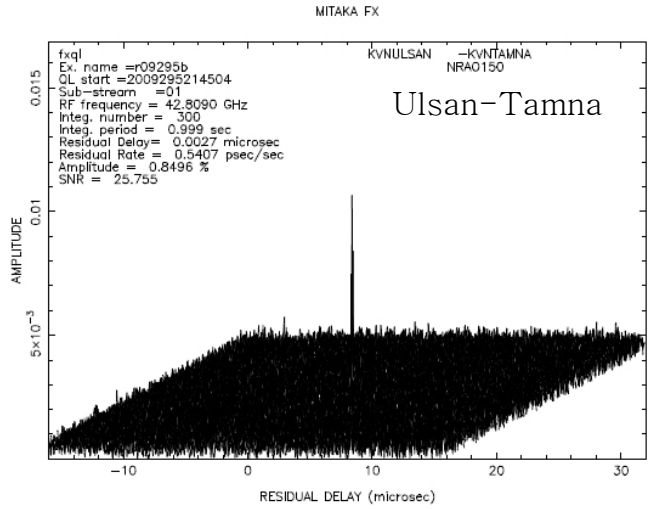


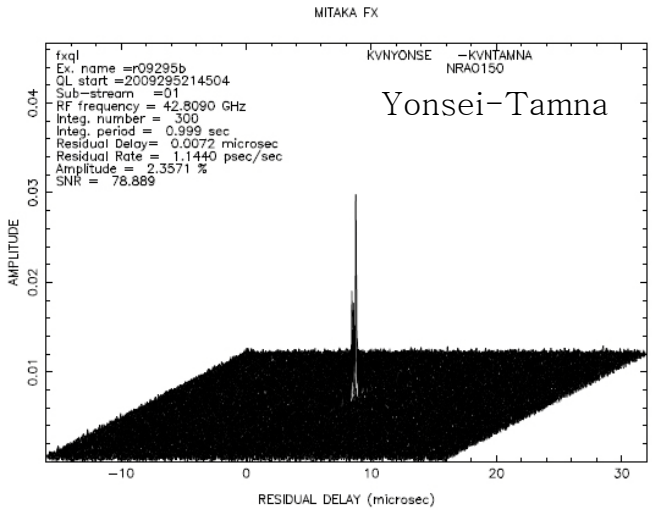


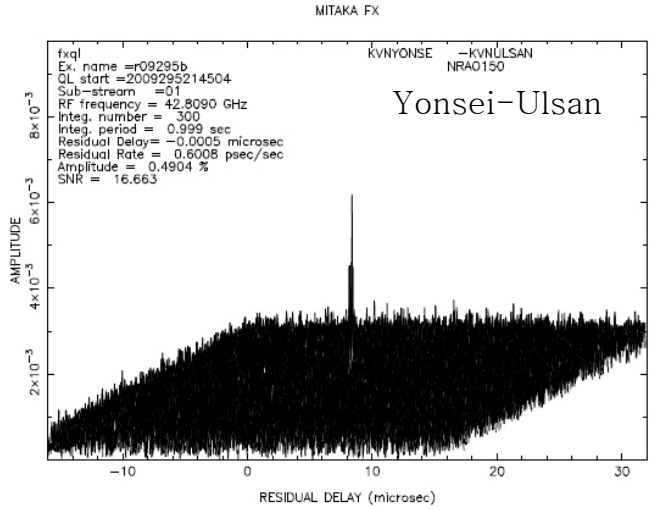


Oct. 16, 2009 (r09289a)
K-band
NRAO150

VLBI Test Observations

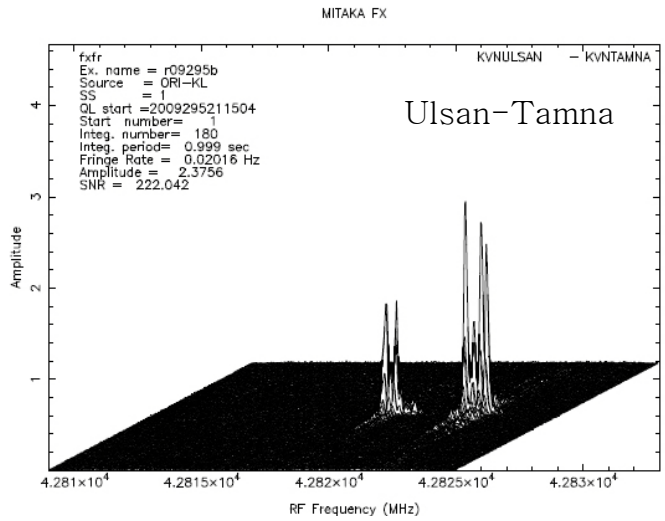


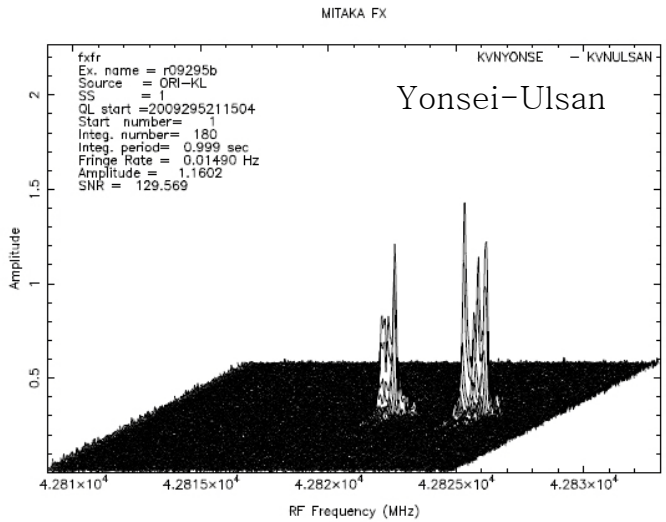


