

# The classification of galaxies in Hercules Galaxy Cluster and Abell3558

Worrapon Panpang

Pua school , Pua district, Nan province Thailand.

Email: fairytail\_mew@hotmail.com

28 June 2556 - 30 October 2556.

## Abstract

This research is the study of the classification of galaxies according to Hubble's Classification. We take images of galaxies in Hercules galaxy cluster and Abell3558 and classify galaxies into different types using Hubble sequence and galaxy classifications scheme.

## Introduction

In general, galaxies are formed into clusters or groups. Galaxy clusters have large structures that are composed of a number of clusters. These clusters are called super clusters.

The Hercules galaxy cluster is a cluster near the Milky Way. The distance between the Milky Way galaxy and the Hercules galaxy cluster is approximately 500 million light years. It is composed of about 200 galaxies including 18 bright galaxies.

The A3558 galaxy cluster is located in the Shapely super cluster. The aim of this research is to classify the 18 bright galaxies in Hercules and the galaxies in the center of A3558 according to Hubble's classification system.

## Materials and Methods

In this research, I acquired images from a PROMPT2 telescope. I used a Lum filter and exposed the image for 45 seconds. Then I compared the galaxies' images with the Hubble diagram in order to classify them according to type. Spiral galaxies, Barred galaxies and elliptical galaxies were found in this study.

Find the ellipticity of galaxies by FWHM (Full width at half maximum) technique by set the contour line round the area that the value is half of the max value of the galaxy. Use ellipse tool to find major axis and minor axis of galaxy for Hubble's classification in this formula:

$$e=100(1-b/a)$$

e = ellipticity of galaxy

b = semi-minor axis

a = semi-major axis

The result of Hubble's classification shows as the numbers from 0-7 the number represented the ellipticity of galaxy from less ellipticity to the most elliptical. This formula was created by Edwin Hubble, an American astronomer.

## Result and Discussion

**Study Table 1** shows the types of galaxies. Name of galaxies Hercules galaxy cluster.

Types of galaxies	List of galaxies	Ellipticity
E2	N6047	2.87
S0	IC1182 N6044 IC1194 N6042 IC1178	
Spiral	IC1181 IC1193 N6054 IC1185	
Barred Spiral	IC1183 N6050 N6040 N6056 IC1192 IC1186 N6045	

**Table 2** shows the types of galaxies. Name of galaxies Galaxy cluster A3558

<b>Types of galaxies</b>	<b>List of galaxies</b>	<b>Ellipticity</b>
E0	PGC47197 PGC47173	0.42 0.82
E1	PGC47273	1.96
E3	PGC88857	3.35
E4	PGC47322	4.89
S0	PGC47355	
Spiral	PGC47177 PGC47086	

### **Conclusion**

The classification of galaxies found that the galaxies observed in Hercules galaxy cluster are mostly spiral and barred spiral galaxies, while most galaxies found in the center of galaxy cluster A3558 are mostly elliptical, ranging from E0-E4.

### **Acknowledgments**

My thanks to those supporting the research. I especially thank to the National Astronomical Research Institute (NARIT) and Mrs.Jiraporn Kakaew, who provided insight and assistance into this research. Thanks also to Dr. Wiphu Rujopakarn, Mr. Matipon Tangmatitham and their faculty and staff who gave additional support to this research.

### **References**

- Boonraksa Sunthontham . (2550 ) . Astronomical physics. Chiang Mai: Faculty of Science University .  
 Matipon Tangmatitham . Guide to the practice and study of astronomy . N.D.  
 Richard Powell. In 2013 . "The Hercules Super clusters". (online).  
 Available <http://www.atlasoftheuniverse.com/supercer.html> (12 September 2013).  
 Robert Nemiroff (MTU) & Jerry Bonnell. In 2013 . "Astronomy Picture of the Day" (online).  
 Available <http://apod.nasa.gov/apod/ap050427.html> (1 October 2013).  
 Richard Powell. In 2013 . "The Shapley Super clusters". (online).  
 Available <http://www.atlasoftheuniverse.com/superc/shapley.html> (12 September 2013).