

Isochrone Fitting of ACS Survey Globular Clusters Using the PAdova and TRIeste Stellar Evolution Code (PARSEC)

We present new isochrone fits to color-magnitude diagrams (CMDs) of five globular clusters including NGC 1261, NGC 1851, NGC 2298, NGC 3201, and NGC 4590. We used archival data obtained from the Advanced Camera for Survey (ACS) on board the Hubble Space Telescope (HST). The data of these five globular clusters were collected V and I filters. In this study, the isochrone fitting to globular cluster CMDs was analyzed using the PAdova and Trieste Stellar Evolution Code (PARSEC), which are the fundamental tool for age and distance estimation and modelling the evolution of stellar clusters and distant galaxies. The main purpose is to estimate the fundamental physical properties of the globular cluster samples using the PAdova and Trieste Stellar Evolution Code (PARSEC) and compare with results from different tools in published articles. The fundamental physical parameters determined in the study are age, metallicity, reddening, and distance modulus. We found that the main-sequence turnoff points of these five globular cluster; NGC 1261, NGC 1851, NGC 2298, NGC 3201, and NGC 4590 are located at $V(\text{TO}) = 19.3 \pm 0.3$, $V(\text{TO}) = 19.7 \pm 0.2$, $V(\text{TO}) = 19.2 \pm 0.3$, $V(\text{TO}) = 17.8 \pm 0.3$, and $V(\text{TO}) = 18.7 \pm 0.1$, respectively. The theoretical isochrone fits properly with the shape of CMD at the turn-off point that can be used to estimate the age of the clusters. Among the analyzed clusters, the age of NGC 3201 to be 11.3 ± 1.0 Gyr which is the youngest globular cluster compare to the others. Studies of the properties and distribution of globular clusters play an important role in the study of the formation and evolution of the Milky Way.

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