Mem. S.A.It. Vol. 88, 826

Memorie della

Phase-space structure in the Monoceros region: radial velocities and TGAS data

E. J. Alfaro, M. T. Costado, M. González, A. J. Delgado, and GES consortium

Instituto de Astrofísica de Andalucía – CSIC, Glorieta de la Astronomía s/n, Granada, 18008, Spain, e-mail: emilio@iaa.es

Abstract. Two sets of RV data and positions, one centered on (RA, DEC = 99^o, $+6^o$) covering a surface of $8^o \times 12^o$ squared degrees, and other, 1 squared degree, with centre at NGC 2264 observed in a homogeneous way by GES consortium, have been taken as inputs for obtaining the Spectrum of Kinematic Groupings (SKG) (Alfaro & González 2016), in the region. The analysis leads to detecting similar kinematic groupings in both samples, despite the different covered areas and data quality (Fig. 1). Most interesting is that the selected kinematic groups show clear counterparts in the space formed by stellar physical variables such as: $T_{\rm eff}$, log(g), and EW(Li). Field stars in the area of the observed clusters enable us to get information on the Galactic kinematic structure in that directions.

1. Introdcution

We have collected radial velocity data from the literature for a region of $8^o \times 12^o$ squared degrees centred on (RA, DEC = 99^o, $+6^o$), which includes both associations, Mon OB1 and Mon OB2 (Costado et al. 2017, in preparation). TGAS (Lindegren et al. 2016) provides astrometric information, including parallax, for the brightest stars in the sample, and the distances of these stars are taken from Astraatmadja & Bailer-Jones (2017; `http://www.mpia.de/homes/calj/tgas_distances/main.html`). Gaia-ESO-Survey (GES; Gilmore et al. 2012; Randich et al. 2013) provides information of different physical parameters, $T_{\rm eff}$, log(g), and EW(Li) for a rich sample of stars in one square degree around NGC 2264.

Using the methodology proposed in Alfaro & González (2016) we obtained the Spectrum of Kinematic Groupings (SKG; for examples of application see Costado et al. 2017 and González & Alfaro 2017) for the complete sample (RV compilation from the literature) (Fig. 1, top-left), detecting at least 4 different kinematic groups with central radial velocities at -16, 20, 38, and 47 km s^{-1}, respectively. These peaks appears to be associated to the Local Arm, NGC 2264, NGC 2244, and Perseus Arm.

In the region of NGC 2264 (GES data), we can find four different populations in terms of radial velocity, $T_{\rm eff}$, log(g), and EW(Li) (Fig. 1, bottom). These populations with RVs centred on -3, 21, 52, and 84 km s^{-1} correspond to the Local Arm, Perseus Arm, NGC 2264 and the Outer Arm, respectively. Giant stars in the sample are mainly located at the Perseus and Outer Arms, while young PMS stars are associated with NGC 2264. In addition, NGC 2264 presents a high degree of RV internal structure (see González & Alfaro 2017, and talk by Venuti in this meeting). This kind of studies can help to unveil the Milky Way structure from field stars in stellar cluster areas. Thus,

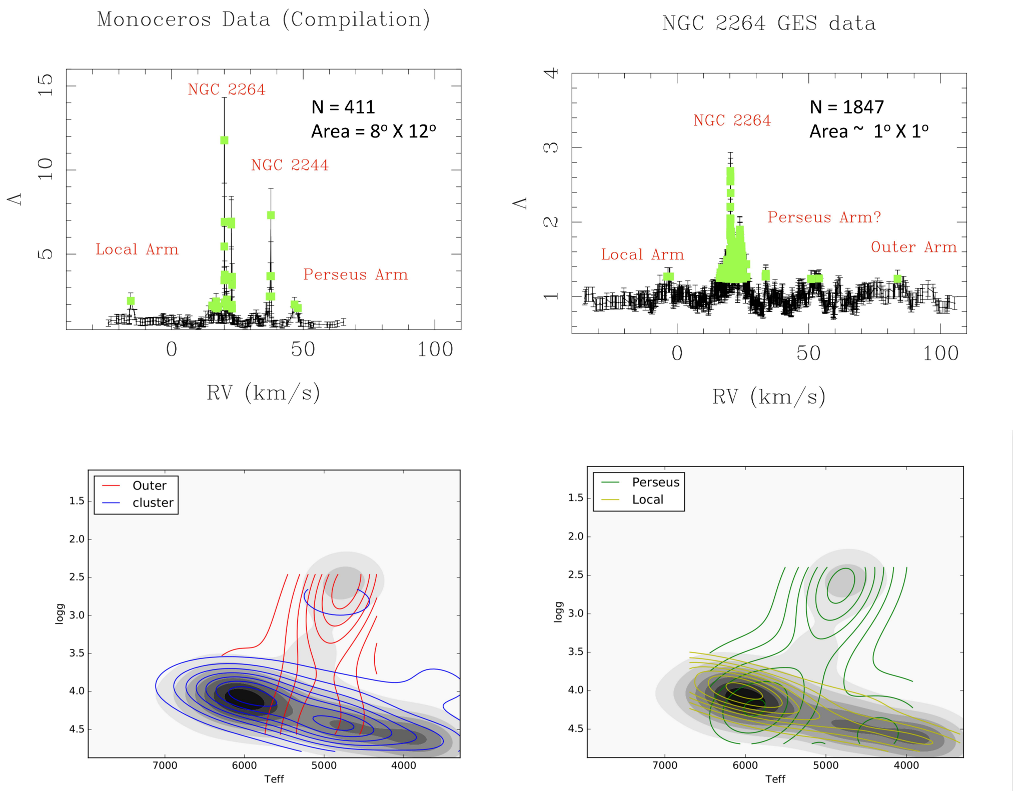

Fig. 1. Spectra of Kinematic Groupings for the two samples (top line). Features corresponding to the Local Arm, Perseus Arm, and NGC 2264 are observed in both spectra; NGC 2244 is detected in the large-scale sample (Monoceros compilation), while the Outer Arm is only visible in the GES NGC 2264 data with higher limit magnitude. The four kinematic populations detected from GES data also show to be separate in the ($T_{\rm eff}$, log(g)) space (bottom line). Field stars, in the observed areas around GES clusters, are fantastic probes for unveiling the Galactic Structure, in terms of Kinematics and Stellar Populations, for these directions.

we can extract information from the gangue, after cluster members (the ore) were selected. GES open clusters become an important information source for Milky Way studies, not by the clusters themselves, but by the field stars in the region.

References

Alfaro, E. J., & González, M. 2016, MNRAS, 456, 2900

Costado, M. T., Alfaro, E. J., González, M., & Sampedro, L. 2017, MNRAS, 465, 3879

Gilmore, G., Randich, S., Asplund, M., et al. 2012, The Messenger, 147, 25

González, M., & Alfaro, E. J. 2017, MNRAS, 465, 1889

Lindegren, L., Lammers, U., Bastian, U., et al. 2016, A&A, 595, A4

Randich, S., Gilmore, G., & Gaia-ESO Consortium 2013, The Messenger, 154, 47