The Age of the Coma Ber Cluster Constrained Using Amateur Data

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Purpose: There is a disparity in the estimated age of the Coma Ber Cluster. A recent study used the turnoff point method to determine an age estimate of 800 Myr (Tang et al. 2018), significantly older than the conventional 400-650 Myr in literature. However, the study used a sample size of four stars, all were evolved and not close to the turnoff point. The goal of this project is to use a larger population size, including less evolved stars to obtain a better estimate of the turnoff point and age. This project's alternate hypothesis is that the result will digress from the 400-650 Myr estimate. Procedures: A telescope was used with a phone camera and colored filters to take photographs of the cluster in two wavelengths. The images were analyzed in APT (NASA's Aperture Photometry Tool) to get fluxes for total of forty two stars from three observing runs. Then this data was processed, from which the individual magnitudes and B-V indexes, turnoff mass, and overall age of the cluster were determined. Results: Fluxes and magnitudes were derived for all stars. The mean turnoff B-V index is -0.053. The mean turnoff point mass is 2.64 Msun. From this information a final age estimate 893 ± 236 Myr can be determined. Conclusions: The result of 893 Myr is consistent with the result of Tang et al. (2018) and significantly older than the conventional estimate. This project's research also shows that useful astronomical results can be obtained from amateur data.

Awards Won:
Fourth Award of $500