Revista Mexicana de Astronomía y Astrofísica, **47**, 185–192 (2011)

uvby − *β* PHOTOELECTRIC PHOTOMETRY OF THE OPEN CLUSTERS NGC 1647 AND NGC 1778

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Received 2010 October 21; accepted 2011 February 15

RESUMEN

Se presenta fotometría $uvby - \beta$ de 35 estrellas en la dirección del cúmulo abierto NGC 1647 y de 16 estrellas del cúmulo NGC 1778. Del análisis de los datos obtenidos para NGC 1647 se ha determinado un enrojecimiento $E(b-y) = 0.32 \pm 0.02$ mag y un módulo de distancia de $V_0 - M_V = 8.75 \pm 0.09$ correspondiente a una distancia $d = 564 \pm 106$ pc; asimismo, se han encontrado las estrellas miembros y se ha determinado un valor numérico para la edad del cúmulo de log edad (en años) $= 7.98 \pm 0.23$. A partir del análisis de los datos obtenidos para NGC 1778, se concluye que no es posible determinar si hay un cúmulo en esa dirección, pues las distancias encontradas para las estrellas observadas son muy diferentes.

ABSTRACT

We present photometry $uvby - \beta$ for 35 stars in the direction of the open cluster NGC 1647 and for 16 stars in the direction of the cluster NGC 1778. From the analysis of the data obtained for NGC 1647 we determine a mean reddening of $E(b-y) = 0.32 \pm 0.02$ mag and a distance modulus of $V_0 - M_V = 8.75 \pm 0.09$ corresponding to a distance $d = 564 \pm 106$ pc; also, we find the cluster member stars and a numerical value of log age (in years) $= 7.89 \pm 0.23$. From the analysis of data obtained for NGC 1778, we conclude that it is not possible to determine whether there is a cluster in that direction, because the distances found for the observed stars are very different.

Key Words: open clusters and associations: individual (NGC 1647, NGC 1778) — techniques: photometric

1. INTRODUCTION

Galactic open clusters are ensembles of stars with low concentration and irregular shape, gravitationally-bound systems formed at the same time from the same original cloud. They represent examples of stars of comparable age and intrinsic chemical composition and are important in the study of stellar evolution and star formation. As a consequence, the problem of determining the cluster member stars is very important. For this, it is necessary to know the distance, reddening and absolute magnitude of each star.

The present work studies two open clusters, NGC 1647 and NGC 1778, using Strömgren photometry ($uvby - \beta$) to determine their parameters: reddening, distance modulus and age. The results will be compared with those obtained from the Johnson photometry taken from the literature.

Based on the individual distances of the stars, we will determine whether they belong to the cluster. There are other important physical characteristics in the study of stellar evolution to characterize a star cluster namely temperature and surface gravity of the stars. Using them we can determine the clusters' age (Meynet, Mermilliod, & Maeder 1993).

NGC 1647 is situated beyond the Taurus dark cloud complex, only a few degrees from the Hyades cluster. The center equatorial coordinates are $\alpha(2000) = 4^h46^m8^s.45$ and $\delta(2000) = +19°04'37''$. The diameter of the cluster is about $45'$ and it is a relatively rich cluster that has not been studied by $uvby - \beta$ photometry. Other authors have reported physical parameters (Table 1): Hoag & Applequist (1965) observed 65 stars and reported a distance $d = 549$ pc, a reddening $E(B-V) = 0.30$ and

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