RevMexAA (Serie de Conferencias), **40**, 282–282 (2011)

DIFFRACTO-ASTROMETRY OF THE ORION TRAPEZIUM

J. Olivares,[1] L. J. Sánchez,[1] A. Ruelas,[1] C. Allen,[1] A. Poveda,[1] R. Costero,[1] and A. Nigoche-Netro[2]

The Diffracto-Astrometry technique arises as a continuation of the work done by Allen et al. (1974, 2004) about the internal motions of Trapezium-type systems. Applying this technique to a 12 year period (1995–2007) Orion Trapezium images from the public database of the Hubble Space Telescope (HST) Wide Filed Planetary Camera 2 (WFPC2), it is possible to obtain high precision astrometric results (Sánchez et al. 2008). Thus we add new measurements to the historic data compilation (1832–2007) and determine relative motions and transversal velocities for some Trapezium components.

In the HST database we found 62 Orion Trapezium images, in the 1995–2007 period, taken by WFPC2 with 16 different filters. Only in 18 of those images, a usable diffraction pattern is present. So far we have applied the Diffracto-Astrometry technique (Sánchez et al. 2011) to just four Orion Trapezium components (A, B, C, E) in 6 images. The stellar positions thus determined, together with the historical data, allow us to establish relative kinematics for these Trapezium components.

As an example, Figures 1 and 2 show respectively, the change in time of separation and position angle for components A and E. It has to be noted that the precision obtained with this technique is of the order of 5 mas; thus, error bars can not be appreciated in our data. The rate of change for position angle and separation of components A, B, C and E is shown in Table 1.

These results, together with those to be obtained for the rest of the components, will lead to a more detailed analysis of Orion Trapezium kinematics. Thus it should be possible to detect runaway stars, as it could be the case of component E (Allen, Poveda, & Worley 1974; Costero et al. 2008).

Founding for this investigation was provided by CONACyT grants I-52081 and SNI-I-102284 and also from UNAM-DGAPA grant PAPIIT IN109809.

[1]Instituto de Astronomía, Universidad Nacional Autónoma de México, Apdo. Postal 70-264, 04510 México, D. F., Mexico (jromero@astroscu.unam.mx).

[2]Instituto de Astrofísica de Andalucía, Glorieta de la Astronomía s/n, 18008, Granada, Spain.

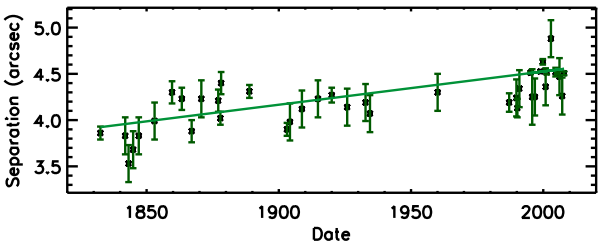

Fig. 1. Separation time evolution between components A and E of the Orion Trapezium.

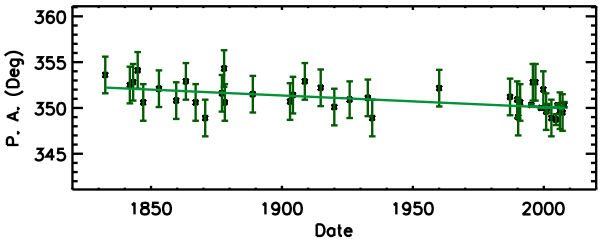

Fig. 2. Position Angle time evolution for components A and E of the Orion Trapezium.

TABLE 1

Moving Star Vector	Separation Change Rate arcsec (100 y)$^{-1}$	P.A. Change Rate deg (100 y)$^{-1}$	Transverse Velocity[a] km s^{-1}
AB	0.15 ± 0.01	−1.2 ± 0.2	2.95 ± 0.19
AC	−0.04 ± 0.01	0.5 ± 0.1	0.68 ± 0.19
AE	0.35 ± 0.02	−0.8 ± 0.3	6.78 ± 0.37

[a]It was calculated using 414 pc as the distance to Orion Nebula (Menten et al. 2007).

REFERENCES

Allen, C., Poveda, A., & Hernández-Alcántara, A. 2004, RevMexAA (SC), 21, 195

Allen, C., Poveda, A., & Worley, C. E. 1974, RevMexAA, 1, 101

Costero, R., et al. 2008, RevMexAA (SC), 34, 102

Menten, K. M., Reid, M. J., Forbrich, J., & Brunthaler, A. 2007, A&A, 474, 515

Sánchez, L. J., Ruelas-Mayorga, A., Allen, C., & Poveda, A. 2008, RevMexAA (SC), 34, 10

Sánchez, L. J., et al. 2011, RevMexAA (SC), 40, 308