Recent Status of KVN Construction

Korea Astronomy and Space Science Institute

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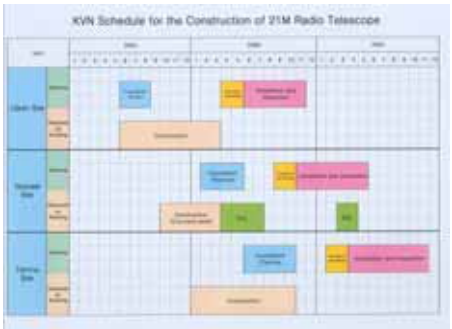
1. Abstract

Korean VLBI network(KVN) is being constructed since year of 2001, and is the first dedicated mm-wavelength VLBI network in East Asia from the middle of 2008. KVN consists of three stations with 21m radio telescopes and has the maximum observation frequency of 129GHz with the maximum baseline length of 480km. KVN will be unique facility which is able to make simultaneous observation by using millimeter wave multi-frequency band receivers in order to calibrate phase fluctuation due to troposphere. By taking advantage of this facility we are considering various science topics, including not only maser emitting regions and young stellar objects in our galaxy, but also extragalactic objects. Receivers, data acquisition system and a correlator have been concurrently developing. Ground breaking ceremony was held at Ulsan university on December 2004 as the first KVN site. All three antenna installations will be finished in the end of 2007.

Site Construction

Yonsei Site(Seoul), Ulsan Site(Ulsan), Tamna Site(Jeju)

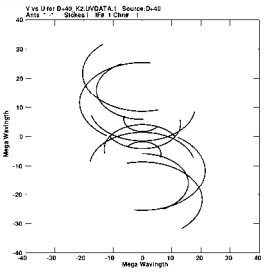


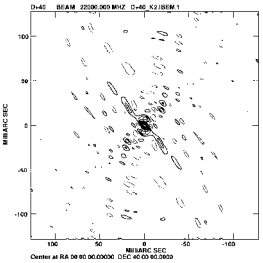
KVN 21m Radio Telescope

UV coverage and synthesized beam shape of the KVN+TRAO (for 22GHz, Dec=60 deg. source)

Site name	Longitude [° ′ ″ E]	Latitude [° ′ ″ N]	Altitude [m]
Seoul	126 56 35	37 33 44	260
Ulsan	129 15 04	35 32 33	129
Jeju	126 27 43	33 17 18	320

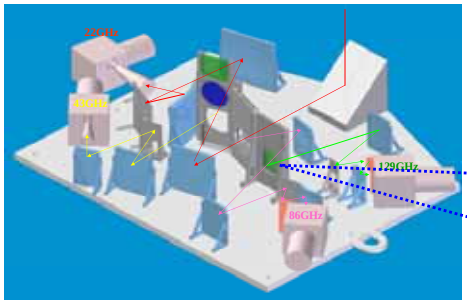
Site name	Baseline length [km] Seoul	Ulsan	Jeju
Seoul	—	305.2	477.7
Ulsan	—	—	358.5
Jeju	—	—	—





KVN Multi-Frequency Band Receiver

- Simultaneous observation for 22, 43, 86 and 129GHz
- Low-pass Filters with mesh for low loss and cross polarization
- 2/8GHz receiver will be installed for geodesy on other bench



Optical Bench for Multi-frequency Band Receiver

LPF with mesh

Receivers	2 GHz	8 GHz	22 GHz	43 GHz	86 GHz	129 GHz
Freq[GHz]	2.2~2.8	8~9	21.5~23.5	42~44	85~87	128~130
LO Freq. [GHz] (PDRO with Tripler)	6 (Up-converter)		14	11.5 x 3	TBD	TBD (SIS)
IF Freq. [GHz]	8.2-8.8	8-9	7.5-9.5		7.5-9.5	
IF Output Power [dBm]	-25	-25	-25	-25	-25	-25
Trx [K]	< 25	< 25	30	50	<100	<150
Nominal Tsys [K]	30	40	60	130	200	300
RF to IF gain [dB]	~ 65	~ 65	~ 60	~ 60	~ 55	~ 55
Baseband Freq.	512~1024 [MHz]					
Baseband LO Freq. (Programable)	9.5 ~10.5 [GHz]					
Baseband LO Step Freq.	1 [kHz]					
Polarization	- Both LHCP/RHCP - RHCP only for 2/8 bands					

DAS (Data Acquisition System)

- Designed for both LCP and RCP, 1 Gsps sampling rate
- 4 date streams to meet multi-channel requirement
- 256MHz Digital Filters (instead of analog or digital BBC)
- 4channels 64MHz digital spectrometers