

PROPER MOTION OF OPEN CLUSTER TRUMPLER 14

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Relative proper motions were obtained for stars in a field of view of $30' \times 7'$, around open cluster Trumpler 14 in the Carina Nebula. We aim to use common proper motions to determine members to a gravitationally bound group of stars with a time baseline of a little over 9 years.

The observations used were taken with the 8-chip CCD mosaic WFI camera of the 2.2 m ESO/MPI telescope at La Silla Observatory in Chile for the V, I, R and H α filters in 2003 and 2006 for a total of 24 images. The 2012 data consists of 6 images taken in the u, g and r filters with the 32-chip CCD mosaic OmegaCAM, attached to the VLT Survey Telescope at ESO's Paranal Observatory in Chile. Only a subset of the chips were used from both cameras. We should note that these images were not acquired with astrometry in mind. An ideal astrometric data set should include multiple observations of the same field with a large numbers of dithers at each epoch, so it is possible to randomize any distortion error. These observations were few, taken with very little dithering, so in some sense, they represent what can be done with the typical archival wide-field ground-based data set.

The data was processed with the IRAF³ package. Object parameters were obtained using SExtractor (Bertin & Arnouts 1996) and then recentered with Yale centering routines (Casetti-Dinescu et al. 2006), the *SPM4* catalogue (Girard et al. 2011) was used as an external reference frame. The following color-magnitude diagrams (CMDs) of the target field were used to identify field stars in order to establish a relative reference frame: V vs. $V - I$, I vs $V - I$ and r vs $g - r$. We selected stars along a main sequence present in the CMDs associated to field stars, not the (very young, 1Myr old) cluster. From an initial list of probable non-members we used positions from both epoch images to transform the position of every star in each 2nd epoch image into the 1st epoch image reference frame. The 2nd

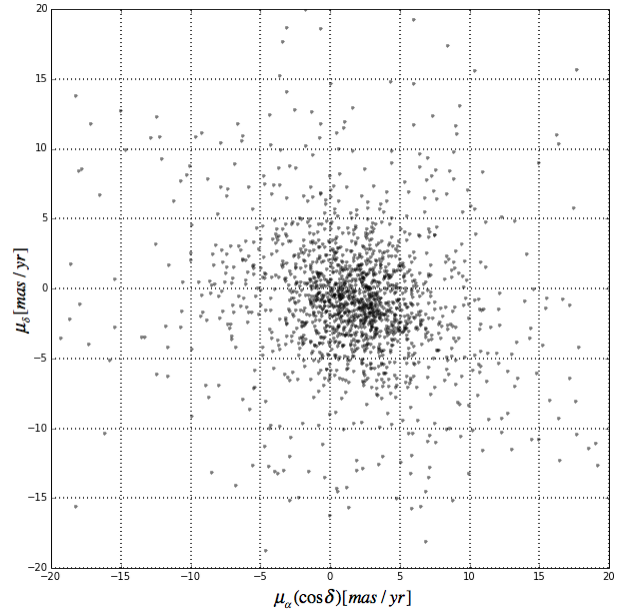


Fig. 1. Point-vector diagram for stars present in the field of view, cluster members are concentrated around $0 \text{ mas yr}^{-1} < \mu_{\alpha} \cos \delta < 5 \text{ mas yr}^{-1}$ and $-5 \text{ mas yr}^{-1} < \mu_{\delta} < 0 \text{ mas yr}^{-1}$.

epoch frames were then transformed to the 1st epoch standard coordinate system and proper motions obtained, reflecting proper motion of the cluster stars with respect of the local field stars.

A variable and dynamic distortion field was found in both cameras, suspected to be related to the read-out system of the CCDs. Such distortion made it difficult to attain precise enough individual proper motions that could be used to assign a membership probability to the cluster for each measured star. Nonetheless we were able to distinguish the trend in proper motion of the cluster from the field stars as can be seen in Figure 1. From the experience gained we suggest a properly sampled set at one (or preferably both) epochs which would allow to optimize the astrometric measurements.

REFERENCES

- Bertin, E., Arnouts, S. 1996, A&AS, 117, 393
 Casetti-Dinescu, D. I., et al. 2006, ApJ, 132, 2082
 Girard, T. M., et al. 2011, ApJ, 142, 15

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