

**Annual parallax distance and kinematical property of the maser source  
in IRAS 19312+1950**

N12b

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IRAS 19312+1950 has been an object whose evolutionary status is in debate. This object should be one of the key objects that provide important clue to revealing final stellar evolution forming a complicated planetary nebula morphology. We have conducted comprehensive study of silicon monoxide (SiO), water vapour (H<sub>2</sub>O), and hydroxyl (OH) masers in this object using HSA, VLBA, and JVN, as well as a measurement of the annual parallax distance and the secular motion of the object using VERA. We found double sources of SiO, H<sub>2</sub>O maser emission, which may trace a bipolar flow. Independently, the 1612 MHz OH masers indicates the existence of a shell with a radius of  $R \sim 400$  AU and an expansion velocity of  $V_{\text{exp}} \sim 6$  km s<sup>-1</sup>. We obtained an annual parallax distance to IRAS 19312+1950,  $D = 3.80_{-0.58}^{+0.83}$  kpc, and estimate the location in the Galaxy,  $(R, z) = (7.07 \pm 0.12$  kpc,  $28 \pm 3$  pc), and the secular motion,  $(V_R, V_\theta, V_z) = (33 \pm 28, 214 \pm 4, -14 \pm 8)$  [km s<sup>-1</sup>] in galactic cylindrical coordinates. These results suggest that IRAS 19312+1950 should be an intermediate-mass evolved star. The studies in this poster will appear in the following papers.

- (1) H. Imai, D. Tafuya, M. Honma, T. Hirota, & T. Miyaji 2011, PASJ, 63, VERA Special Issue, in press
- (2) J. Nakashima, S. Deguchi, H. Imai, A.J. Kemball, & B.M. Lewis 2011, ApJ, in press