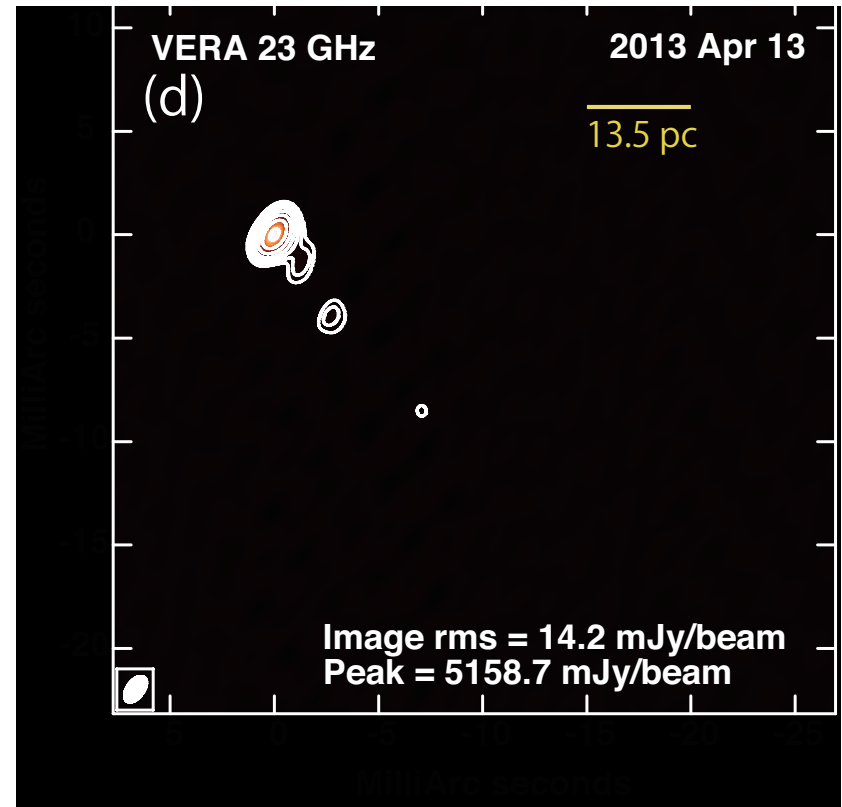
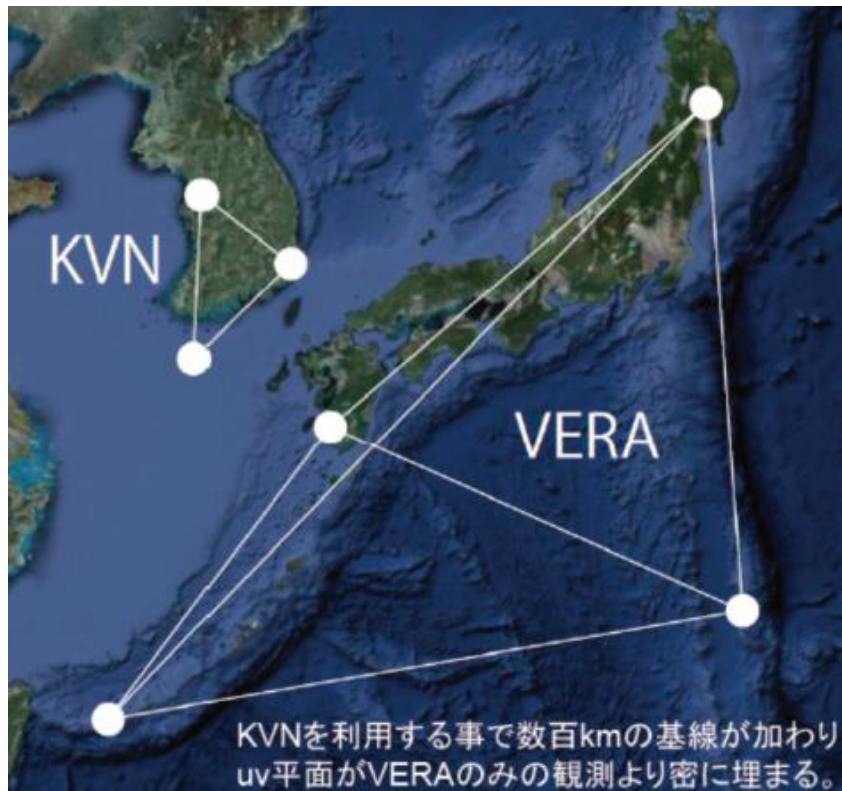


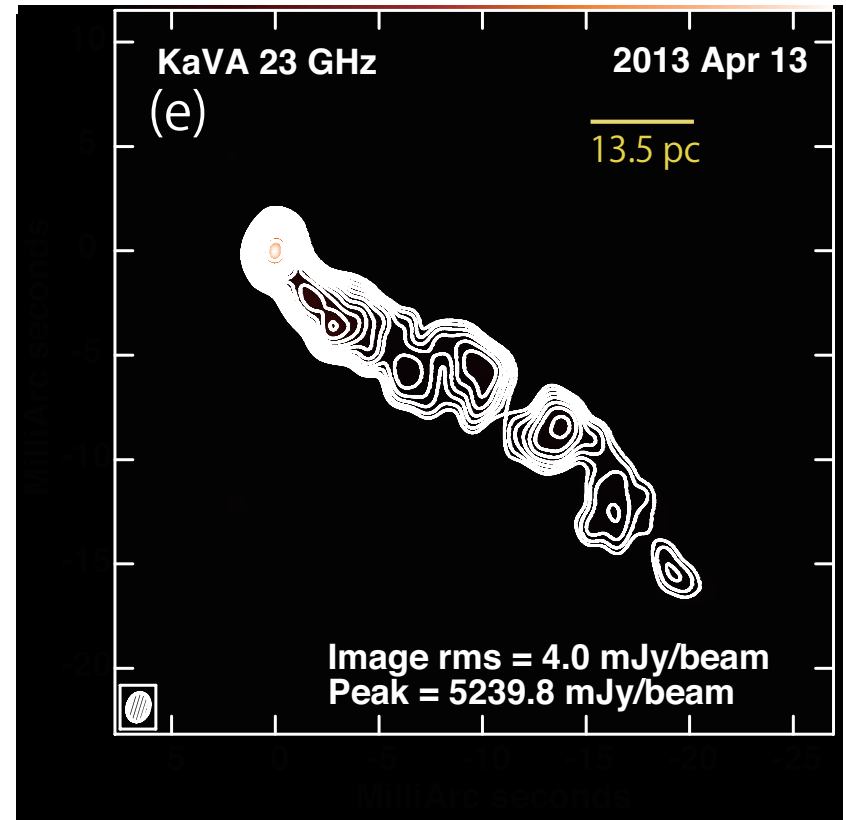
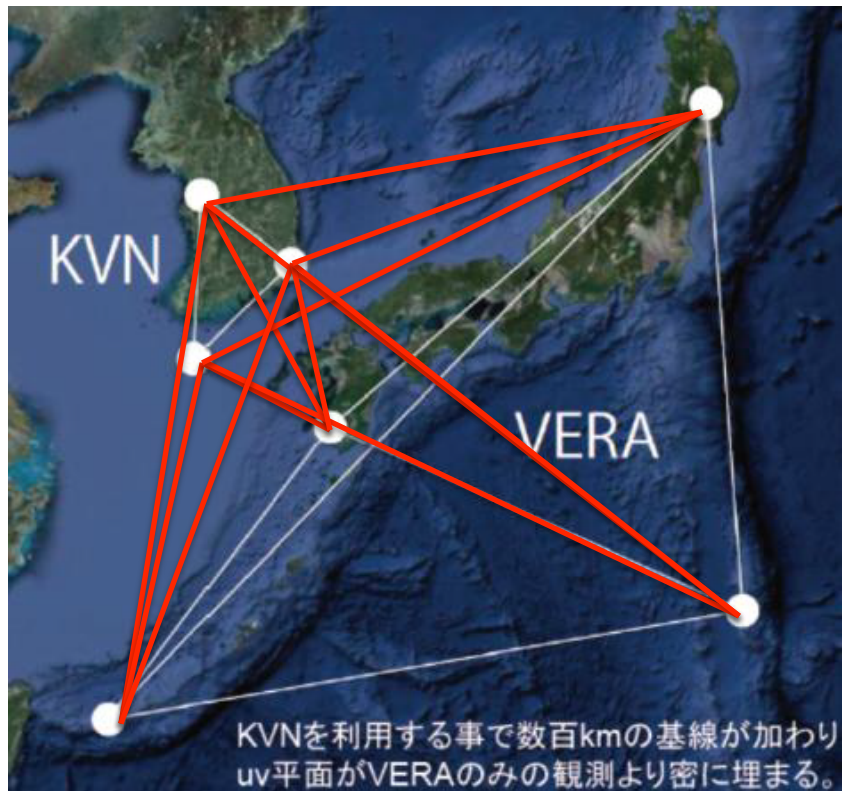


Contents:

- Objective
- Test obs. – 2013 April 13/14
- Capability
- Result – 128 Mbps
- Preliminary 1 Gbps result
- Summary

Imaging capability of KVN and VERA Array (KaVA)

