ABSTRACT ONLY

CHEMICAL COMPOSITION OF YOUNG STARS IN THE LEADING ARM OF THE MAGELLANIC SYSTEM

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Seven element abundances (He, C, N, O, Mg, Si, and S) and kinematics were determined for eight O-/B-type stars, based on high resolution spectra taken with the MIKE instrument on the Magellan 6.5m Clay telescope[10]. The sample is selected from 42 candidates (Casetti-Dinescu et al. 2014, CD14) of membership in the Leading Arm (LA) of the Magellanic System.

After investigating the relationship between abundances and kinematics parameters, we found that five stars have kinematics compatible with LA membership, i.e. RV $>$ 100 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 [Mg/H] $= -0.07 \pm 0.06$ that are kinematical members of the Galactic disk (see Fig. 1). Moreover, among the five LA members, four have compatible [Mg/H] with that of B stars in cluster NGC 2004 in the LMC, while [Mg/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 $\sim 50 - 70$ 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.

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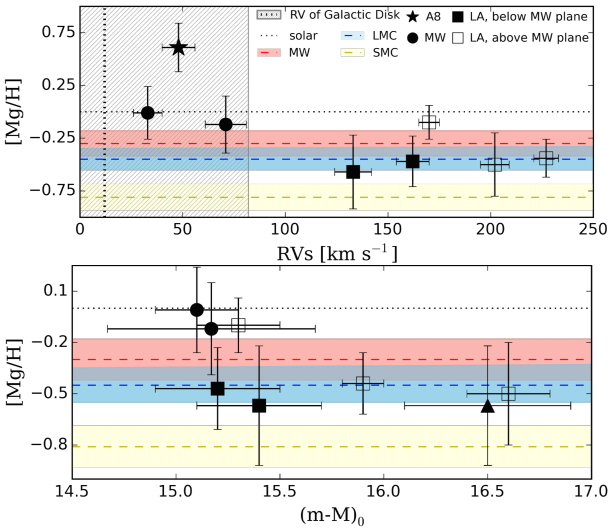

Fig. 1. [Mg/H] as a function of RV and distance modulus for our target stars.

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