Recent activities related to broadband system of Kashima VLBI group

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Initial State of Broadband Gala-V Project

Kashima 34m



MARBLE2 1.5m @Konganei







Rindgren

QRHA

Original broadband Feed NINJA, IGUANA-H







•NINJA feed (3-15G) updated

- OMT for dual polarization was installed
- Two ambient LNA were installed
- 2RF signals transfer via single fiber with the wavelength division multiplexing (WDM)





Residuals between two compacts antennas

(O - B) - (O - A)= A - B

Where O: Kashima 34m A: Compact #1 B: Compact #2

3 stations = 200 TB



Tomorrow (2017 DOY282), broadband observation between Kas34 – Hob12 will be carried out

- Four 1GHz bandwidth observation
- $\Delta\,\text{TEC}$ observation, source structure, and Stokes parameter

The strong signal contaminated during observation



ET in 3C279 ??

The south direction view at Kashima Many satellites on the orbit





- Satellite survey
 - Kashima 34m with NINJA feed
 - 3-15GHz
 - V-polarization
- Broadcast satellite is allocated the frequency range of mostly 4GHz and 12 GHz
- Some satellites emit 3GHz, 7GHz(?), 11GHz
- Do not see with the bare eye!
 Added 10dB attenuator before LNA



- range of 0-20GHz
- RBW 2MHz
- beam direction for satellite ABS7

Date: 21.SEP.2017 17:52:58



• direction for APSTAR6

Date: 21.SEP.2017 18:43:27



 direction for asiasat5

Date: 21.SEP.2017 18:08:43



• direction for chinasat12

Date: 21.SEP.2017 18:29:13



 direction for Superbird2

Date: 22.SEP.2017 11:23:41



Good use of the bad satellite

Holography for Kashima 34 m



Reuse the main surface of compact antenna









- on 7 Jul 2017
- satellite JCSAT-3A
 - AZ,EL=(200.87d,46.241d)
- Frequency band 12GHz
- Kas34-MARBLE0
- V-polarization

Preliminary result (correlation kas34marhlan

Amplitude of Holography of Kas34-MARBLE0 on 7 Jul 2017







Azimuth offset, 0.025/cos(46d) steps [degrees]



Some bowl shape deformation??



Kashima34m

Yamaguchi 32m

Kashima 34m can participate 6.7GHz methanol observation of Japanese VLBI network

6.7GHz methanol maser (G9.621+01)





summation of two signals

$$P_{sum} = |P_a + P_b|,$$
$$= \sqrt{P_a^2 + P_b^2 + 2P_a P_b \cos\theta}.$$

phase difference θ was determined by VLBI



Noise canceling headphone





out of phase signal generator

$$P_{sum} = |P_a - P_b|,$$
$$= \sqrt{P_a^2 + P_b^2 - 2P_a P_b cos\theta}.$$

The phase of 180 deg is added to θ





