

VLBI Observations and NH₃ Mapping of the Star-forming Region NGC2264

Tatsuya Kamezaki¹,
Kenji Imura¹, Takumi Nagayama², Toshihiro Omodaka¹,
Toshihiro Handa¹, Yoshiyuki Yamaguchi¹, James O. Chibueze¹,
Kazuyoshi Sunada² and Makoto Nakano³

¹Department of Physics and Astronomy, Graduate School of Science and Engineering,
Kagoshima University, 1-21-35 Korimoto, Kagoshima, Kagoshima 890-0065
email: kamezaki@milkyway.sci.kagoshima-u.ac.jp

²Mizusawa VLBI Observatory, Mitaka Office, National Astronomical Observatory of Japan,
2-21-1 Osawa, Mitaka, Tokyo 181-8588

³Faculty of Education and Welfare Science, Oita University, Oita 870-1192

Abstract. We have measured the annual parallax of the water maser source associated with star forming region NGC2264 from observations with VLBI Exploration of Radio Astrometry (VERA). We detected masers at $V_{\text{LSR}} = 7.2 \text{ km s}^{-1}$. We discussed its driving sources of detected maser spots. One of the maser spots was associated with a centimeter continuum source observed with VLA. Neither optical, infrared nor X-ray sources is catalogued near the spot. The other maser spot is located close to an X-ray source, although there is no optical or infrared counterpart. The proper motion of the former spot was $(\mu_{\alpha}, \mu_{\delta}) = (23.91 \pm 4.29, -29.81 \pm 4.27)$ and the proper motion of latter spot was $(\mu_{\alpha}, \mu_{\delta}) = (-0.96 \pm 0.58, -6.05 \pm 3.06)$. For the latter spot, the peculiar motion is $\sim 150 \text{ km s}^{-1}$ and it has the high velocity and this may be a jet or an outflow from a young star. The observed parallax is $1.365 \pm 0.098 \text{ mas}$, corresponding to the distance of $738_{-50}^{+57} \text{ pc}$. This value is constant with the photometric distance of NGC2264 previously measured. The fitting result of the parallax is shown in figure 1. We also observed in NH₃ (1,1), (2,2), (3,3) lines of NGC2264 with the Kashima 34m telescope. We estimated the star formation efficiency (SFE) of NGC2264 from the dense molecular mass of NH₃ and the stellar mass calculated by Teixeira *et al.*(2012). The SFE is 9 – 12 % which is consistent with previous results.

Keywords. stars: formation — ISM: individual (NGC2264) — astrometry

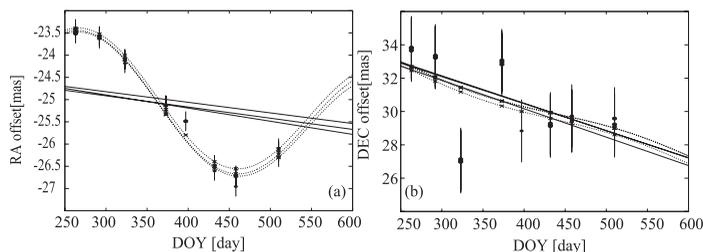


Figure 1. The fitting of the parallax.

References

Teixeira, P. S., Lada, C. J., Marengo, M., & Lada, E. A. 2012, A&A, 540, A83