K. Niinuma (Yamaguchi U.)
on behalf of KaVA AGN sub-SWG



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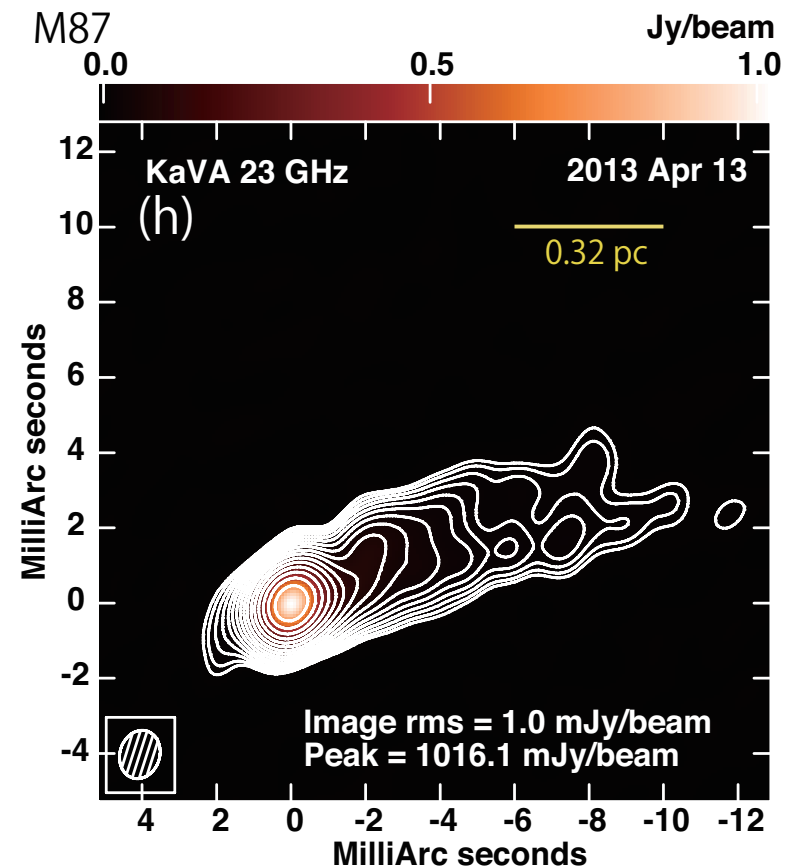
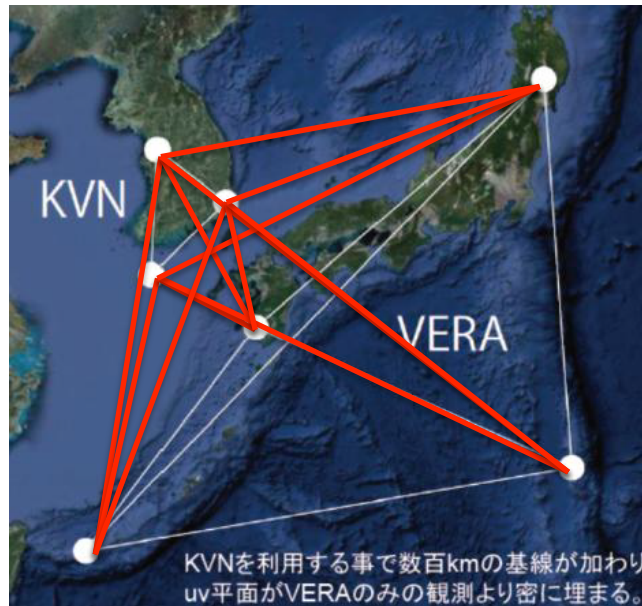
Imaging capability of KVN and VERA Array (KaVA)

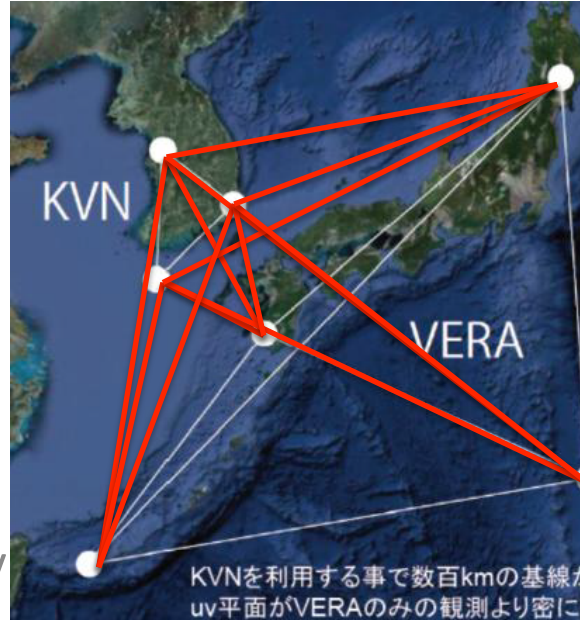
K. Niinuma (Yamaguchi U.)
on behalf of KaVA AGN sub-SWG

Objective:

KaVA test observation of bright AGNs

- Evaluation of Imaging capability at K-/Q-band
 - Toward KSP of KaVA AGN sub-SWG

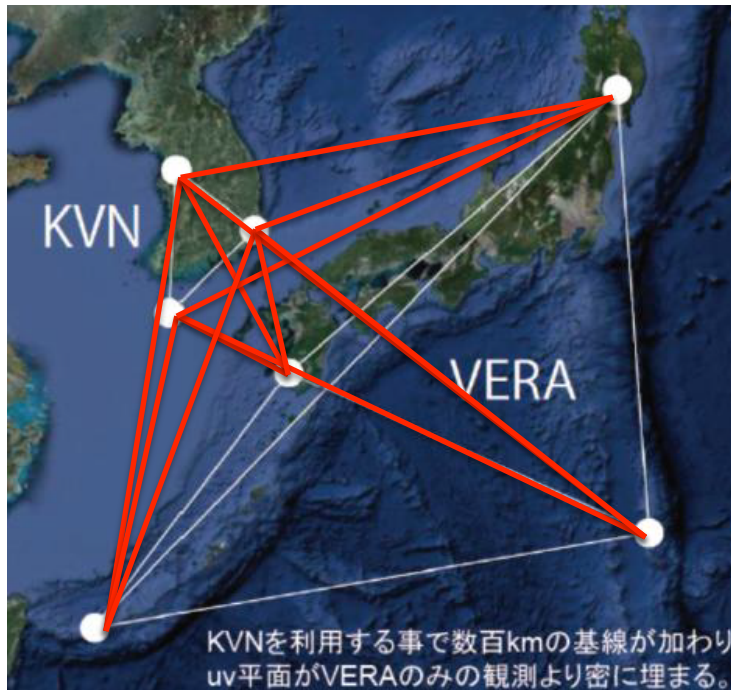




OBSERVATION

- AGN sub-Science Working Group -

Observation Summary



KaVA: 21-baselines (300 – 2300 km)

KVN: 3-baselines (300 – 500 km)

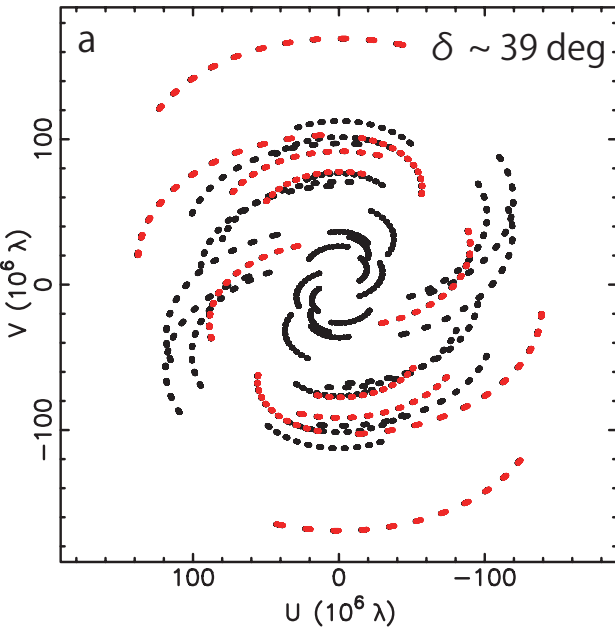
VERA: 6-baselines (1000 - 2300 km)

- Epoch : 2013-Apr-13/14
 - Apr-13 : Kband (6-hours)
 - Apr-14 : Qband (8-hours)
 - 128-Mbps recording
 - Quasi-simultaneous
- Sources
 - Extended jet – M 87, 3C 273
 - Compact – 4C +39.25
- On-source time
 - 60-/90-min for each (K/Q)
 - 6 min/scan x 10-15 scan

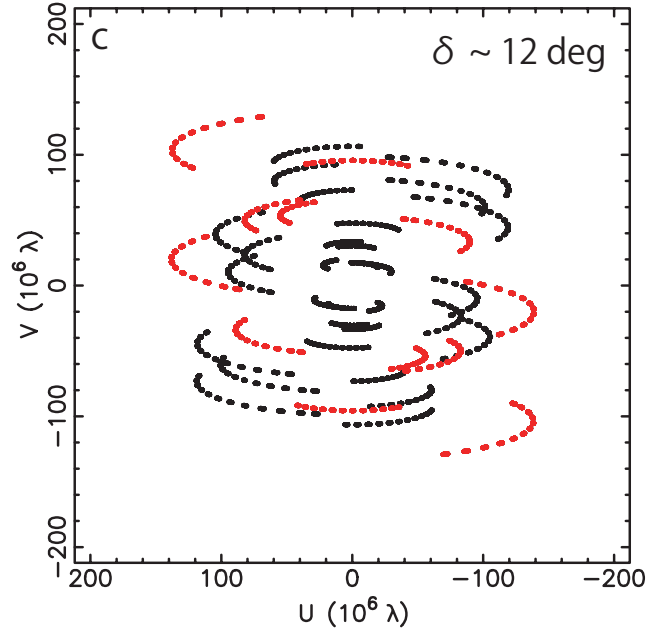
uv-coverage

6-hours snap-shot (each decl. @Kband)

