

VLBI Discussion Session

Capabilities

What instrumentation and facilities do we currently have access to?

Demands

In the next 5-10 years:

What instruments/facilities are needed for the science goals?

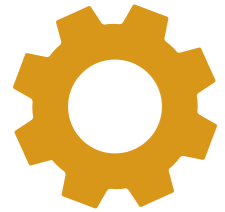
Advancements

In the next 5-10 years:

What instruments/facilities are we building?

What instruments/facilities can we get involved with?

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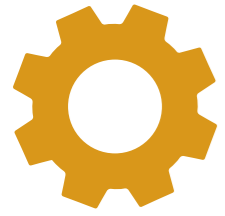


Capabilities (i)

What instrumentation and facilities do we currently have access to?

- 230GHz - EHT (ALMA Non-standard proposal), Continuum
Now: GLT (Oct-April VLBI main focus),
JCMT oversubscribed by 5:1 in Winter
2020: NOEMA, Kitt Peak - powehi+jet
SMA 230GHz only part of EHT (no other proposals)
- JCMT uses SMA maser
- Caution as we build this network to maintain user community, when funding goes to one main project, there are issues keeping community alive
 - EAVN up to 43GHz, lowest 6.7GHz (open use within 1 year)
 - FAST detected fringes at 1.6GHz
 - In East Asian regions there is possibility for low frequency observations (<5GHz)
 - 86GHz upcoming at JCMT - Daytime observations possible
 - KVN, 86 GHz

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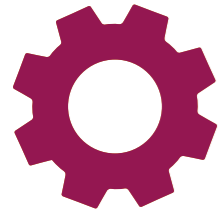


Capabilities (ii)

What instrumentation and facilities do we currently have access to?

- GMVA - Global Millimetre Wave Network - 86GHz (Twice/year)
- Thailand (1GHz, 25GHz, first light next year), (46GHz, 86GHz first light in 2-3 years), 40 meter dish - joining VLBI network
- EHT standardised
- EHT monitoring system *open source* (central server, python client) - one website that has a display of all site conditions (and predicts Precipitable Water Vapour!)

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Demands (i)

In the next 5-10 years:

What instruments/facilities are needed for the science goals?

wide band width

Multiple Frequency Receiver: Frequency Phase Transfer (need increase coherence)

improve efficiency

meter observation

radial velocity ()

Faster time to fringes

over 1 day 4-5 hours (fast timescale changes in compact observations) 4 telescopes
(Nobeyama + SPART + others)

1 long period variable biweekly - time exceeds 100 hours per year

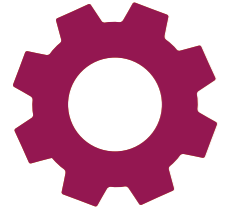
spectral line (absorption) and AGN focus with GLT+JCMT?

200 hours with KVN, 100 hours with EAVLBI (per semester)

-better organization for VLBI - central hub for decisions about go/no-go

-Expanding 86GHz capabilities for Evolved Stars, etc.

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Demands (ii)

In the next 5-10 years:

What instruments/facilities are needed for the science goals?

- Time and coordination - how fast is setup? - make VLBI observations more frequent and more flexible
- The faster the setup, the more flexible = *Automation*
- Flexible observing for different weather conditions at different sites
 - Japan needs Mark6 data storage? - worldwide standardization
 - Dynamic scheduling at 86

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Advancements

In the next 5-10 years:

What instruments/facilities are we building?

What instruments/facilities can we get involved with?

- SMA, GLT, JCMT, *Tibet* for high frequency VLBI
- 60M submm telescope (Tibet)
- Younger generation education - building instrumentation and small dishes? ~SWAN VLBI Network~

VLBI Discussion - contributed notes

Event Horizon Telescope (EHT) – 230 GHz VLBI

So far, continuum only.

Basically, ALMA users can submit 230 GHz VLBI proposal.

Current: ALMA, APEX, GLT, IRAM 30m, JCMT, LMT, SMA, SMT, SPT

Near Future: NOEMA, Kitt Peak

3 mm VLBI

Current: KVN, NRO, GLT, ATCA, Yebes

Near Future: JCMT, Thailand

Compact Array + Long Baseline Array (from extended to compact sources)

JCMT vs VLBA Hawaii Station

Plan for increasing bandwidth? (EHT: 64 Gbps)

VLBI Data Correlation

SHAO

KASI

Any request for the upgrade?

Future Instruments

Multiple Frequency Receiver: Frequency Phase Transfer

Future New 3 mm / 230 GHz VLBI Sites

China (Ali)