

The relations between numbers of stars and sizes of the galaxies

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Abstract

This study is the investigation of the correlation between the galaxies' size and the number of stars, comparing the correlation among different types of galaxies by create a comparison chart of the correlation the number of stars and the galaxies' size. The result of this study shows that the number of stars varies directly with the galaxies' size. On the other hand, it can be said that the higher number of stars, the larger size of the galaxy. These relationships of the majority of galaxies are crowd in the similar range. In addition, Elliptical galaxies (E-type galaxies) have higher number of stars than other types of galaxies.

1. Introduction

Galaxy is a celestial body which is the large system consists of numerous stellar systems, interstellar gas and dust. Galaxies have the difference in their shape and size, these differences also cause the difference in the number of stars in galaxies. The author of this study investigated the correlation between the galaxies' size and the number of stars in various types of galaxies by using images from the SIMBAD database to find these relationships.

2. Research methodology

- 1) Select galaxies' images from SIMBAD and VIZIER database (<http://simbad.u-strasbg.fr/simbad/>), then use the software SAOImageDS9.
- 2) Determine the estimated size of galaxy (20% of its actual size) from galaxies' contour images in SAOImageDS9, then calculated contour 20% galaxy size in degree and radian.
- 3) Calculate the absolute magnitude (M) of each galaxy.
- 4) Calculate the number of stars of each galaxy.
- 5) Create the comparison chart of the correlation between the number of stars (Y-axis) and the galaxies' size (X-axis).

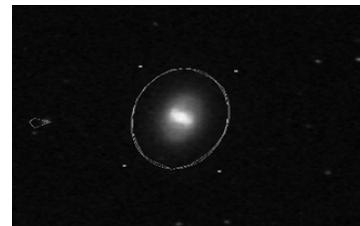
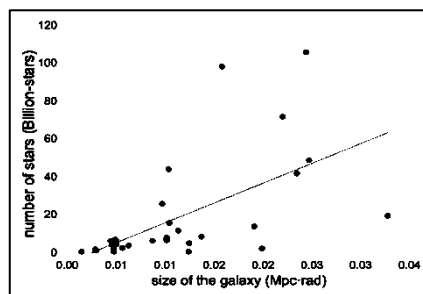


Fig 1: The contour image of the Galaxy in SAOImageDS9 (Measuring the size of the galaxy)

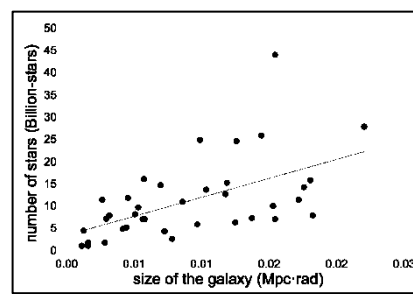
3. Results and Discussion

Table 1: The summary of the number of stars in each galaxy type.

Type of galaxy	The number of stars (Billion-stars)	The size of the galaxy (Mpc-rad)	The highest number of stars in each type of galaxies (Billion stars)	The number of studied galaxies	The average of stars for galaxy type (Billion-stars/Mpc-rad)
E	0-20	0-0.015	106	32	highest
S0	0-20	0-0.009	54	79	moderate
SAB	0-20	0-0.02	45	38	lowest
SB	0-20	0-0.008	48	55	high
S	0-20	0-0.007	49	98	low



(a) Ellipticals



(b) Spirals

Graph 1: The relationship between the number of stars and the size of galaxies in different types of galaxies. For examples, Elliptical galaxies (Left) and Spiral galaxies (Right).

4. Conclusions

The study found that the number of stars varies directly with the size of galaxies. On the other hand, it can be said that the higher number of stars, the larger size of the galaxy. However, This direct variation pattern is not found in some galaxies.

5. Acknowledgment

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6. Reference

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