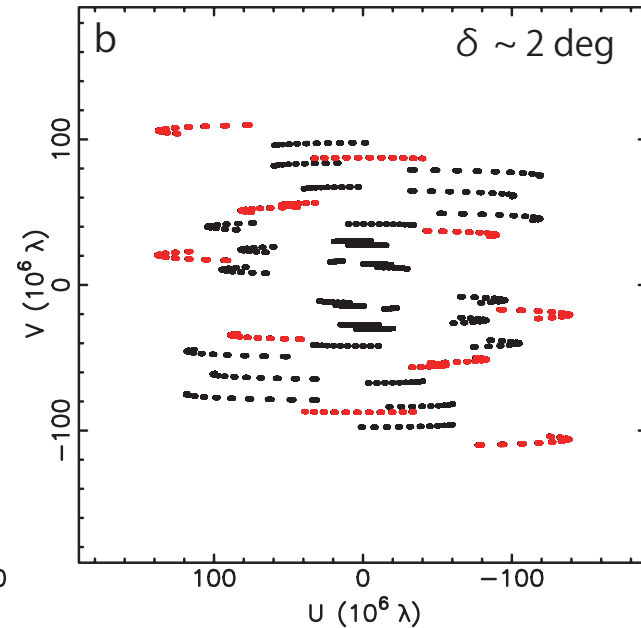
4C39.25 at 22.984 GHz in LL 2013 Apr 13



M87 at 22.984 GHz in LL 2013 Apr 13



3C273 at 22.984 GHz in LL 2013 Apr 13

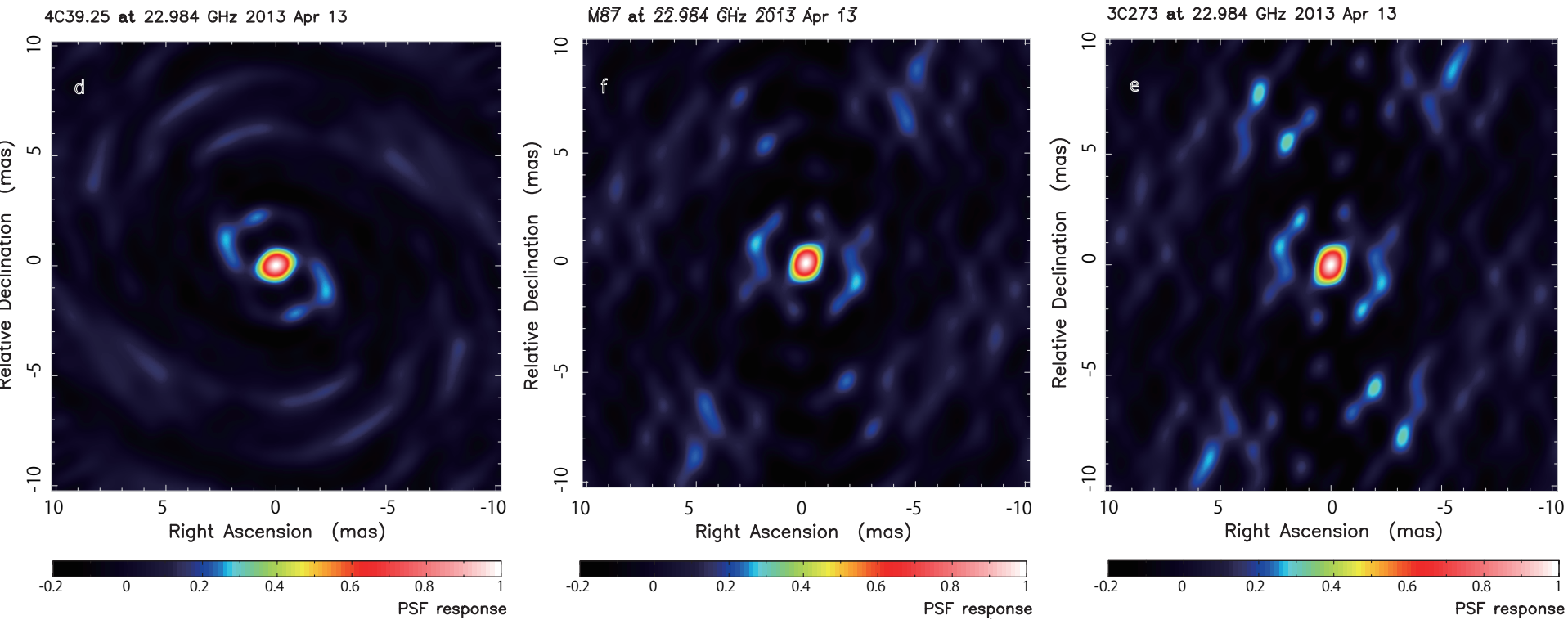


Red: VERA baselines

Red+Black: KaVA baselines

Point Spread Function

6-hours snap-shot (each decl. @Kband)



Great Improvement!

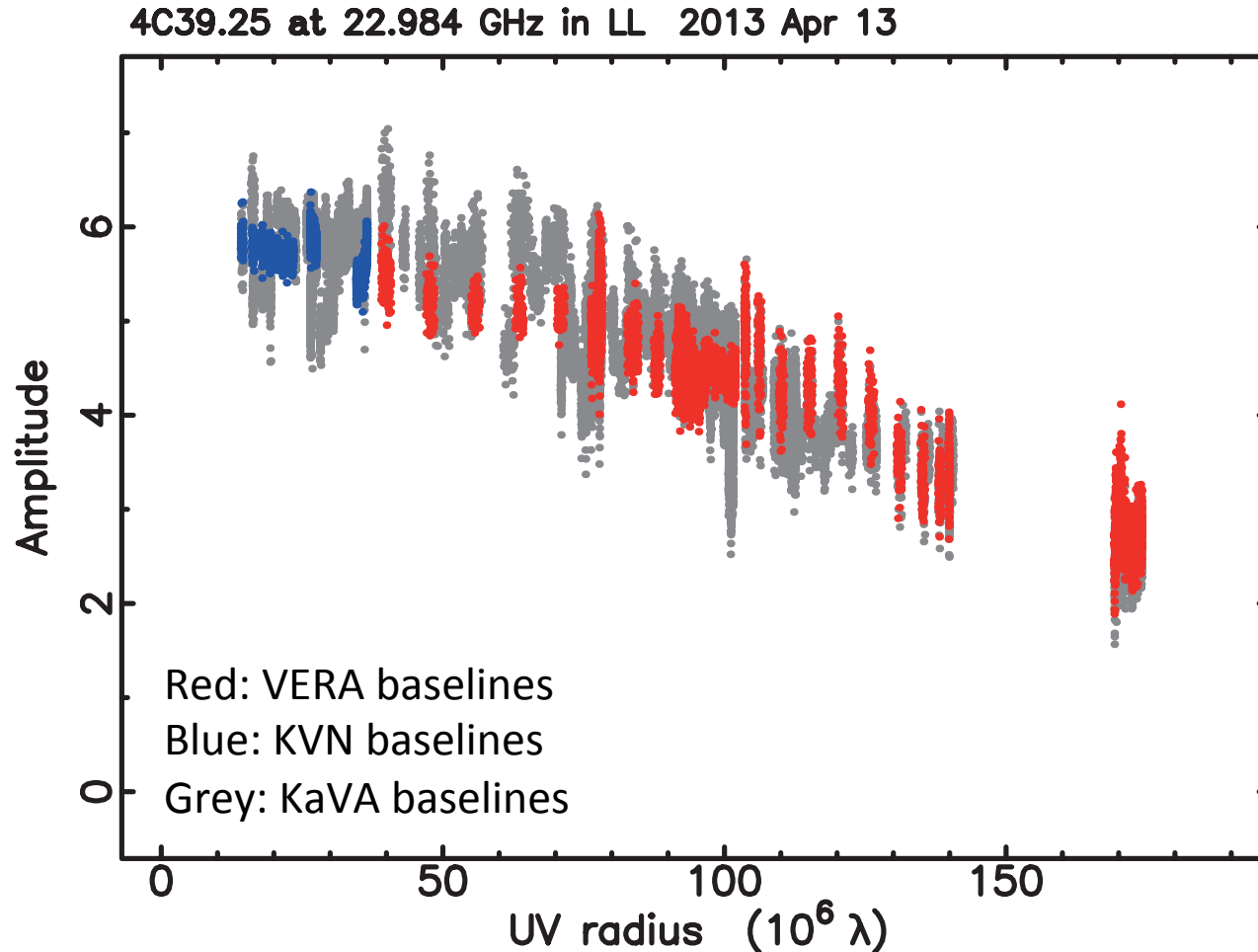
KVN and VERA Array (KaVA)

RESULT – IMAGE GALLERY

(4C +39.25, 3C 273, M 87)

