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RADIAL VELOCITIES, BINARITY, AND KINEMATIC MEMBERSHIP IN OPEN CLUSTERS WITH BLUE STRAGGLER CANDIDATES

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We present results of a spectroscopic study of luminous stars in 10 open clusters (NGC 2437, NGC 2516, NGC 2539, NGC 3114, NGC 3532, NGC 3766, NGC 6067, NGC 6281, NGC 6530 e IC 4651) which contain blue straggler (BS) candidates. Our main goal is to investigate two aspects that are crucial to understand these objects: their membership to the clusters and their binary nature.

We obtained echelle spectra for 170 objects including BS candidates, red giants and early-type main sequence stars. These observations were carried out at Complejo Astronómico El Leoncito (CASLEO), San Juan, Argentina. Radial velocities were obtained by cross correlations, using as templates observed spectra of standard stars. Double-lined binary stars were measured using the two-dimensional cross correlation technique (Zucker & Mazeh 1994).

A statistical analysis of our observations allowed us to evaluate different instrumental factors affecting the radial velocity measurements. For the adopted instrumental configuration, our observational error was 0.7 km/s, being the centering of the star in the slit the main source of error.

We detected 7 double-lined spectroscopic binaries and 14 radial velocity variables. We derived the orbits of the two double-lined binaries NGC 6530-73 and NGC 2516-130. Both systems are short-period binaries with main-sequence components. Their stellar parameters allow us to predict the occurrence of mass-transfer before the end of the main-sequence stage. Slow variations of the center-of-mass velocity of NGC 6530-73 suggests that it is a triple system.

We determined the mean radial velocity for each cluster and carried out a membership study. For the clusters NGC 2516, NGC 3114, and NGC 3532, we defined and computed membership probabilities from the cluster and field velocity distributions and the expected percentage of contamination at each position. These results were published by González & Lapasset (2000, 2001a, 2001b). Additional membership criteria were defined using the interstellar lines present in our spectra, and the spectroscopic distance-modulus and reddening. From this analysis 14 % of the stars were rejected as cluster members and membership was confirmed for most of the BS candidates. By comparing the available photometric data with theoretical isochrones, we selected 18 objects as good BS candidates. Then, we discussed the evolutionary nature of these objects on the basis of our observational data.

Our results support the existence of several mechanisms for the BS formation. On the one hand, we found two binary BSs (NGC 2437-1 and IC 4651-44), which are significantly brighter than the cluster turnoff point. Some other objects might be interpreted as merger products, and the two short-period binaries analyzed in this work are probable blue straggler predecessors. In the other hand, there is evidence of the occurrence of a second star burst in the cluster NGC 6067. Finally, we identified a group of low-rotating BSs that lie on the left of the main-sequence. These objects can be explained by the effects of the stellar rotation on the color indexes (D'Souza et al. 1992). This hypothesis might explain about 40% of the selected BSs.

REFERENCES

D'Souza J. Mathew A., & Rajamohan R. 1992, JA&A, 13, 109
González J.F. & Lapasset E. 2000, AJ, 119, 2296
González J.F. & Lapasset E. 2001a, AJ, 121, 2657
González J.F. & Lapasset E. 2001b, in preparation
Zucker S. & Mazeh T. 1994, ApJ, 420, 806