大学VLBI連携観測事業

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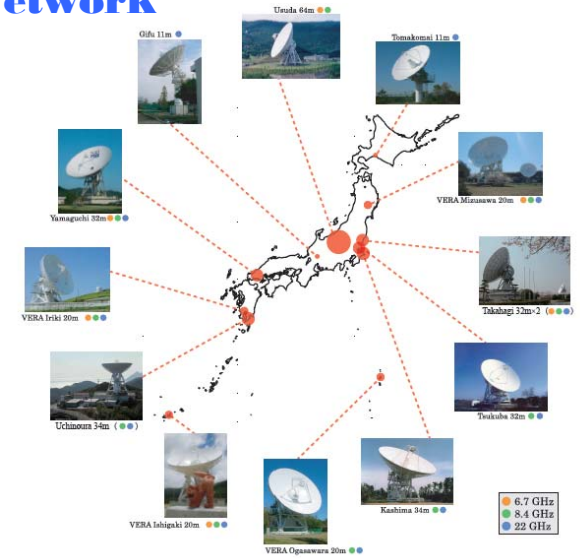
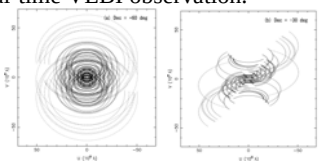
Network



Japanese VLBI Network

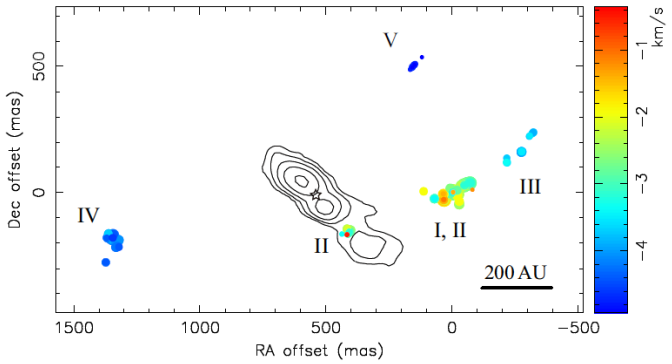
The Japanese VLBI Network consists of ten antennas that are owned and operated by four research institutes (NAOJ, JAXA, NICT, GSI) and four universities (Hokkaido, Gifu, Yamaguchi, Kagoshima University).
These antennas form 50 - 2560 km baselines across the Japanese islands and provide very dense UV-coverages. Three observing bands are now available (6.7, 8.4, and 22 GHz). The subarrayof five telescopes (Usuda 64m, Kashima 34m, Tsukuba 32m, Yamaguchi 32m, and Gifu 11m) are connected with information networks at 2.4 Gbps for real-time VLBI observation.

UV-coverage example.
Left : δ= +60deg
Right : δ= -20 deg



Results

Methanol Maser

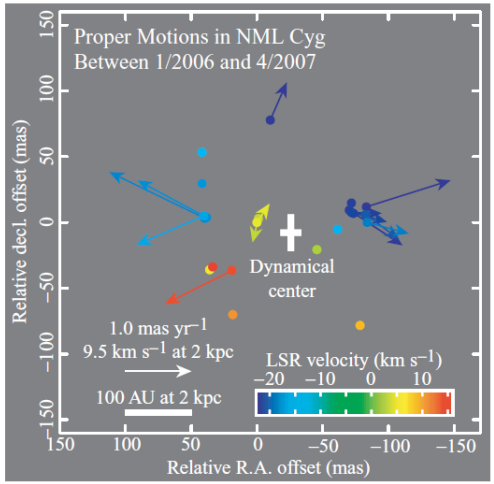


Sugiyama et al. (2008) accepted to PASJ

A Synchronized Variation of the 6.7 GHz Methanol Maser in Cepheus A

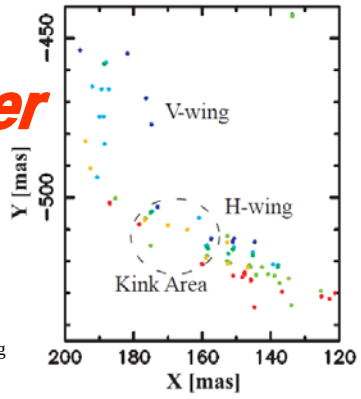
A spatial distribution of the 6.7 GHz methanol maser spots (filled circle) of Cep A. The spot size and color indicates its peak intensity in logarithmic scale and its radial velocity (see color index at the right), respectively. The contours indicate the VLA 22 GHz continuum observed by Torrelles et al. (1998) and re-reduced by Gallimore et al. (2003). A star indicates the peak of 43 GHz continuum emission with the positional uncertainty of about 10 mas.

Water Maser



Nagayama et al. (2008) accepted to PASJ
H2O Maser Outflow from the Red Supergiant Star NML Cygni observed with Japanese VLBI Network

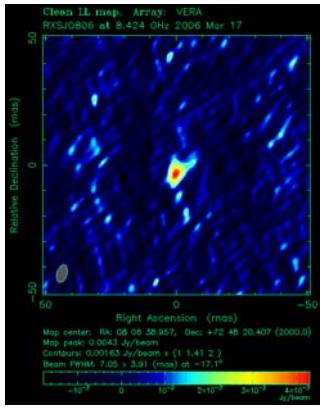
Distributions and proper motion vectors of H_2O masers in NML Cyg. The color index denotes the LSR velocity range from -22.2 to 15.5 kms^{-1}, where 22 features are located. The map origin is located at the position of the reference maser feature at v_{LSR} = 5.6 km s^{-1}. The displayed proper motion vector is that subtraced by a velocity bias (μ x, μ y) = (0.19,-0.28) [mas yr^{-1}] from the original vector to cancel out the average motions of all features.