KaVA Imaging Capability of AGN jet

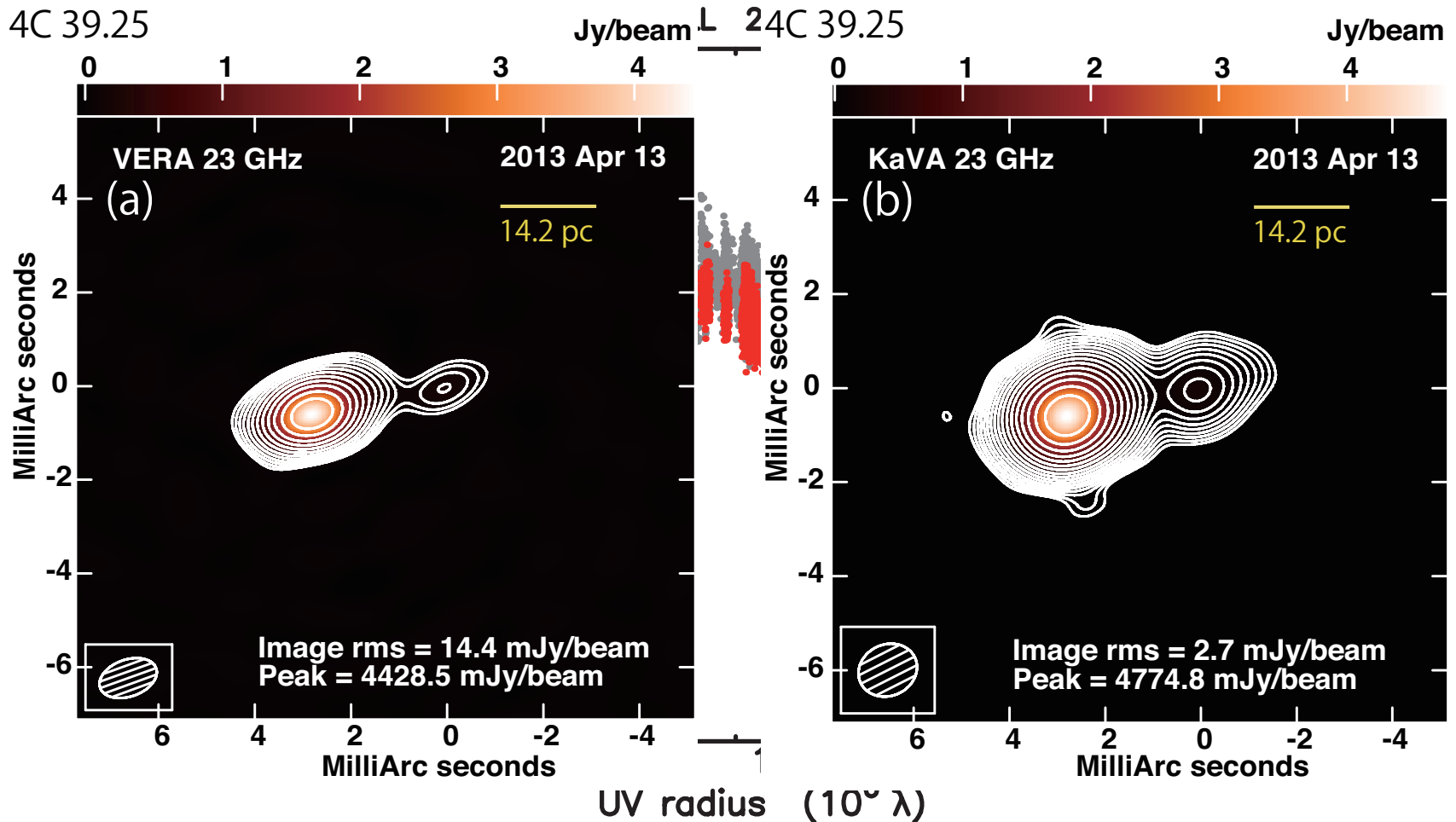
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of 4C+39.25

KaVA Imaging Capability of AGN jet

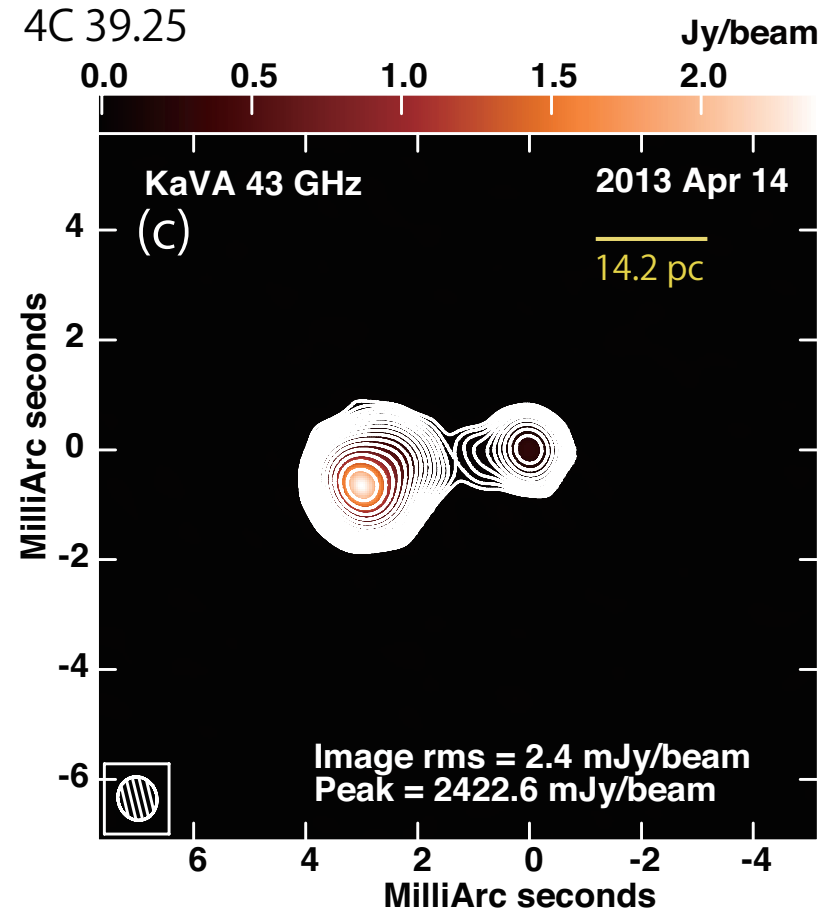
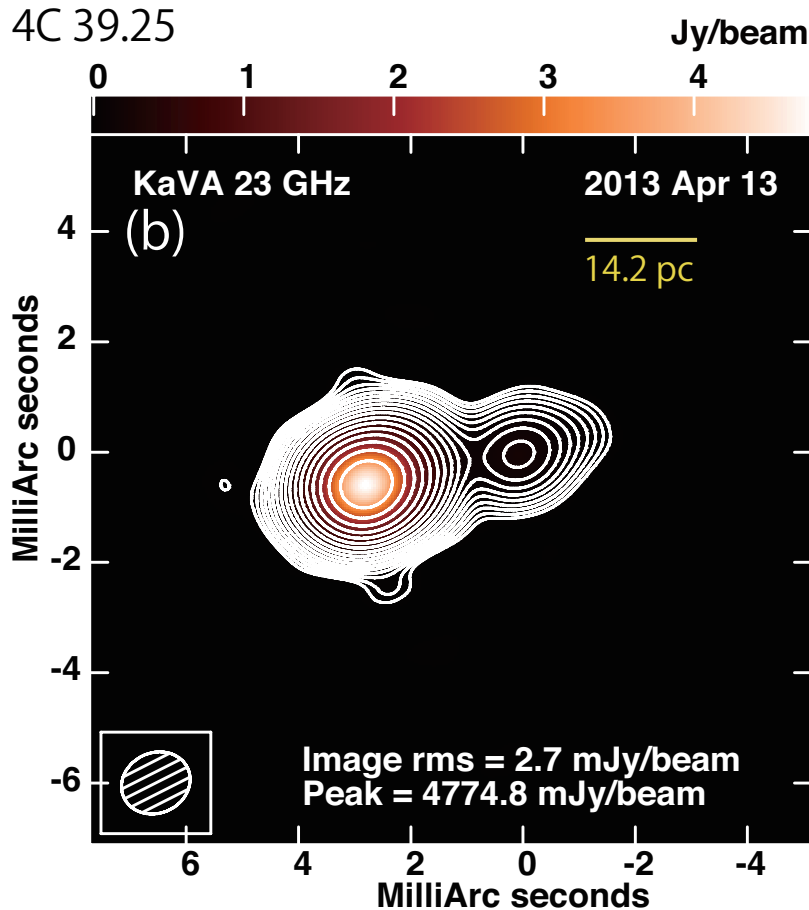
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VLBI images - Case of 4C+39.25

KaVA Imaging Capability of AGN jet

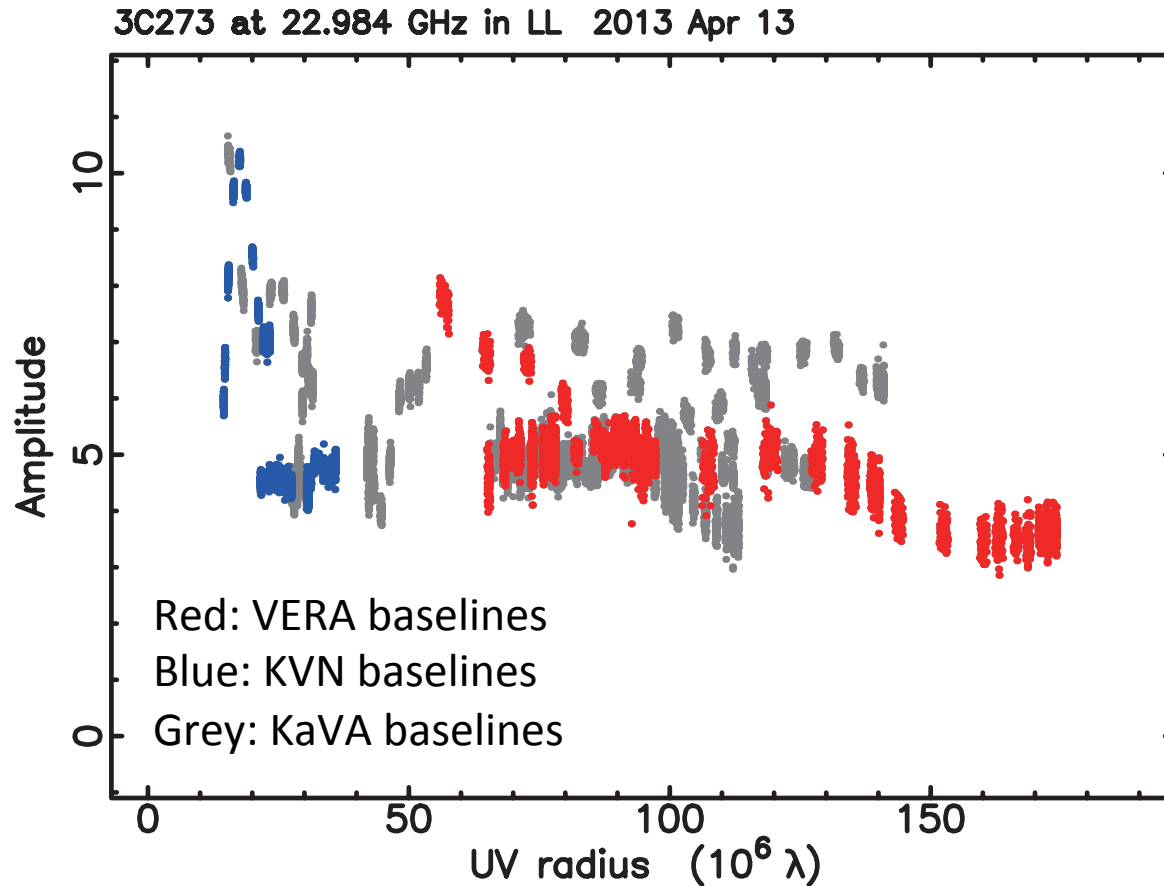
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of 4C+39.25

