The relation between stars and gas in distant galaxies

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Observing any galaxy in the universe will yield the fact that it contains stars and also gas. The dynamics of both can be explored by observing galaxies and collecting spectroscopic data.

Abstract abstract

Contents

1. INTRODUCTION

Amongst the different types of cosmic structure within our universe, galaxies can be seen as the island powerhouses of industry and activity. Containing countless stars, gas, dust, and dark matter [1], it would be difficult not to express the statement that the motions of these objects must be linked in some galactic relationship.

By utilising astronomy's most powerful tool, observation, galaxies, their structure and the motions of the objects within them can be studied to a great depth. For example if we took optical measurements of the stellar population, then we could use that information to estimate the potential age of the galaxy. [ref] Or if we wanted to know about the material composition or the distance to that galaxy, we could split the collected light in a spectrograph. [ref]

Gathering and processing this optical and spectroscopic data allows us to build a broad picture of the internal workings of a galaxy. However this picture would not be complete unless we had a general understanding of galaxies themselves.

a. Galaxy classification

If we observed a large enough sample of galaxies then we would begin to see that

some of them can be grouped together, this categorisation is called the *Hubble Sequence* or the *Hubble Tuning Fork*. With a horizontal handle and two prongs, the sequence itself does not show the evolution of the galaxies, rather it provides a way to view the possible different types of galaxies on one graph. [REF and show an example of the sequence - find some data and plot it? or images of galaxies?]

We introduced the concept that through optical measurements of the stars

What do I want to say with this? I want to introduce galaxies, the different types of galaxies, how they form, how they can be confused with other types of structure.

b. Data

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1. Hubble Ultra Deep Field

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2. MUSE

To obtain spectroscopic information on the Hubble UDF objects, the Multi-Unit Spectroscopic Explorer or MUSE was employed. This instrument is

what is MUSE, where it is on the VLT, problems, limitations of MUSE - why it is useful...etc

FIG. 1: A colour image of the Hubble Ultra Deep Field created using MUSE spectroscopic data. The wavelength range was split into three components, which were then collapsed to create the three colour bands (R, G, B). For every pixel the median value was found from the reduced spectroscopic data. [I NEED TO ADD THE ACTUAL OPTICAL IMAGE FOR A COMPARISON]

2. ANALYSIS

a. Cube extraction

b. pPXF

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3. DISCUSSION

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magna. Nunc sed lacus diam. Nam enim mauris, imperdiet ut egestas quis, tincidunt at odio. Ut viverra nulla at libero dictum aliquet. Suspendisse lacus lacus, imperdiet nec elit nec, ullamcorper facilisis ex.

4. CONCLUSIONS

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Acknowledgments

(OPTIONAL) The author would like to thank...

References

[1] Bradley W. Carroll and Dale A. Ostlie. An Introduction to Modern Astrophysics. Pearson, 2nd edition, 2007.