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Analysis of Color Magnitude Diagram by Aperture Photometry Tool

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The variations of stellar brightness in globular clusters are major evidence of their evolutions. In this study, optical images of two globular clusters were taken. First, images of NGC6121 (M4) were taken by Panchromatic Robotic Optical Monitoring and Polarimetry Telescopes 8 (PROMPT 8) at Cerro Tololo national observatory, Chile. Later, images of NGC7078 (M15), were taken by 2.4m Telescope at Thai National Observatory in Thailand. The images were reduced and analyzed by Aperture Photometry Tool to measure the absolute magnitude for each star in the cluster. The calculated magnitudes were used to create plots between color index B-V and the apparent magnitude in filter V. The plot is generally known as Color Magnitude Diagram (CMD), which is a simple form of Hertzsprung - Russell diagram (H-R Diagram). CMD for NGC6121 and NGC7078 were compared to previous studies by Patrick R. Durrell and William E. Harris (1993) and G. Alcaino, W. Liller, and F. Alvarado (1997) respectively. The results from this study show similar evolution trends to previous studies. Upon the analysis of the evolution curves, the positions of the main-sequence turnoff are found to be at $V \sim 16 - 17$, $(B - V) \sim 0.8 - 1.0$ for NGC6121 and $V \sim 19 - 20$, $(B - V) \sim 0.3 - 0.5$ for NGC7078. Furthermore, the ages of both clusters were calculated based on the magnitudes of stars at the positions of the main-sequence turnoff. We found that their ages are different from the previous studies, although in the same order of Gyr. For further detailed analysis, the effect of extinction due to interstellar medium should be taken into consideration.

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