KaVA Imaging Capability of AGN jet

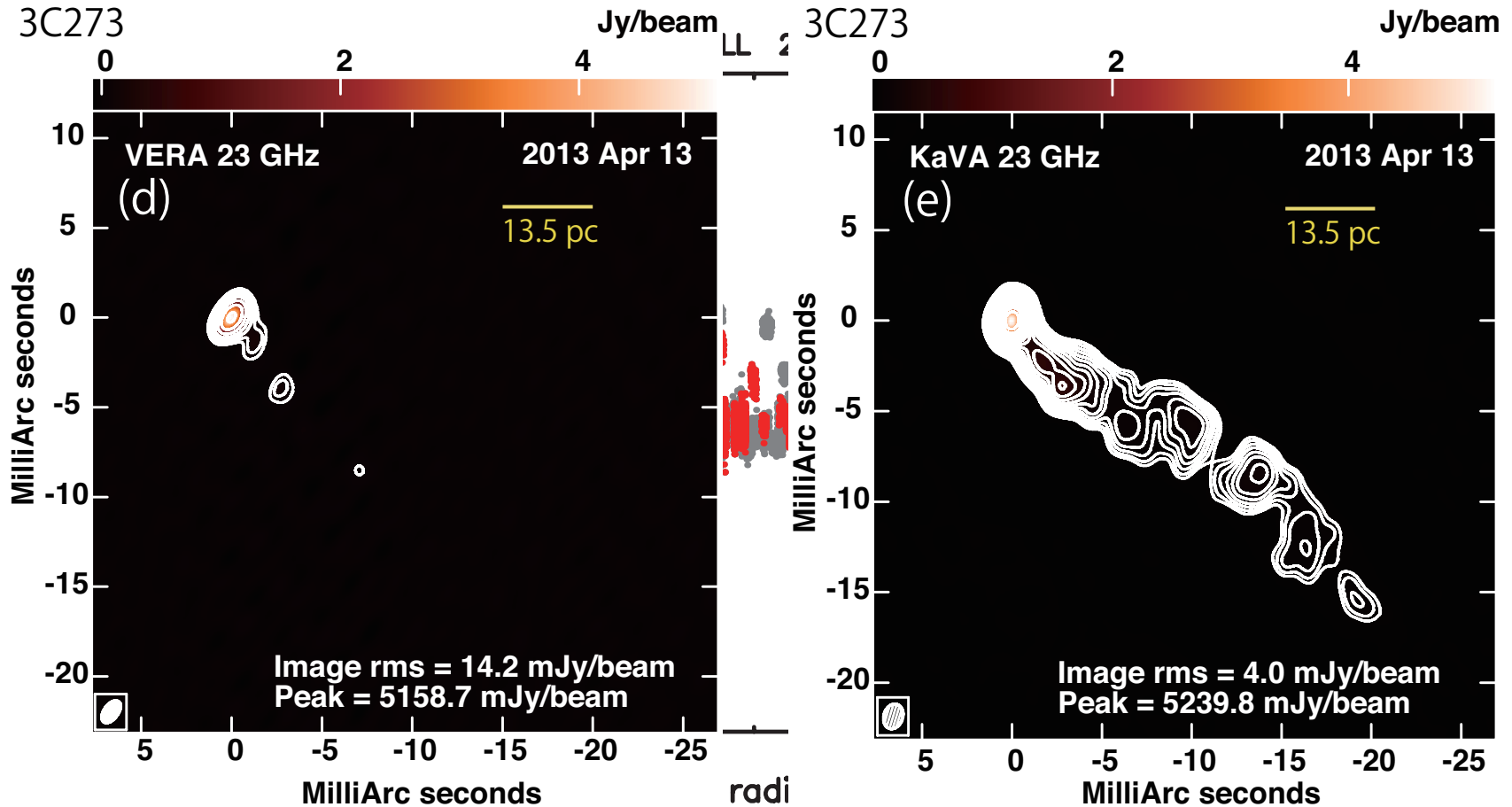
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of 3C 273

KaVA Imaging Capability of AGN jet

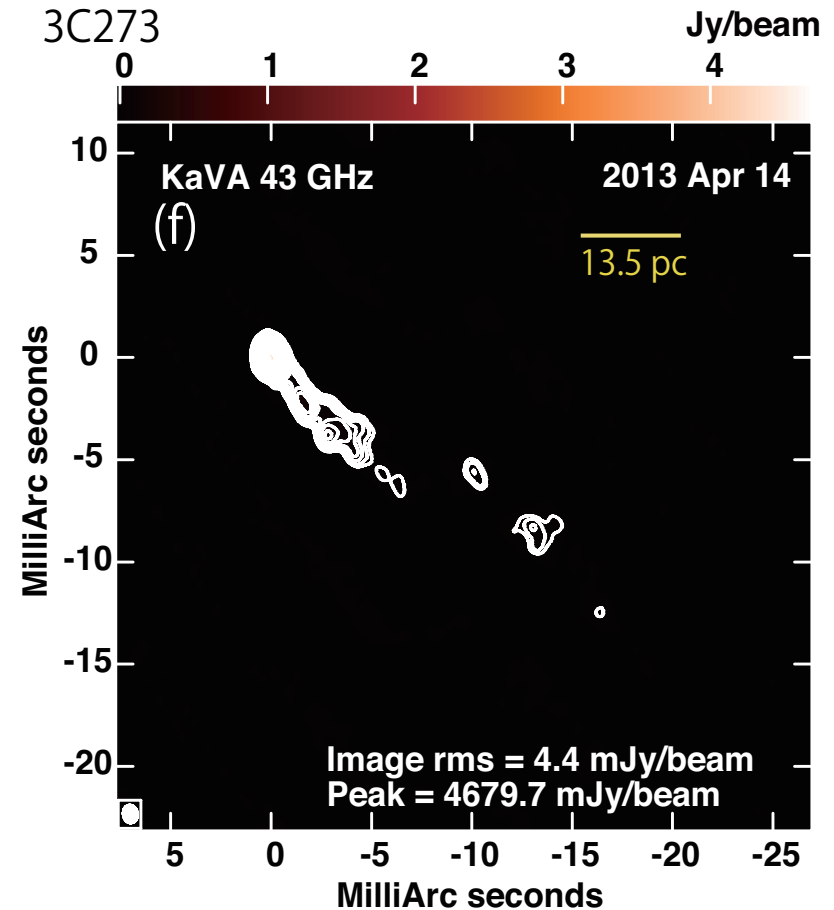
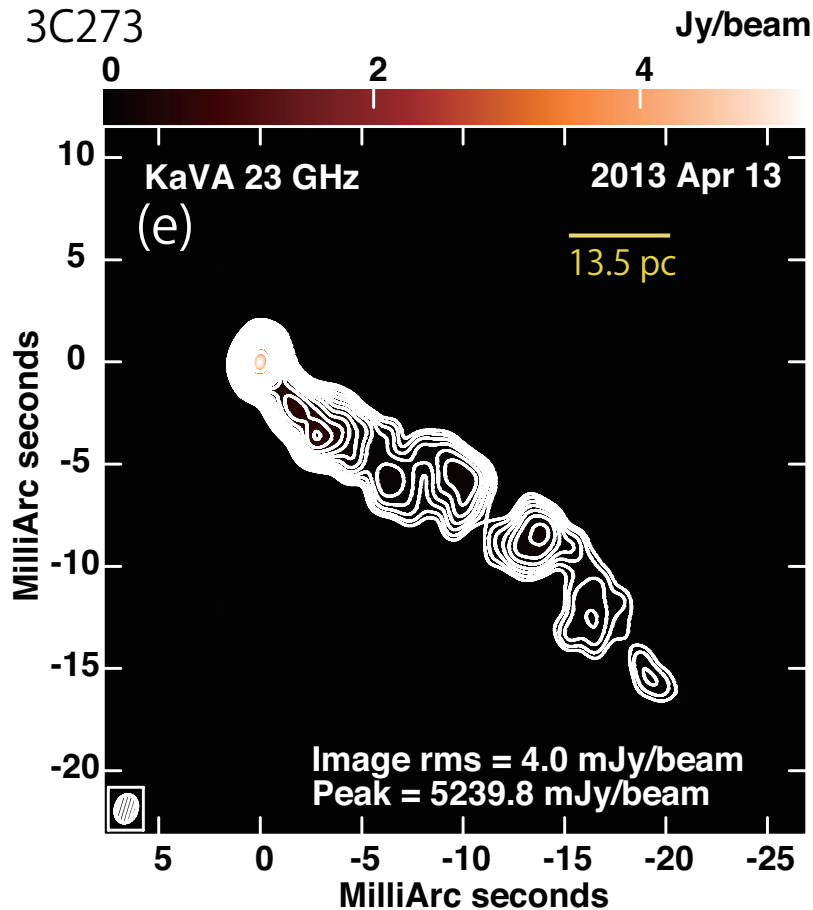
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of 3C 273