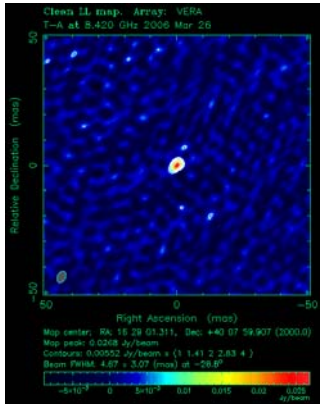


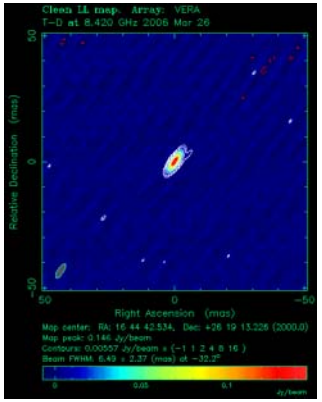
Motogi et al. (2008) accepted to MNRAS
Microstructure and kinematics of H2O masers in the massive star forming region IRAS 06061+2151

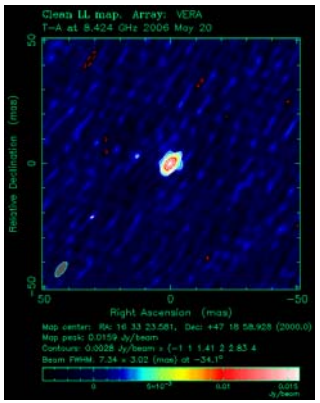
Each point denotes each maser feature. Colour of the maser features indicates a detection epoch, epoch1 (blue), 2 (light blue), 3 (green), 4 (light green), 5 (yellow) and 6 (red). The kink area containing the brightest features is indicated by dashed circle.

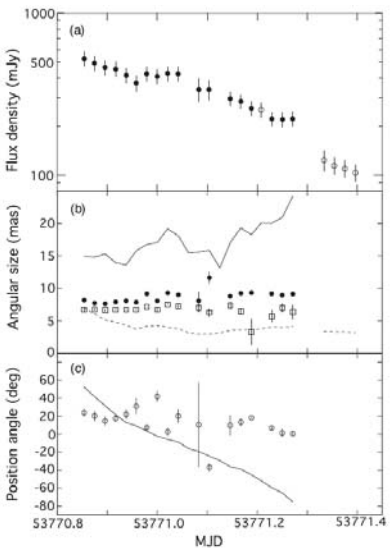
Narrow-Line Seyfert 1 and AGNs

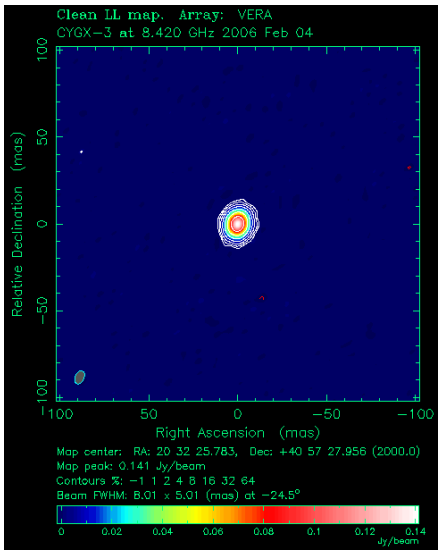












Tsuboi et al. (2008) PASJ, 60, 465

The 2006 Radio Outbursts of a Microquasar Cygnus X-3: Observations and Data

Upper panel : VLBI image of Cyg X-3 obtained by JVN.

Lower panels : Evolution of the source structure of Cyg X-3 obtained with VLBI. A series of measurements was performed by a visibility based model-fitting using an elliptical-Gaussian profile model with free parameters of the flux density, the FWHMs along the major and minor axes, and the position angle of the major axis (see text in detail).

(a) Flux densities of the VLBI component (filled circles). The open circles represent measurements using a circular-Gaussian model, rather than an elliptical one, due to poor data quality. (b) Angular sizes of fitted source structure. The filled circles and open squares represent the FWHMs along the major and minor axes, respectively. The solid and dashed lines represent the major and minor axes of HPBWs of a synthesized beam in uniform-weighting, for a comparison. (c) Position angles of the major axis of the fitted source structure (open circles). The solid line represents the position angle of the major axis of synthesized beam, for a comparison.

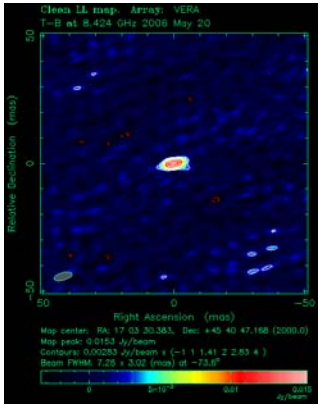
In near future…

East-Asian VLBI Network

The JVN will extend to the East-Asian VLBI Network (EAVN) in near future, collaborating with the Chinese VLBI Network (CVN) and the Korean VLBI Network (KVN). EAVN has large aperture and long baselines up to 5000 km; it is one of the largest VLBI networks in the world.

EAVN is expected to be a ground array for VSOP-2 as well as the VLBA and EVN. We have started VLBI experiments with Chinese/Korean colleagues for constructing EAVN.

Micro-Quasars



Doi et al. (2007) , PASJ, 59, 703

Japanese VLBI Network Observations of Radio-Loud Narrow-Line Seyfert 1 Galaxies

JVN images of a radio-loud NLS1 (RXS J08066+7248) and 4 other sources at 8.4 GHz. The images were synthesized in natural weighting. RMS of the image noise was 0.54 mJy beam^{-1}. Half-power beam sizes are shown in the lower left corners.