Session:	**[B3C-6] S6 : Observing Facilities and International Collaborations**
Date:	August 20, 2014 (Wednesday)
Time:	16:00~17:30
Room:	Room F (Room 108)
Chair:	Jongsoo Kim (Korea Astronomy and Space Science Institute)

[B3C-6-1] **16:00~16:15**

[Invited] Key Science Observations of AGNs with KaVA Array

Motoki Kino (Korea Astronomy and Space Science Institute, Korea)

I will introduce early science results of AGN observations with KaVA which is the combined array of the Korean VLBI network (KVN) and VLBI Exploration of Radio Astrometry (VERA).Then, I will present our future plan of monitoring observation of Sgr A* and M87. Because of the largeness of their central super-massive black holes, we select them as top priority sources of our key science program (KSP). The main science goals of the KSP are (1) mapping the velocity field of the M87 jet and testing magnetically-driven-jet paradigm, and (2) obtaining tightest constraints on physical properties of radio emitting region in Sgr A*.

[B3C-6-2] **16:15~16:30**

[Invited] Planning Large Programs of Stellar Maser Studies with KaVA

Se-Hyung Cho (Korea Astronomy and Space Science Institute, Korea), Hiroshi Imai, and the KaVA Evolved Star sub-Working Group

We will present our activities to plan out large programs for studying circumstellar H2O and SiO maser sources with KaVA (combined network of Korean VLBI Network: KVN and Japanese VLBI Exploration of Radio Astrometry: VERA). A great advantage of KaVA for the stellar maser observations is the combination of unique capability of the multi-frequency phase referencing technique and the dual-beam astrometry using KVN and VERA, respectively. We have demonstrated this advantage through the test observations conducted by the KaVA Evolved Star Sub-working Group from 2012 March to 2014 March. Snapshot imaging with KaVA is confirmed to be possible in integration time of 0.5 hour at 22 GHz band and 1.0 hour at 43 GHz band in typical cases. This implies that large snapshot imaging surveys towards many H2O and SiO stellar masers are possible within a reasonable machine time (e.g., scans on ~100 maser sources within ~200 hours). Therefore, we selected about 100 candidate target sources which are suitable for future long-term (~10 years) intensive (biweekly-monthly) monitoring observations, based on KVN K/Q-band single-dish observational results toward about 1000 evolved stars. The output of the snapshot imaging program will be used for statistical analyses of the structures of individual maser clumps and the spatio-kinematical structures of circumstellar envelopes undergoing accelerating outflows. The combination of astrometry in milliarcsecond(mas) level and the multi-phase referencing technique enables us to measure not only trigonometric parallax distances of masers but also precise reference position for registration of different maser lines. The accuracy of the map registration affects an interpretation of the excitation mechanism of SiO maser lines and the origin of various maser actions, which are expected to reflect periodic behaviors of the circumstellar envelope with stellar pulsation. Currently we are checking the technical feasibility of KaVA operation for this combination. After the feasibility test and further careful selection of about 20 sources, the long-term monitoring campaign program will be propelled as one of KaVA legacy projects.

[B3C-6-3] **16:30~16:45**

[Invited] Observational Studies of Star-forming Regions with KVN and KVN+VERA

Kee-Tae Kim (Korea Astronomy and Space Science Institute, Korea), Tomoya Hirota, and KVN+VERA Star Formation Working Group

Methanol masers are divided into two classes, class I and class II. Class II methanol masers trace the disk-outflow systems of massive young stellar objects (YSOs), while class I methanol masers appear to trace the interaction regions of outflows with the ambient molecular gas. Class II masers have been extensively studied by single dishes, connected arrays, and VLBIs. Meanwhile, class I masers have been much less studied. They have not been detected by any VLBI facility. Thus they have been believed to have more extended structures than class II masers.
We made fringe surveys of 44GHz class I methanol maser emission towards about 170 massive YSOs with flux densities >10 Jy using KVN, and detected fringes in ~20% of the sources. This is the first VLBI detection of class I methanol masers. We performed follow-up imaging observations of the detected maser sources with KVN and KVN+VERA. The observations aim to investigate the distribution and kinematics of 44GHz methanol maser features in each source at milli-arcsecond resolutions, and to understand what they trace. In this talk we will present the fringe survey and imaging results, and discuss the implications.

[B3C-6-4] **16:45~17:00**

[Invited] The Shanghai 65m Radio Telescope

Zhi-Qiang Shen (Shanghai Astronomical Observatory, China) and the Shanghai 65m Radio Telescope Project Team

The Shanghai 65m radio telescope is a general purpose, fully steerable radio telescope. It features a shaped Cassegrain antenna comprised of a 65-meter diameter main reflector with a primary focal ratio of 0.32 and a 6.5-meter diameter sub-reflector. The main reflector is made up of 14 rings of 1008 high-precision solid panels, each having an area of 2.66-4.90 square meters. The sub-reflector is comprised of 3 rings of 25 aluminum honeycomb sandwich panels. The accuracies of the panels in the primary and sub-reflectors are better than 0.1 mm (rms) and 0.05 mm (rms), respectively. A novel technology known as active surface control scheme was adopted for assembling the main reflector. A total of 1104 actuators were installed at the locations where the panels join the antenna backup structure so as to compensate for gravity deformation in the reflecting surface during tracking. This can greatly improve the observing efficiency at high frequencies. The whole supporting track employed seamless welding technique, by which 30 precision-machined 6-ton segments were all-welded together to be a single track with an overall unevenness of 0.5 mm (rms). This technique has laid the foundation for assuring the precision of the antenna's axial system. The telescope is fitted with receiving equipment for eight frequency bands (namely L, S, C, X, Ku, K, Ka and, Q) corresponding to an observing wavelength coverage from 7 mm to 21 cm. The frequency switch can be accomplished within one minute.
The Shanghai 65m radio telescope saw its first light on October 26, 2012, when a trial run was successfully launched at a wavelength of 18 cm towards a massive star forming region. On November 28, 2012, fringes were successfully detected on a single baseline to the 25-meter VLBI station at Sheshan, Shanghai. Relying on its superiorities such as better sensitivity and wider frequency coverage, the Shanghai 65m radio telescope will play an extremely important role in the astronomical observations of molecular spectral line emission and pulsar. When used in the single-dish mode, the telescope will also perform observation of various radio sources, with specific targets including radio-loud blazars, micro-quasars and X-ray binaries. Research activities on the fast time variation of Active Galactic Nuclei and the transient phenomenon of X-ray binaries are key topics for high-sensitivity single-dish observations. As a key element of the VLBI network in China and the world, it significantly increases its sensitivity for VLBI observations. This is China's first radio telescope capable of observing at the 7 mm wavelength, and then will open up new areas of millimeter wave VLBI observations.

Poster Session **17:00~17:30**

Chairs: **Jongsoo Kim** (Korea Astronomy and Space Science Institute)

Hideyuki Kobayashi (National Astronomical Observatory of Japan)