KaVA Imaging Capability of AGN jet

128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*

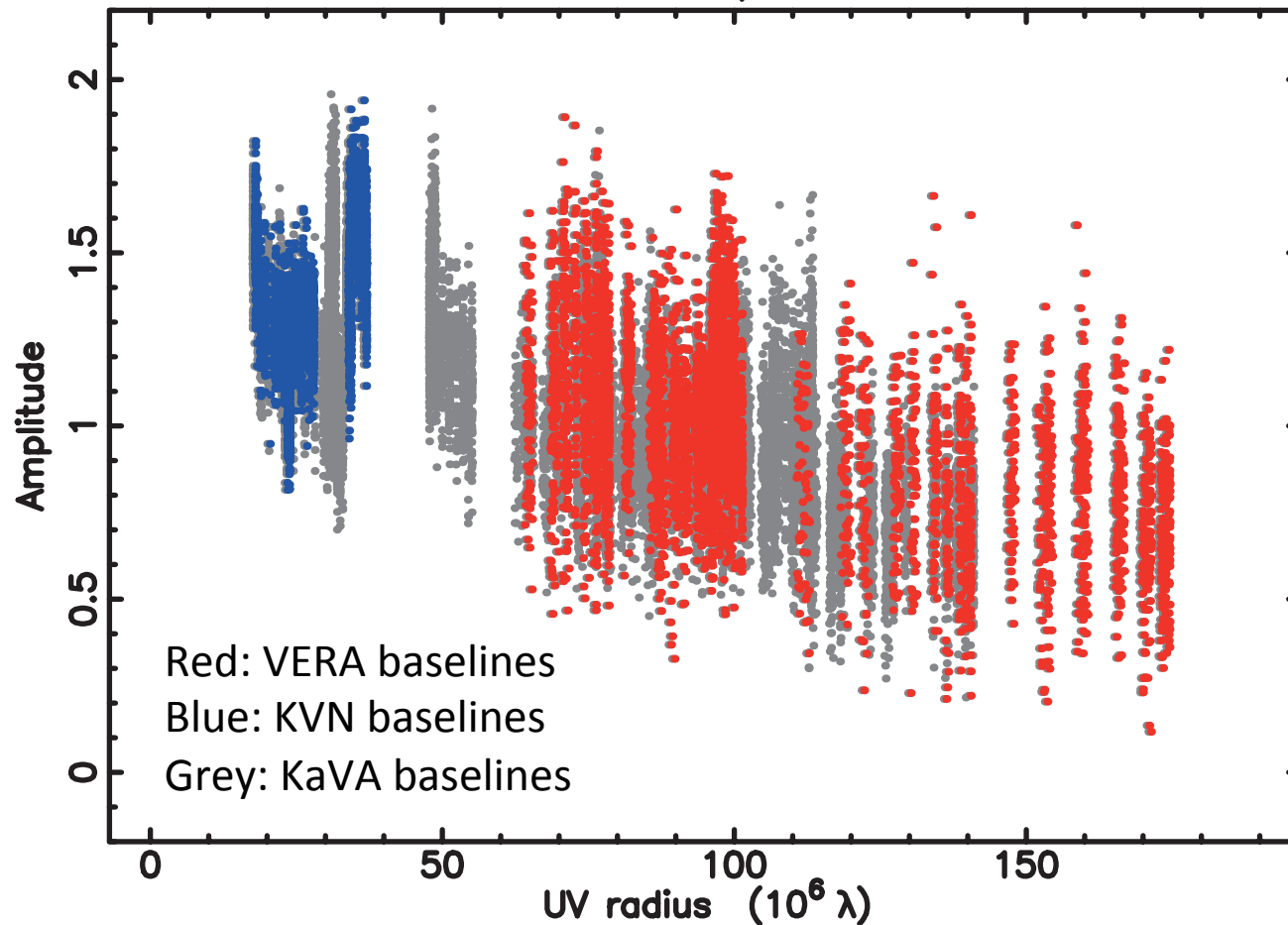


VLBI images - Case of 3C 273

KaVA Imaging Capability of AGN jet

128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*

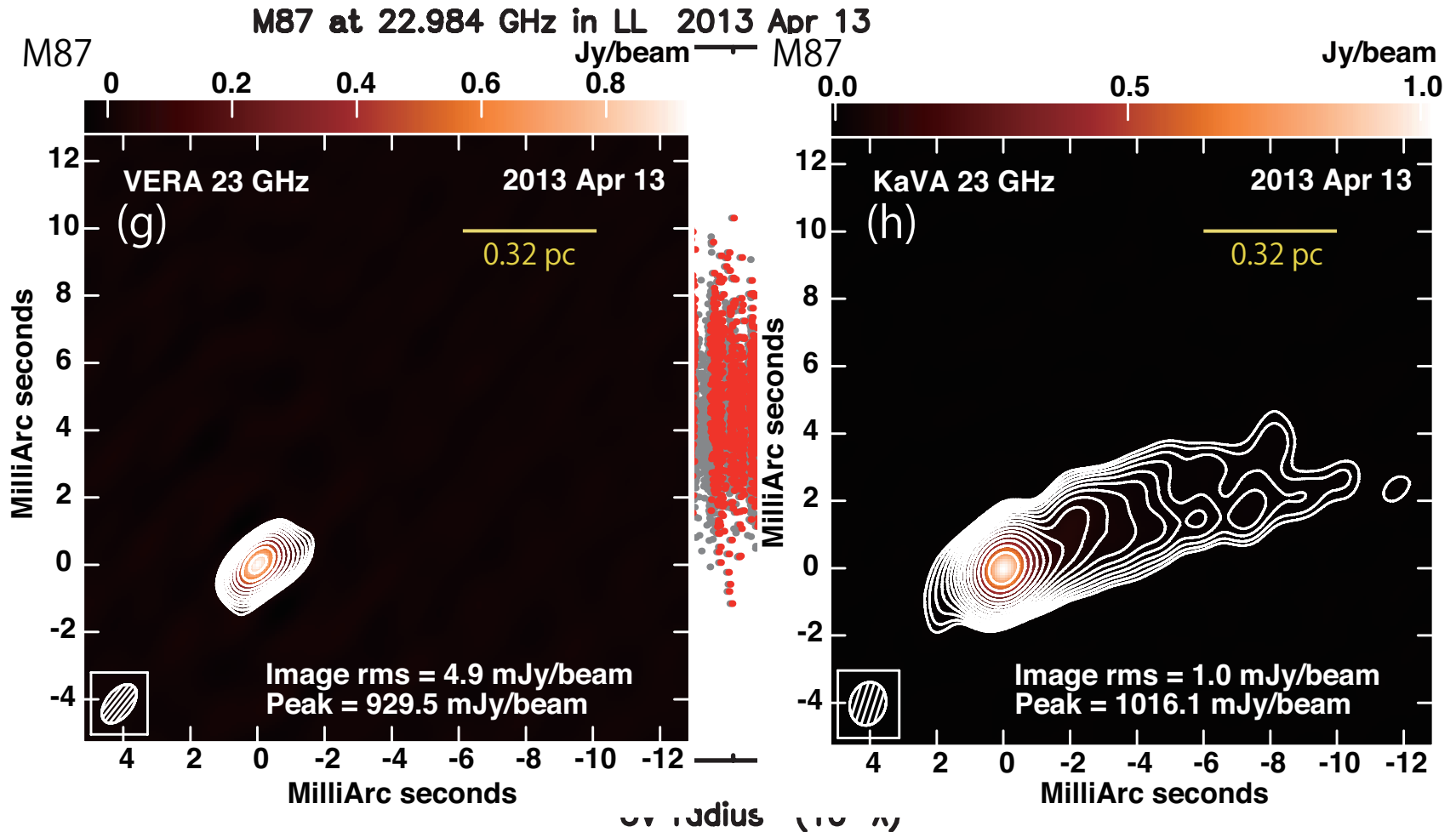
M87 at 22.984 GHz in LL 2013 Apr 13



VLBI images - Case of Messier 87 (M87)

