

Astrophysical Insights: Age and Distance Analysis of Open Cluster NGC 4815

Saksham Agarwal¹, Abhay Bhaskar¹, Derek Chang¹, Khedaar Kashyap¹, Aminatou Seye¹,
Aayush Tripathy¹, Sriya Veluri¹

¹NASA SEES, University of Texas at Austin Center for Space Research, Austin, Texas

In the quest to understand stellar formation, evolution, and galactic structure, astronomers have turned their attention to open clusters. Our study focuses on NGC 4815, an intriguing open cluster nestled in the constellation of Musca. This cluster stands out due to its potential role as a tracer for the abundance gradient, a feature that could shed light on the distribution of elements across the galaxy. Our mission was twofold: to unravel the secrets of NGC 4815 and to ascertain the age and distance of its constituent stars. To achieve this, we employed AstroImageJ, an open-source tool, which allowed us to estimate these parameters.

Our methodology involved taking brightness measurements of the stars using photometry, aided by the analysis of two extensively studied stars. The B-V index was used to calculate the star's spectral class, revealing a significant presence of B stars in the cluster. This abundance is indicative of the cluster's relatively young age. Our analysis encompassed 257 stars in NGC 4815, a representative sample of the over 8500-star open cluster. We then turned our attention to the G-class stars discovered in the cluster, drawing comparisons with our Sun. The cluster's relation to the Zero Age Main Sequence (ZAMS) path was also examined. We discovered that for NGC 4815, the turn-off point was at, approximately, 0.1 B-V. To get the distance, we utilized the distance modulus formula, estimating that NGC 4815 is 1,390 lightyears away. Details will be reported.