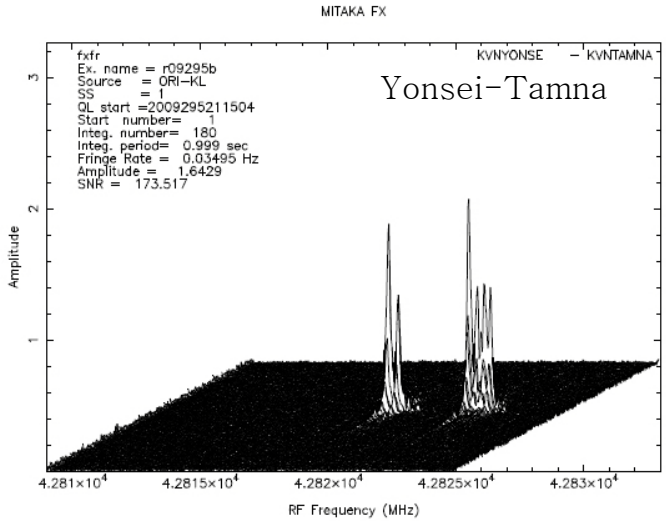


- Source : NRAO150
- Date : Oct. 12, 2009
- Freq. : 42.809 GHz
  (Continuum)

VLBI Test Observations







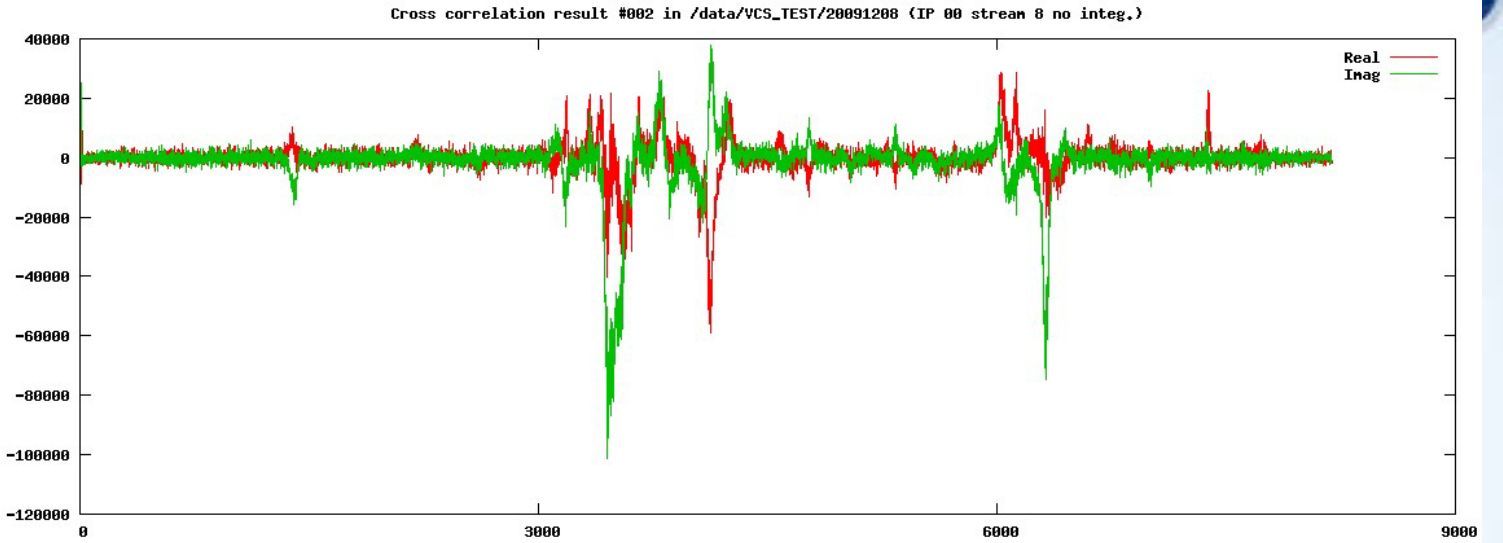
- Source : Ori-KL
- Date : Oct. 12, 2009
- Freq. : SiO Maser line