KaVA Imaging Capability of AGN jet

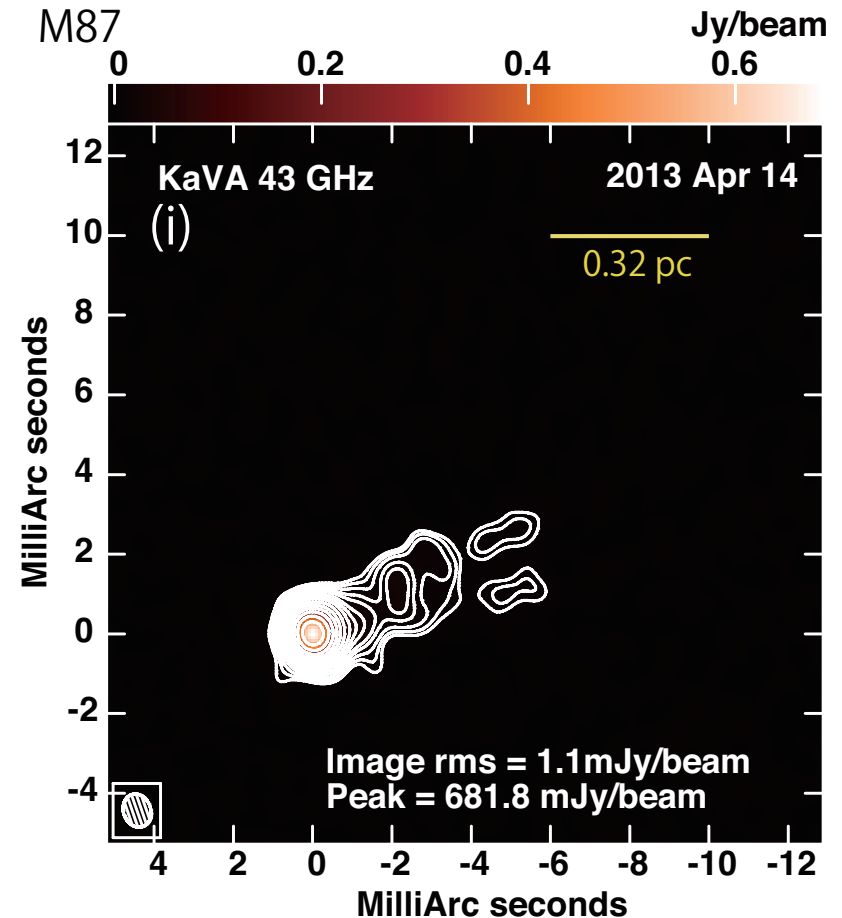
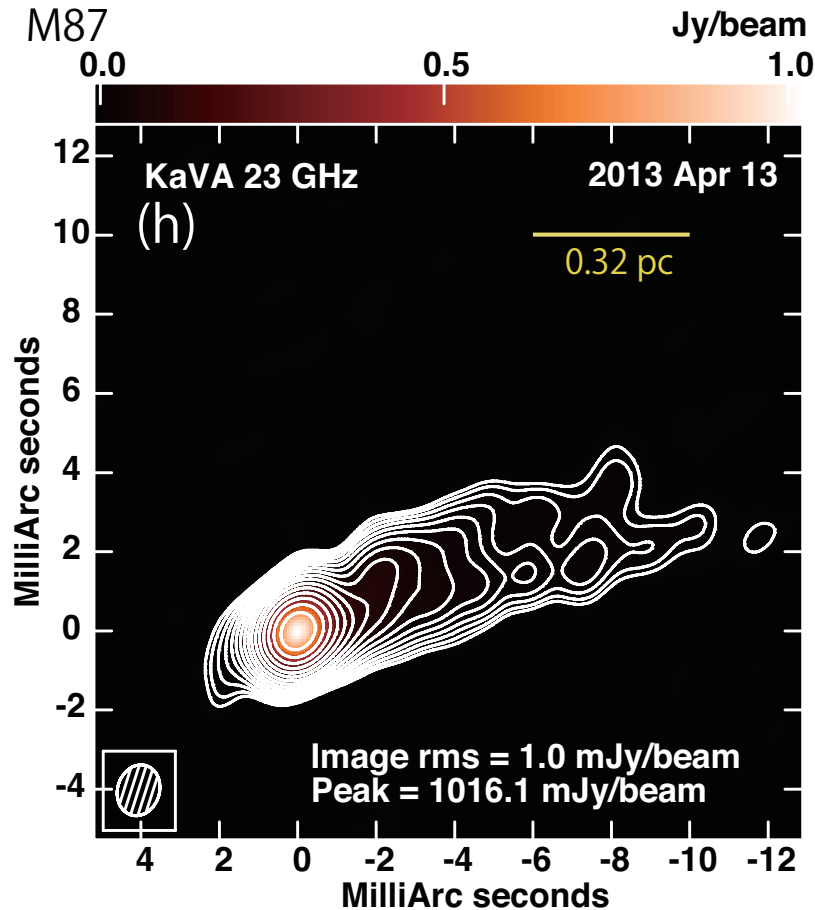
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of Messier 87 (M87)

KaVA Imaging Capability of AGN jet

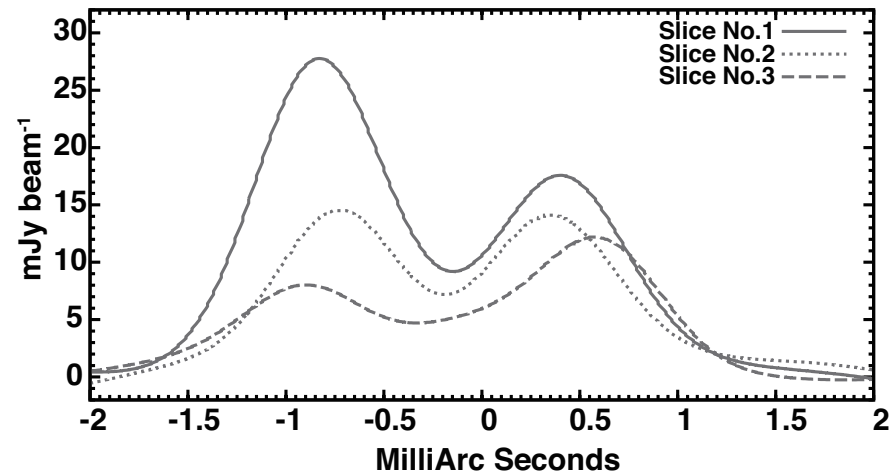
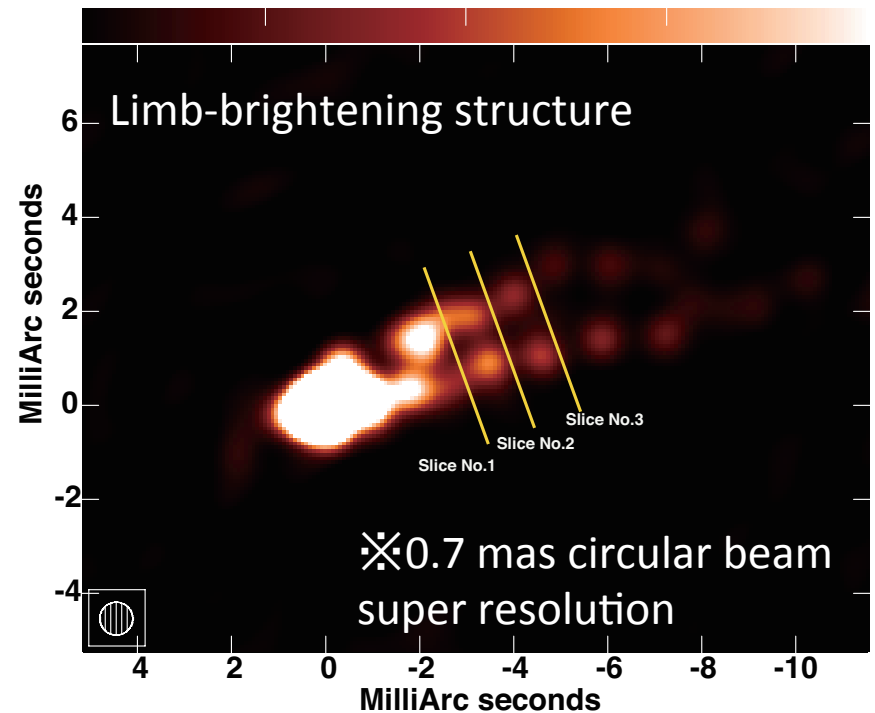
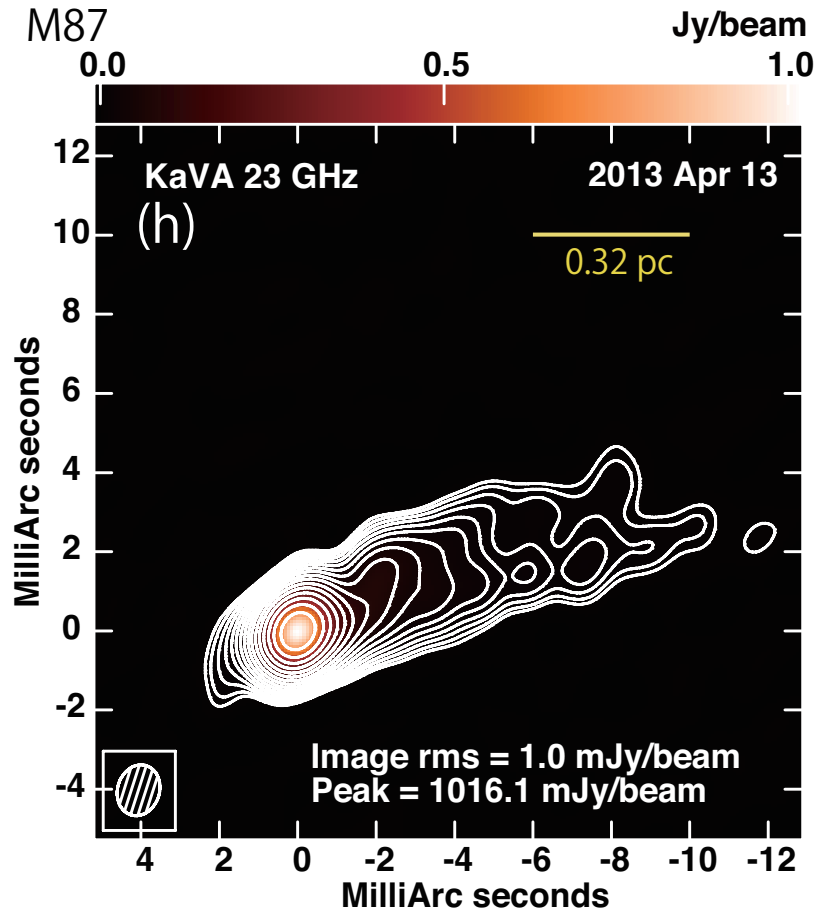
128 Mbps recording – *Niinuma, Lee et al. accepted to PASJ*



VLBI images - Case of Messier 87 (M87)

KaVA Imaging Capability of ACRIMA

128 Mbps recording – *Niini*



VLBI images - Case of

KVN and VERA Array (KaVA)

