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Investigating Dynamical Ages of Open Clusters using Blue Straggler Stars

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Blue straggler stars (BSS) are rejuvenated core hydrogen-burning stars that are bluer and brighter than the main-sequence turnoff stars of star clusters. They are believed to have formed via binary evolution and multiple stellar interactions. BSS are among the most massive populations of star clusters and therefore experience significant gravitational drag compared to other cluster populations and sink in the cluster center faster than any other cluster population. This observational signature has been used to assess the dynamical ages of globular clusters. We estimate the relative sedimentation level of the BSS population of 23 old open clusters (ages > 1 Gyr), utilizing various methods such as normalized BSS radial distributions, and estimation of the area enclosed between cumulative radial distributions of BSS and reference populations, A^+ . Upon comparing the theoretical parameters related to clusters' dynamical states and the observed values of A^+ , we learn that they follow the same broad correlation as found in the globular clusters.

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