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Identification of Fragmented Brightest Cluster Galaxies

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Introduction

Brightest Cluster Galaxies (BCG) are important structures for deep space observations. They are some of the largest galaxies we know of and can give great insight into many mysteries of galaxy formation. In this project, we are attempting to identify and classify fragmented BCGs. These are dense groups of galaxies within galaxy clusters and have the potential to form into a BCG. We hope to use this project as precursor to further quantitative research in the future.

Key Findings

Using online astronomical databases and a search coding language called structured query language (SQL), we searched within galaxy clusters to find fragmented BCGs that contained galaxies within 25 kiloparsecs of each other. In doing these searches we found that groups of 2-4 were fairly common so we decided to refine our search to find larger groups. We found a quite a few groups of around 6 and a few potential candidates of around 10. We hope to continue research in the future by finding redshift data on our most promising groups and then continuing with physical analysis.

This is a rare candidate for fragmented BCGs that potentially contains 11 members.

This is a potential fragmented BCG candidate. This one contains 3-4 members and is an example of much more common candidates. (Both pictures are from the online database Sloan Digital Sky Survey)

Conceptual Framework

Extensive research has already been done for BCGs themselves as they have proven to be useful for deep space measurements, observing behaviors of large galaxies, and observing supermassive black holes at the center of these galaxies. We hope that our research will lead to further analysis for better understanding of large galaxy formations and better identification of fragmented BCGs.

Conclusions

This was a continuation of a project from last summer to do further cluster identification and refine our classifications. We found that we got the most reliable searches by including built-in flags in the database as well as searching for galaxies with a brightness magnitude between 0.1L* and 1.1L* (here L* is the luminosity of the Milky Way). This has given us a good initial standard to use for future identification. The few large groups we found appear extremely promising and future research will focus primarily on these groups to better understand large galaxy interactions.

References

1. **Sloan Digital Sky Survey Online Astronomical Database**
2. **NASA/IPAC Extragalactic Database**

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