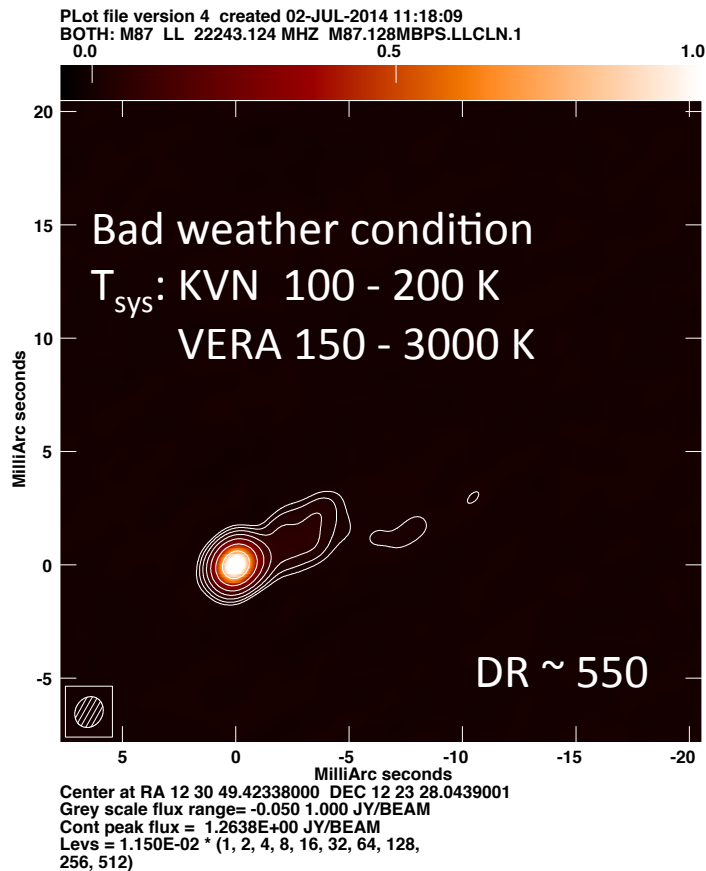
1 Gbps Observations with KaVA

Observation – status – 1-Gbps multi-epoch (AGN sub-WG)

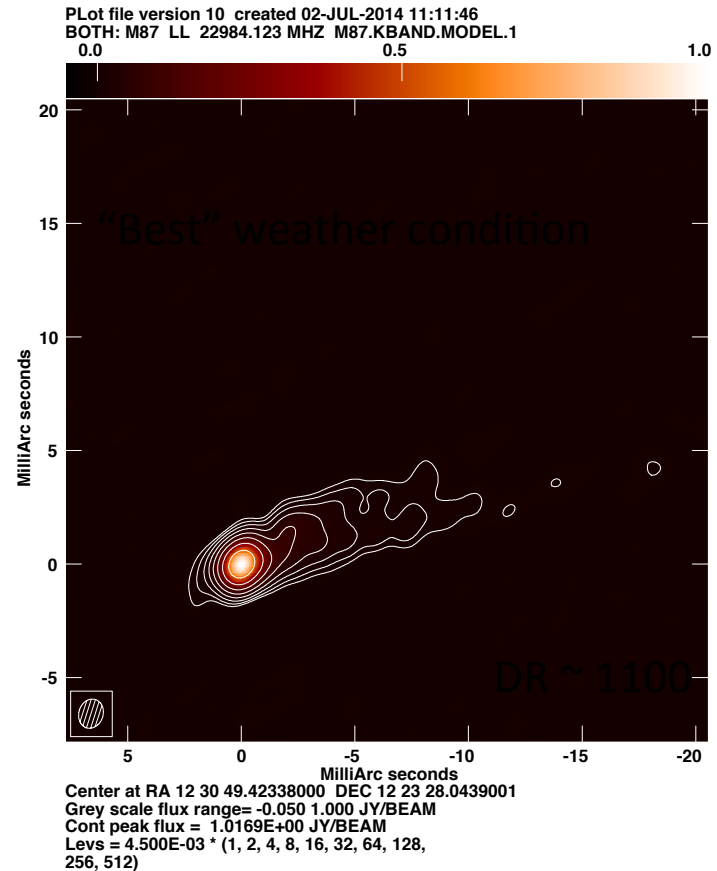
- Purpose
 - 1-Gbps imaging verification for AGN
 - Multi-source, Multi-epoch
- Frequency & Recording
 - K-band, MK5B/DR2K (and/or OCTADISK) 1Gbps (256 MHz: 16 MHz x 16 IFs)
- Observations: multi-snapshot (e.g. GENJI)
 - Total: 8 hrs / epoch
 - 5 ~ 11 scans / source (On-source: 30 ~ 70 min / source)

Comparison with Niinuma+14 (on M87)

32 MHz v.s. 32 MHz



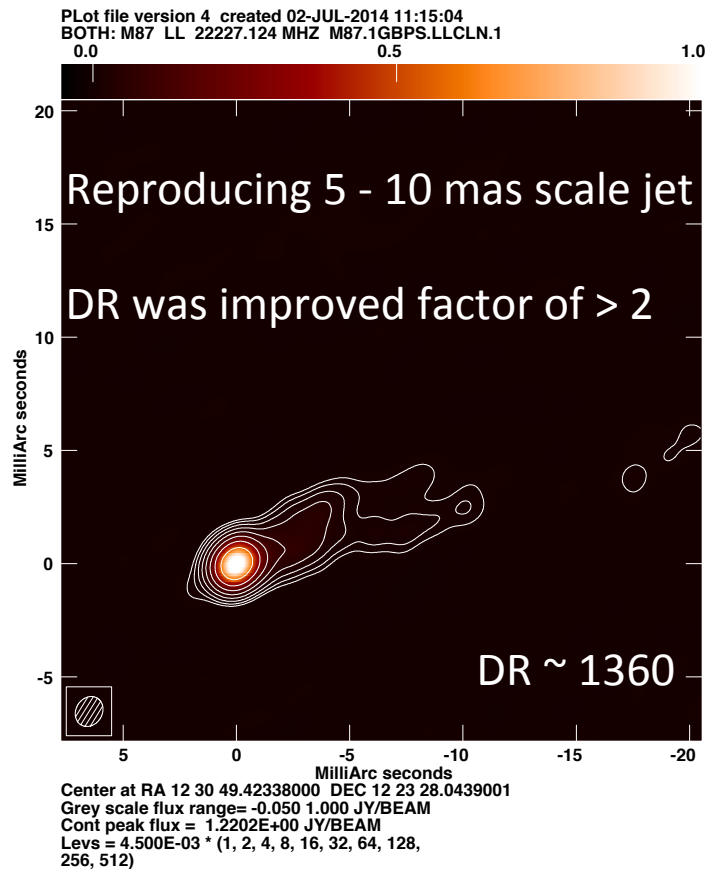
2013 Dec 05
MK5B/DR2K, $\Delta B = 32\text{MHz}$



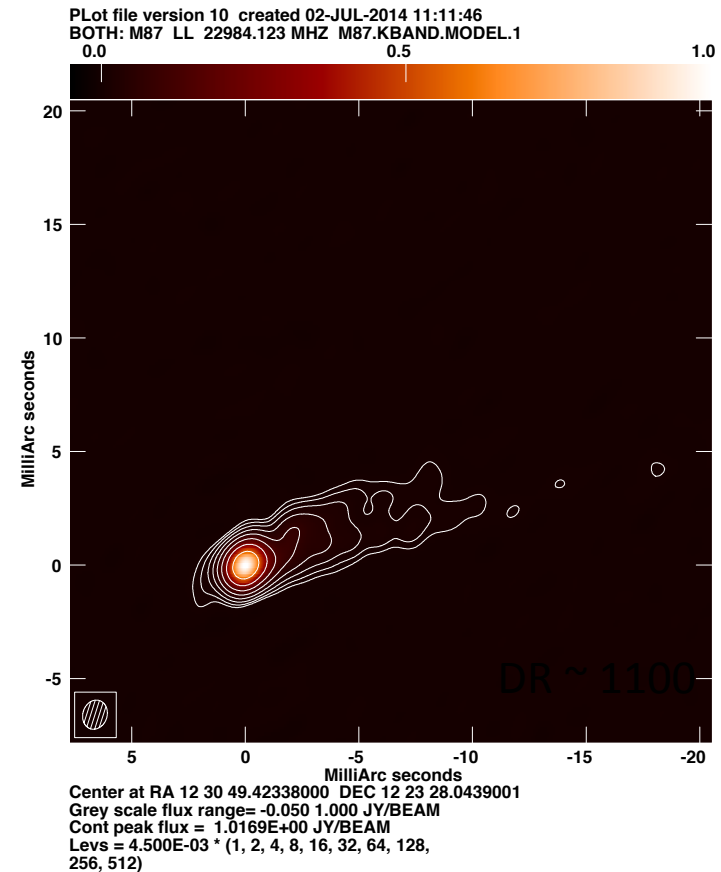
2013 Apr 13 (32 MHz, Niinuma+14)

Comparison with Niinuma+14 (on M87)

32 MHz v.s. 256 MHz



2013 Dec 05 (MK5B/DR2K, 256 MHz)



2013 Apr 13 (32 MHz, Niinuma+14)

✂ Images of a few more epochs: Kino-san's talk

Summary

- Evaluated the imaging capability of KaVA at both K-/Q-band (with 128 Mbps)
 - KaVA is the powerful VLBI array in East Asia
 - Advantage for diffused emission due to higher dynamic range
 - $DR_{\text{KaVA}} / DR_{\text{VERA}} \sim 3$
- 1 Gbps observations
 - Good imaging capability and higher sensitivity
 - Continue preparatory observations on KSP of KaVA AGN sub-SWG
 - Kicked-off the preparatory observations for KSP on AGN
 - > Kino-san's talk (on multi-epoch images ...)