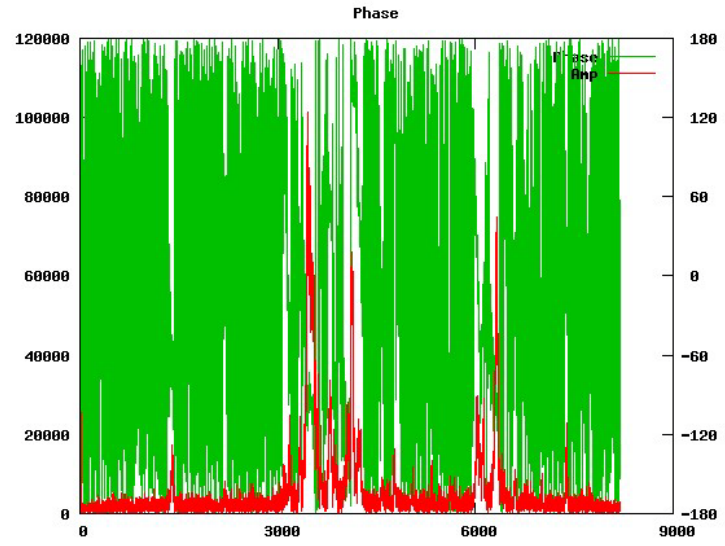
Correlator

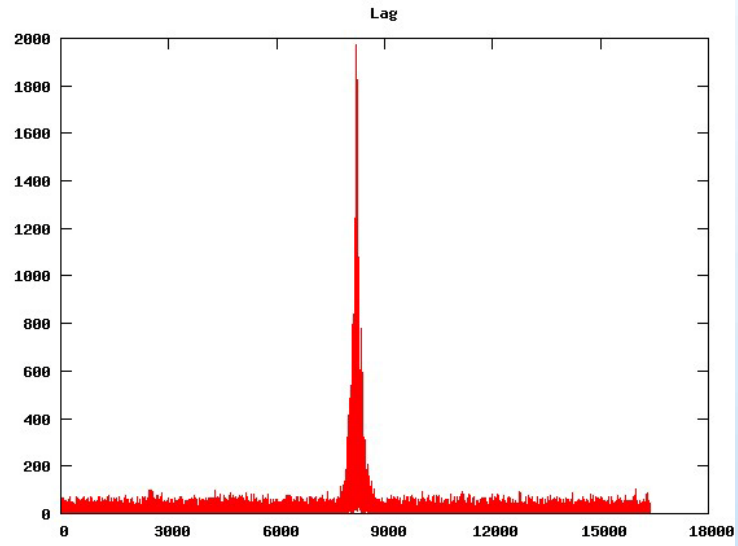
- Korea-Japan Joint VLBI Correlator
- 16 Recorders
  (8 Mark5B, 4 VERA2000+ DMS-24, 4 K5)
- 16 RVDB (Raw VLBI Data Buffer)
- Data Archive
  (100TB, 1PB in future)
- Serve of VLBI data analysis
- Backup system
- e-VLBI
- Operation from 2011
- Will be Used for KVN, KVN+ VERA, EAVN, & VSOP-2

KJJVC(Korea-Japan Joint VLBI Correrlator)

Cross-Corr(Yonsei-Ulsan: W49N)







KVN-Recent States

- Systems
  - 43 GHz Rx Upgrade
  - Cladding Problem
  - Sub-Reflector Problem
  - S/W Development for Correlator

- Observations
  - Single Beam Research Observations
    : A Few Papers Published and Submitted
  - VLBI Test Observations with VERA

KVN-Future

System

System		States
Telescopes		Installed in 2008
Rx	22/43 GHz	Installed in 2009
	86/129 GHz	Install one set in 2010 Install all set in 2011
Correlator		Install in 2010

KVN-Recent State and Future

Observations

Frequency		States
22/43 GHz	Single Beam	- Started from 2009 - Open from 2010
	VLBI	- On Test Observation - Start from 2011
86/129 GHz	Single Beam	- Start from 2011
	VLBI	- Start from 2012

KVN-International Cooperation

- Cooperation with VERA
  - Start from 2011 (Half of Total Observing Time)

- Cooperation with Others
  - VSOP-2
  - Univ. in Japan(Yamaguchi, Kagoshima etc)
  - EAVN
  - etc