The Study of Globular Cluster Systems in Virgo Cluster Dwarf Galaxies

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The globular cluster (GC) specific frequency (S_N) is a fundamental property representing the relationship between the globular cluster systems and their host galaxies. It is defined as the number of GCs per unit host galaxy luminosity. While some low-mass (dwarf) galaxies have the highest GC specific frequencies of any galaxy, others of similar mass have no detectable GCs. Understanding the wide variation of this fundamental property is crucial for us to understand how the galaxies evolve and require a systematic study of GCs in many dwarf galaxies. The Virgo cluster provides such an opportunity, as it is the closest galaxy cluster with a large concentration of dwarf galaxies. I created a processing pipeline to calculate S_N values from images of 1140 Virgo cluster dwarf galaxies from the Next Generation Virgo Cluster Survey. In order to compute S_N, I selected GC candidates from the galaxy images and corrected the GC count. I found that galaxies in the dataset with relatively bright luminosity have S_N values between 0 and 2. In contrast, fainter galaxies have S_N values that vary significantly. The trend shows that binned S_N values increases as the galaxy luminosity decreases. This study of GC systems is the first on the largest dataset of the Virgo cluster dwarf galaxies to date. The results show dwarf galaxies have a more significant fraction of their stars in GCs than more massive galaxies. It suggests that dwarf galaxies are likely to have formed earlier and more intensely.

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