Session:	**[B2C-3] S3 : Stars, Exoplanets and Stellar Systems**
Date:	August 19, 2014 (Tuesday)
Time:	16:00~17:25
Room:	Room C (Room 104)
Chair:	G. C. Anupama (Indian Institute of Astrophysics)

[B2C-3-1] 16:00~16:20

[Invited] The Dust Production by Evolved Stars in the Magellanic Clouds

F. Kemper (Academia Sinica Institute of Astronomy and Astrophysics, Taiwan)

Within the context of the hugely successful SAGE-LMC and SAGE-SMC surveys, Spitzer photometry observations of the Large and Small Magellanic Clouds have revealed millions of infrared point sources in each galaxy. The brightest infrared sources are generally dust producing and mass-losing evolved stars, and several tens of thousands of such stars have been classified. After photometrically classifying these objects, the dust production by several kinds of evolved stars -- such as Asymptotic Giant Branch stars and Red Supergiants -- can be determined. SAGE-Spec is the spectroscopic follow-up to the SAGE-LMC survey, and it has obtained Spitzer-IRS 5-40 micron spectroscopy of about 200 sources in the LMC. Combined with archival data from other programs, observations at a total of ~1000 pointings have been obtained in the LMC, while ~250 IRS pointings were observed in the SMC. Of these, a few hundred pointings represent dust producing and mass-losing evolved stars, covering a range in colors, luminosities, and thus mass-loss rates. Red Supergiants and O-rich and C-rich AGB stars -- the main dust producers -- are well represented in the spectroscopic sample. In this talk I will review what we know about the mineralogy of dust producing evolved stars, and discuss their relative importance in the total dust budget.

[B2C-3-2] 16:20~16:40

[Invited] Observational Studies of Evolved Stars Using the KVN

Se-Hyung Cho (Korea Astronomy and Space Science Institute, Korea) and KVN Evolved Star Sub-Working Group Members

The Korean VLBI Network (KVN) as a world-first multi-frequency VLBI system is operated at four bands of 22, 43, 86, and 129 GHz simultaneously. Using this advantage of KVN, we have performed simultaneous observations of H2O and SiO maser lines in order to investigate spatial structure and dynamical effect from SiO to 22 GHz H2O maser regions in AGB stars and characteristics of both maser emission at the evolutionary process from AGB to post-AGB star.At the first stage of KVN operation, we have performed single dish surveys and monitoring observations. After confirming the performance of VLBI network since 2013, we have also performed VLBI observations toward selected targets based on single dish results. Here we present the main results of single dish observations toward about 1000 evolved stars together with several VLBI results. Firstly, main results of single dish are summarized as following. The intensities of SiO masers are stronger than those of H2O masers in most evolved stars and at most optical phases. However, the peak intensities of H2O are stronger than those of SiO around maximum phases in several stars. One-way and double peaks of H2O maser emission which may be associated with an asymmetric outflow appear in large percentage at late stage of AGB evolution and at post-AGB stage compared with young AGB stage. In addition, SiO v=2 only masers showed the similar tendency. Different detection rates between SiO and H2O masers also appear at post-AGB stage Secondly, VLBI results are summarized as following. The fringe detection rates at one epoch obtained from simultaneous fringe survey of 41 evolved stars at 4 bands were 62% at 22 GHz, 83% at 43 GHz, 54% at 86 GHz, and 17% at 129 GHz bands, respectively. For VY CMa and IK Tau, 4 band images were obtained simultaneously. Based on these observational results, we plan to start KVN key science program in the field of evolved stars from this autumn.

[B2C-3-3] **16:40~16:55**

Japanese VLBI Network Mapping of SiO v=2 and v=3 J=1-0 Masers around Evolved Stars

M. Oyadomari (Kagoshima University, Japan) and H. Imai

We present results of simultaneous Very Long Baseline Interferometric (VLBI) observations of v=2 and v=3 J=1-0 maser emission of SiO towards 12 long-period variable stars using the VLBI Exploration of Radio Astrometry (VERA) and the 45 m telescope of Nobeyama Radio Observatory (NRO).The v=3 masaer emission was detected in 5 stars and image synthesis with v=2 and v=3 masers was obtained in 4 stars: W Hya, WXPsc, T Cep and R Leo. The maser distribution of v=3 maser emission was clearly different between T Cep and others. We suggest that the v=3 maser of T Cep was predominantly excited in H2O overlapping pumping mechanism, others was excited in collisional pumping mechanism.

[B2C-3-4] **16:55~17:10**

Period Variation of EROS Eclipsing Binary Systems in the Large Magellanic Cloud

Pakakew Rittipruk (Sejong University, Korea), Young-Woon Kang, and Kyeongsoo Hong

We investigated the period variation for 79 eclipsing binary systems using 20 years (1990-2009) EROS, Macho, and OGLE survey observations. We discovered 9 apsidal motions, 8 Mass Transfers, 5 Period increasing and decreasing systems, 12 Light-Travel-time effects, 5 eccentric systems and other 40 systems show no period variation. We select 4 representative eclipsing binary systems which are Eros1052 for apsidal motion, Eros1056 for Mass transfer, Eros1039 for period decreasing systems and Eros1037 for Light-Travel-time effect.
We determine the period variation rate (dP/dt), orbital parameters of the 3rd body (e_3, ω_3, $f(m_3)$, P_3, T_3), apsidal motion parameters ($d\omega/dt$, U, P_s, P_a, e) and apsidal motion period by analyzed light curves and O-C diagrams.

[B2C-3-5] **17:10~17:25**

Kinematical Properties of Planetary Nebulae with WR-type Nuclei

A. Danehkar (Macquarie University, Australia), W. Steffen, and Q. A. Parker

We have carried out internal field unit (IFU) spectroscopy of Hα and [N II] emission lines for a sample of Galactic Planetary Nebula (PNe) with Wolf-Rayet (WR) stars and weak emission-line stars (wels). Based on the spatially resolved observations, combined with archival imaging, we have determined their kinematic structures. Comparing the observed velocity maps provided by the IFU observations with those produced by morpho-kinematic models allowed us to exclude the projection effect from the nebula's appearance and identify the morphology of most PNe, apart from the compact objects. Our results indicate that these PNe have axisymmetric morphologies, either bipolar or elliptical. In many cases the associated kinematic maps for the PNe around hot WR central stars also reveal the presence of so-called fast low-ionization emission regions (FLIERs). However, it is as yet unknown which mechanism produces axisymmetric morphologies and how the density and velocity of FLIERs contrast sharply with the main body of the nebula. Deeper spectroscopy of their central stars will develop a better understanding of the mechanisms shaping their kinematic structures.