Session:	**[B3C-2] S2 : Interstellar Matter, Star Formation and the Milky Way**
Date:	August 20, 2014 (Wednesday)
Time:	16:00~17:30
Room:	Room B (Room 103)
Chair:	Shu-ichiro Inutsuka (Nagoya University)

[B3C-2-1] **16:00~16:20**

[Invited] Radio Astrometric Observations and the Galactic Constant as Basis of the Galactic Kinematics Study

Takumi Nagayama (National Astronomical Observatory of Japan, Japan), Toshihiro Omodaka, Toshihiro Handa, Hideyuki Kobayashi, and Ross A. Burns

We made phase-referencing Very Long Baseline Interferometry (VLBI) observations of Galactic 22GHz H2O maser sources with VLBI Exploration of Radio Astrometry (VERA). We verified the positional measurement accuracy of VERA using the G48.99-0.30 and G49.19-0.34 astrometric observations. The measured positional systemic error in R.A. and Decl. of (23, 31) micro arcsec for G49.19-0.34 is dominated by tropospheric contribution in Earth's atmosphere. That of (23, 53) micro arcsec for G48.99-0.30 depends on a tropospheric contribution and a maser structure effect. The formal positional error by the thermal noise is significantly smaller than these systemic positional errors. VERA phase-referencing observations could achieve the positional accuracy of a few tens of micro arcsec in both R.A. and Decl. Directions for point-like and bright sources at high elevation. We measured the parallax distances of ON1, ON2N, G48.99-0.30, G49.19-0.34, and IRAS 20143+3634 which are located near the tangent point and the Solar circle, to be 2.47+/-0.11 kpc, 3.83+/-0.13 kpc, 5.62+/-0.59 kpc, 4.74+/-0.39 kpc, and 2.72+/- 0.31 kpc respectively. The angular velocity of the Galactic rotation at the Sun's position (i.e. the ratio of the Galactic constants) is derived using the measured parallax distances and proper motions of these sources. The derived value of 28+/-2 km/s/kpc is consistent with recent values obtained using VLBI astrometry but most likely 10% larger than the International Astronomical Union (IAU) recommended value of 25.9 km/s/kpc = (220 km/s) / (8.5 kpc).

[B3C-2-2] **16:20~16:40**

[Invited] Water Maser Outburst in W49N: a Multi-Transition Study

Busaba Hutawarakorn Kramer (Max Planck Institute for Radio Astronomy, Germany), Karl M. Menten, Tomasz Kaminski, and Alex Kraus

Recently, a major (~ 80,000 Jy) flare of the high velocity (violet) component of the 22.2 GHz 616-523 water (H2O) maser line in the most luminous Galactic H2O maser source W49N was reported by A. Tolmachev (The Astronomer’s Telegram, 28 January, 2014). In 2014 early May we have carried out nearly simultaneous observations of several H2O transitions: (1) the 22.2 GHz line using the Effelsberg 100-m radio telescope, (2) the 183 GHz 313-220 transition using the IRAM 30-m telescope, as well as the (3) 325 GHz 515-422, (4) 321 GHz 1029-936 and (5) 475 GHz 533-440 transitions all using the APEX 12-m submillimeter telescope. For the last line, our data represent its first detection in a star- forming region. We have also performed interferometric observations of the 22.2 GHz transition using the NRAO Very Long Baseline Array (VLBA) and of the 321 and 325 GHz transitions using the Submillimeter Array (SMA). One remarkable result is the our detection of very high velocity emission features in several transitions. In this meeting, we will report the results from the single dish observations. Studying these multiple masing transitions in conjunction with theoretical modeling of their excitation places strong constraints on the physical conditions of the masing gas and in particular allows the examination of various models accounting for these high velocity features.

[B3C-2-3] **16:40~16:55**

Trigonometric Parallaxes of Star Forming Regions in the Perseus Spiral Arm

Y. K. Choi (Korea Astronomy and Space Science Institute, Korea), K. Hachisuka, M. J. Reid, Y. Xu, A. Brunthaler, K. M. Menten, and T. M. Dame

Although our Galaxy is known to be a barred spiral galaxy, it is very difficult to determine its structure owing to our location within its disk. Using Very Long Baseline Interferometry (VLBI), one can measure trigonometric parallaxes to massive star forming regions with accuracies of order 10 microarcseconds. The Bar and Spiral Structure Legacy (BeSSeL) Survey is a National Radio Astronomy Observatory (NRAO) key science project that aims to study the spiral structure and kinematics of our Galaxy by measuring trigonometric parallaxes and proper motions of hundreds of massive star forming regions with the Very Long Baseline Array (VLBA). We report trigonometric parallaxes and proper motions of water masers for 12 massive star forming regions in the Perseus spiral arm of the Milky Way as part of the BeSSeL Survey. Combining our results with 14 parallax measurements in the literature, we estimate a pitch angle of 9.9 +/- 1.5 degrees for a section of the Perseus arm. The 3-dimensional Galactic peculiar motions of these sources indicate that on average they are moving toward the Galactic center and slower than the Galactic rotation.

Poster Session **16:55~17:30**

Chair: **Shu-ichiro Inutsuka** (Nagoya University)