

Fragmented Brightest Cluster Galaxies

*Andrew Guillory with adviser Dr. Ming Sun
Department of Physics, University of Alabama in Huntsville*

Overview

Fragmented BCGs are a some what uncommon occurrence among galaxies. Most galaxies are found alone or with a one other galaxy. Given the significance of BCGs, this research project focused on studying certain factors of fragmented BCGS and creating a catalog of them.

The plan was to accomplish this through use of an online astronomical database, named Sloan Digital Sky Survey (SDSS) along with a search language called Simple Query Language, or SQL. Using these resources, a search can be conducted to find fragmented BCGs within galaxy cluster samples.

Back Ground/Significance

Fragmented Brightest Cluster Galaxies (BCGs) are groups of brightest galaxies in a given galaxy cluster. BCGs are previously cataloged galaxies that are the Brightest galaxies in a given cluster. Fragmented BCGs are BCGs with multiple components and there are no significant catalogs of fragmented BCGs.

Fragmented BCGs are significant for a few different reasons. Fragmented BCGs can give insight into galactic cannibalism, supermassive black hole mergers, and insight into new simulation techniques. This cataloging and research will allow to further future research as well as setting up a possible standard for classifying fragmented BCGs.

NED ID Abell 407



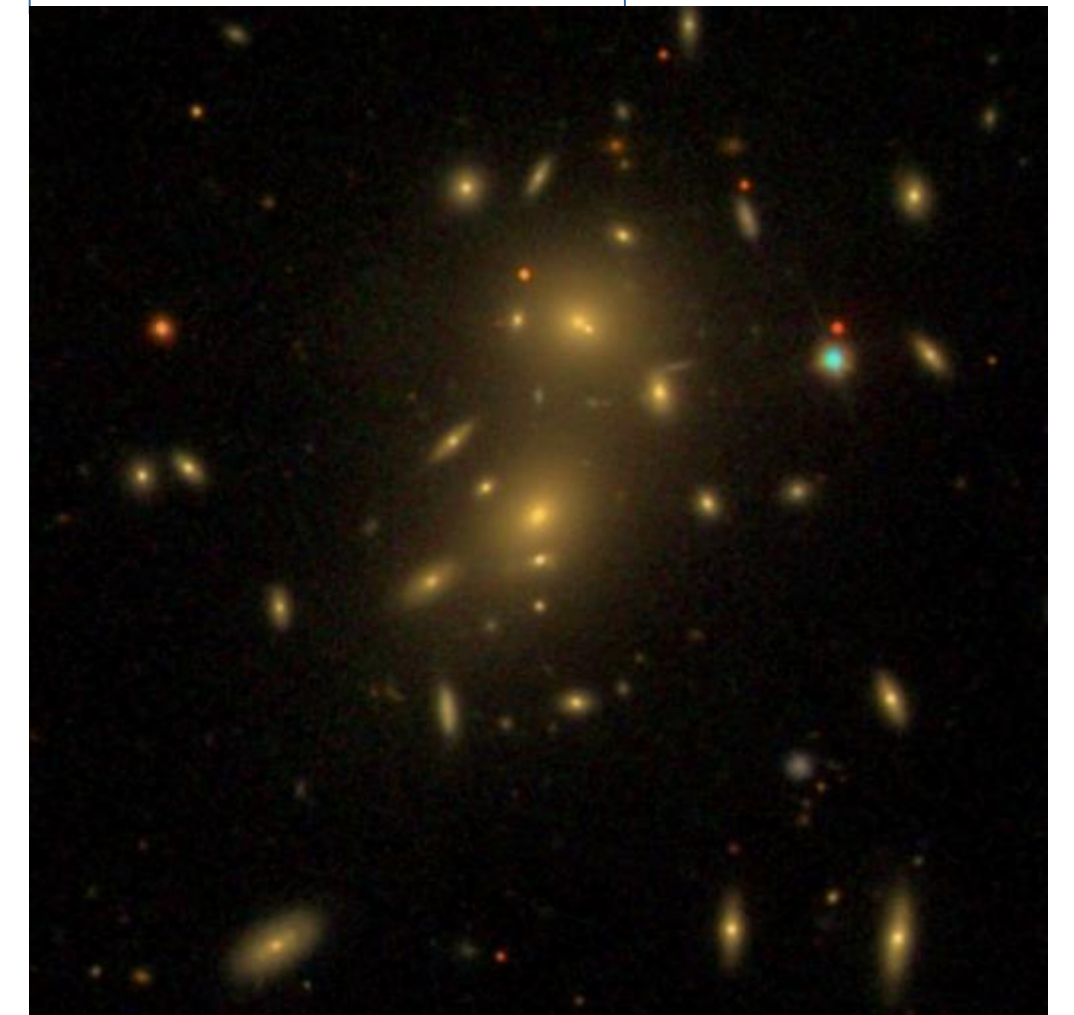
SQL code sample

```
SELECT m.id, m.ra AS ra1, m.dec AS dec1, m.dist AS dist1, m.imag AS imag1, n.objid, n.distance, o.ra AS ra2, o.dec AS dec2, o.petroMag_i as imag2

FROM MyDB.Table1 AS m
  CROSS APPLY dbo.fGetNearbyObjEq( m.ra, m.dec, m.dist) AS n
  JOIN PhotoObj AS o ON n.objid=o.objid

WHERE o.petroMag_i < m.imag AND o.type = 3
order by m.id
```

NED ID Abell 154



RESULTS

This projected revealed that fragmented BCGs bigger than 2 or 3 are a fairly uncommon occurrence. After searching through four different galaxy cluster samples, large samples with every component confirmed by redshift data was a rarity.

The best candidates (the two pictures shown) were from the NASA Extragalactic Database (NED). Two of the other samples only provided one candidate with more than three components. The last sample was not fully analyzed due to time constraints.

Acknowledgements

Special thanks to Dr. Chong Ge for his assistance with SQL. Also thanks to David Cook and Dr. Bernhard Vogler for running the program and putting together various professional development sessions. The RCEU program is funded through the office of the President, the office of the Provost, and the office of the Vice President for Research and Economic Development at UAH.

References:

1. Sloan Digital Sky Survey (skyserver.sdss.org)
2. NASA Extragalactic Database (ned.ipac.caltech.edu)