Astrometric Goal of Small-JASMINE

YANO, Taihei, GOUDA, Naoteru, KOBAYASHI, Yukiyasu, TSUJIMOTO, Takuji, NIWA, Yoshito
(NAOJ)

YAMADA, Yoshiyuki
(Kyoto University)

JASMINE Working Group

Small-JASMINE [1] is the astrometric satellite, which will observe the central region of the Galactic bulge, measuring the parallax and the proper motion with high accuracy using the near infrared wavelength (1.1 μm~ 1.7 μm). The mission time is required to continue for around 1~3 years. Three-year observation will produce the astrometric data of the parallax with an accuracy of about 10 micro-arcseconds and the proper motions with that of about 10 micro-arcseconds per year at Hw=11.5 mag. The region with the above accuracies is at the center of the observing region of 0.3×0.3 square degrees. On the other hand, observing region covers a field of about 3×3 square degrees. The parallax with an accuracy of about 70 micro-arcseconds and the proper motion with that of about 70 micro-arcseconds/yr will be obtained within the region of 3×3 square degrees. These accuracies of the parallax and proper motion are summarized in maps shown in Fig. 1 and Fig. 2, respectively [2].

After the one year observation has passed, we obtain the parallax with an accuracy of 28 μas and the proper motion with an accuracy of 55 μas/yr at Hw=11.5 mag. In this case, we cannot derive the distance of the bulge stars with high accuracy. However, in the case of Hw=10 mag, we obtain the parallax with an accuracy of 14 μas and the proper motion with an accuracy of 23 μas/yr by one year observation. In this case, bulge stars can be obtained distances with high accuracy.

Kinematical and dynamical information on the Galactic bulge stars will be obtained after the observing period of about 1~3 years. Accordingly it is expected that our understanding of the dynamical structure of the Galactic bulge will be greatly improved. Furthermore, we may have the chance to observe the different region which has scientifically interesting target in winter or summer seasons. For example, Cygnus X-1 is one of the observing candidates. If we successfully observe the object during a few weeks, the orbital elements of the star accompanying Cygnus X-1 can be resolved by Small-JASMINE.

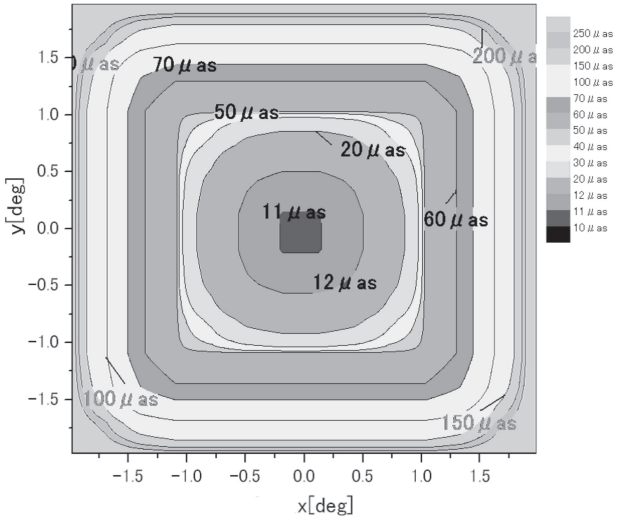

Figure 1: Accuracy map of the parallax.

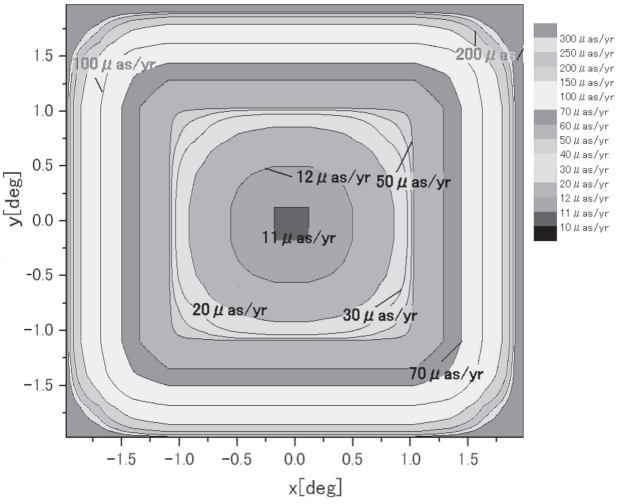

Figure 2: Accuracy map of the proper motion.

References

[1] Yano, T., Gouda, N., Kobayashi, Y., Tsujimoto, T., Hatsutori, Y., Murooka, J., Niwa, Y., Yamada, Y.: 2011, *EAS Publications Series*, **45**, 449.

[2] Yano, T., Gouda, N., Kobayashi, Y., Tsujimoto, T., Niwa, Y., Yamada, Y.: 2012, *Advancing the Physics of Cosmic Distances, Proc. IAU, IAU Symp.*, **289**, 433.