

ABSTRACT ONLY

ABUNDANCES AND KINEMATICS OF OB STARS IN THE LEADING ARM OF THE MAGELLANIC SYSTEM

L. Zhang^{1,2,3}, C. Moni Bidin⁴, D. I.
Casetti-Dinescu^{5, 6}, R. A. Mendez², T. M. Girard⁷,
V. I. Korchagin⁸, K. Vieira⁹, W. F. van Altena⁶ &
G. Zhao³

We determined seven element abundances (He, C, N, O, Mg, Si, and S) and kinematics for eight O/B- type stars which is selected from 42 candidates (Casetti-Dinescu et al. 2014) of membership in the Leading Arm (LA) of the Magellanic System. The high resolution spectra were taken with the MIKE instrument on the Magellan 6.5m Clay telescope¹⁰.

After investigating the relationship between abundances and kinematics parameters, we found that five stars have kinematics compatible with LA membership, i.e. $RV > 100 \text{ km s}^{-1}$. For the five possible LA member stars, Mg abundance of -0.42 ± 0.16 is significantly lower than that of the remaining two $[\text{Mg}/\text{H}] = -0.07 \pm 0.06$ that are kinematical members of the Galactic disk. Moreover, among the five LA members, four have compatible $[\text{Mg}/\text{H}]$ with that of B stars in cluster NGC 2004 in the LMC, while $[\text{Mg}/\text{H}]$ of the remaining one is close to that of cluster NGC 4755 in the MW (Trundle et al. 2007). Considering the stars' individual uncertainties, we can not statistically exclude the possibility that more metal-poor, SMC-like material could have participated in the formation of CD14-A05 and perhaps CD14-B14.

Distances to the LA members indicate that they are at the edge of the Galactic disk, while ages are of the order of $\sim 50 - 70 \text{ Myr}$, lower than the dynamical age of the LA, suggesting a single star-forming episode in the LA. V_{LSR} of the LA members decreases with decreasing Magellanic longitude, confirming the results of previous LA gas studies (McClure-Griffiths et al. 2008; Venzmer et al. 2012).

Our abundance and kinematic results for the LA member stars demonstrate that parts of the LA are hydrodynamically interacting with the gaseous

Galactic disk, forming young stars that are chemically distinct from those in the Galactic disk. These results can provide constraints to future models for the Magellanic leading material.

¹ Key Lab for Optical Astronomy, National Astronomical Observatories, CAS, 20A Datun Road, Chaoyang District, 100012 Beijing, China (zhanglan@bao.ac.cn).

² CAS South America Center for Astronomy, Camino del Observatorio #1515, Las Condes, Santiago, Chile

³ Departamento de Astronomía, Universidad de Chile, Camino del Observatorio #1515, Las Condes, Santiago, Chile

⁴ Instituto de Astronomía, Universidad Católica del Norte, Av. Angamos 0610, Antofagasta, Chile

⁵ Department of Physics, Southern Connecticut State University, 501 Crescent St., New Haven, CT 06515, USA

⁶ Astronomy Department, Yale University, 260 Whitney Ave., New Haven, CT 06511, USA

⁷ 14 Dunn Rd, Hamden, Connecticut, CT 06518, USA

⁸ Institute of Physics, Southern Federal University, Stachki st. 124, 344090, Rostov-on-Don, Russia

⁹ Centro de Investigaciones de Astronomía, Apartado Postal 264, Mérida 5101-A, Venezuela

REFERENCES

- Casetti-Dinescu, D. I., Moni Bidin, C., Girard, T. M., et al. 2014, *ApJL*, 784, L37
McClure-Griffiths, N. M., Staveley-Smith, L., Lockman, F. J., et al. 2008, *ApJ*, 673, L143
Nidever, D. L., Majewski, S. R., & Butler Burton, W. 2008, *ApJ*, 679, 432
Trundle, C., Dufton, P. L., Hunter, I., et al. 2007, *A&A*, 471, 625
Venzmer, M. S., Kerp, J., & Kalberla, P. M. W. 2012, *A&A*, 547, A12

¹⁰program ID: CN2014A-057