Korean Radio Telescopes

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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

- **Recent States**
  - Multi-Beam System (5 x 3)
  - Freq. : 85 – 116 GHz
  - Targets : Molecular Cloud Survey

- **Future (on discussion)**
  - Wide band Rx
  - New SIS Multi-Beam System (6 x 6)
  - 86/129 GHz Rx for the 4th Site of KVN
KVN (Korean VLBI Network)

- 3 × 21m Antennas (Seoul, Ulsan, Jeju)
- Maximum Baseline: 480 km
- 4 Frequencies bands (22, 43, 86, 129 GHz)
  Simultaneous Observing System
- Multi-Frequency Phase Correction System by Simultaneous Observation
- Korea & Japan Correlator with 16 Recorders for EAVN
KVN: History

- 2001: Start Construction of KVN
- 2008: Install 3 Radio Telescopes
- 2008: Install 1 set of 22/43 GHz Rx on Yonsei Telescope
- 2008: First Light of 22/43 GHz H$_2$O & SiO Maser Lines
- 2009: Install 3 set of 22/43 GHz Rx
- 2009: Detection of VLBI Fringes of H$_2$O & SiO Maser Lines
- 2009: Start Single Antenna Research Observation
- 2010: Install Korea-Japan Correlator, but S/W is still on Develop
- 2010: 1 Gbps (Kreonet) btn each Observatory for e-VLBI
- 2011: Install 1 set of 86/129 GHz Rx on Yonsei Telescope
- 2011: Simultaneous Detection of the Maser Lines in 22/43/86/129 GHz (H$_2$O & SiO Lines) toward Ori-KL
- 2011: KVN-JIVE e-VLBI Formatter Test (K band)
KVN: Telescopes

- Mount: ALT−Az Type
- Surface: Shaped Cassegrain type
- Install: Dec. 1, 2008
- Pointing accuracy $\leq 4''$
KVN: Receivers

86 GHz Receiver

129 GHz Receiver

- Inner of Test dewar
  - mixer block
KVN : Receivers

- 4 Ch Receiver System installed on Yonsei Telescope
KVN: 4 Ch. Simultaneous Observation

- 22/43/86/129 GHz toward Ori-KL
### KVN: $T_{rx}$ & $\eta_A$

<table>
<thead>
<tr>
<th>Frequency</th>
<th>22 GHz</th>
<th>43 GHz</th>
<th>86 GHz</th>
<th>129 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trx</td>
<td>~30 K</td>
<td>~60 K</td>
<td>~70 K</td>
<td>~60 K(?)</td>
</tr>
<tr>
<td>Aperture efficiency</td>
<td>69 %</td>
<td>72 %</td>
<td>60 % (?)</td>
<td>45 % (?)</td>
</tr>
</tbody>
</table>
KVN : Future Works

- 2011 : KVN-EVN e-VLBI Fringe Detection (Yebes 40m, Metsahavi 14m)
- 2011 : Install all set of 86/129 GHz Receiver Systems
- 2011 : Complete Install of KJJVC
- 2012 : Operation of KJJVC
- 2012 : VLBI Test Observation of 22/43/86/129 GHz band
- 2012 : Install 6.7–8 GHz Receiver System (with Prof. Ogawa)
- 2012 : Start VLBI Research Observation with VERA (22/43 GHz Band)
- 2012 : Complete KVN HQ in Daejeon
- 2012 : Move KVN HQ from Seoul to Daejeon (~August)
- 2013 : Start VLBI Research Observation with 4 Channel Receiving System (22/43/86/129 GHz)
KVN: New Building

- 1.2 Billion Japanese Yen
- 6,600 m²
- Aug. 2012: Completion
Next Facility in Radio Astronomy

- Participate in East Asian ALMA?
- Participate in SKA Project?
- Korea Basic Science Institute
  - Will Found in 2012
  - Similar to Niken Institute of Japan
  - ~50 Research Projects
  - 12 billion Japanese Yen/yr for each Project

Basic Science Institute

- Belong to BSI
  - 15 Projects
- Any Institute in Korea
  - 10 Projects
- Daejeon Area
  - 10 Projects
- Other Local Area
  - 15 Projects