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Galaxies: Shapes and Evolutions

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Abstract: *People all round the world always fascinated about understand the nature, shape of universe, galaxies, age of the universe. How galaxies evolved, what are shape and properties of galaxies. How properties of galaxies are corelated with each other. What will be density of typical galaxy and which type of stars are found in it. Whether by studying such type of galaxies we can say anything about origin of universe Inflation + hot Big Bang. To better understand the current and proposed classification schemes of galaxies in this review paper we have considered some standard theoretical framework and models of galaxy classification and experimental findings too. By concluding these results, we can provide light on shape of the universe.*

Keywords: Universe, Inflation, Big Bang, framework

I. INTRODUCTION

Galaxies are not only interesting in their own right; they also play a pivotal role in our study of the structure and evolution of the universe. The study of galaxy formation and evolution is very different from most of the areas of experimental physics. We know that we can't observe actual evolution of individual galaxies but looking galaxies which are at longer distances from us is equivalent to looking at younger universe. This is due to the fact that speed of light is finite.[1]

Morphology of galaxies: By the existence of various shapes of galaxies, those are classified into two basic types: spiral and ellipticals. The historical reasons of ellipticals and spirals are called early-typed galaxies (EGTs) and late-typed galaxies (LGTs). One of the earlier classification schemes for galaxies, which is still used, is the Hubble sequence.

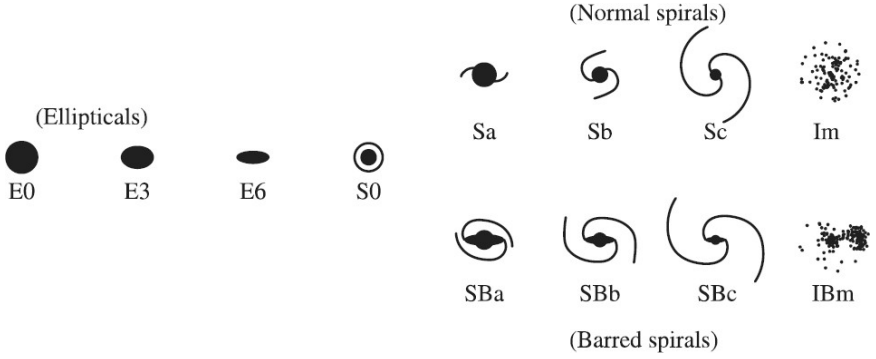

Figure 1. Jeans-Hubble tuning fork (Jeans 1928; Hubble 1936), including the S0 galaxy morphological type theorised in Jeans (1919a), identified in Reynolds (1925, see his p.1016), and later added by Hubble (1936)

One of the most important discoveries in modern science was Hubble's (1929) observation that all galaxies appear to move away from us, and their recession velocities increase in direct proportion to their distances from us, $\upsilon_r \alpha r$. This relation is called Hubble's law, is explained most naturally if the universe as a whole is assumed to be expanding. According to morphology, luminosity and stellar mass, size and surface brightness, gas mass fraction, colour, environment, nuclear activity and redshift galaxies are classified according to Hubble's tuning fork diagram. It is suggested by Hubble that earlier galaxies are elliptical type of galaxies and later on they expand to form spiral or bared spiral galaxies hence known as early type galaxies and late type galaxies.

According to research early type of galaxies which have relatively old stellar populations and are therefore red and late-type of galaxies have found to be ongoing star forming regions in their disc and therefor are blue. However, it is

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important to relate colour-morphology relation is not perfect in disc galaxies may be red due to early type of galaxies following a more concentrated number of density distribution than less massive, blue late type of galaxies.

However, NIR colour criterion along selects galaxies with significant current star formation, even dusty starbursts. Using the photometry in B, Z, and K bands recover the blue galaxies as well as passively evolving galaxies and to be distinguish between two classes. Important property of galaxy distribution reflects the large-scale mass-distribution in Universe. This contradicts the Hubble's prediction. Then it was suggested by scientist communities the prediction about evolution of galaxies may be reverse. Spiral or bared-spiral galaxies may lead to elliptical galaxies.

Recent research in the field especially near IR photometry study of early type of galaxies have shown few new star forming regions as well as few amounts old stellar concentration. Along with stars in the region cloud and dust are also found in such galaxies. Earlier it was believed that elliptical galaxies contain neither gas nor dust, it has become clear over the years that they actually contain a significant amount of interstellar medium which different in character from that in spiral galaxies. In addition, many ellipticals also contains small amount of worm ionized gas as well as cold gas and dust. In many cases dust and ionized gas is located in canter of galaxy in small disc component while other ellipticals revels more complex dust morphology. Galaxy population is also a complex quantity found to be extreme complex especially in elliptical galaxies. [2]

Many objects in the universe, including galaxies and clusters of galaxies have density order higher than density of universe, thus these objects are in non-linear regimes, to complete our discussion on formation of universe, we need to go beyond the perturbation growth in linear and quasi-linear regimes, and address the gravitational collapse of over density and nonlinear regimes.[5-6]

It has often been repeated over the last century that the merit of a galaxy classification scheme can be measured by its ability to track evolutionary pathways. As noted earlier, the changing, luminosity-weighted, mean age of the stellar population along the Jeans-unmark- Hubble sequence was routinely heralded as a success of this classification scheme, an evolutionary pathway from right to left along the tuning fork, was not correct. Although this study has focussed on the morphological classification of galaxies, it is insightful to review some of the relevant developments pursuing a kinematic classification. As noted previously, the prevalence of discs in ETGs has taken a remarkably long time to be realised. Indeed, most, if not all, relaxed E4 to E6/E7 galaxies are misclassified S0 galaxies.

Thus, it could be a different way of evolutionary sequence. The Universe is big. The observable portion of the Universe may contain in excess of 1011 galaxies, notably higher than the, at the time impressive, figure of nearly one million galaxies circa 1930.[2-4]

The dramatic increase in galaxy sample sizes since the early 1900s has resulted in an explosion of data and catalogues that all too often is not matched by the human resources required to fully analyse it. This inability to classify every galaxy using the ways of the past,

i.e. visual inspection, could potentially undermine the current classification scheme. Indeed, there have been calls to replace galaxy morphological types with quantitative metrics that machines can quickly calculate. This final subsection serves to acknowledge the merits of such a suggestion based on robust non-degenerate metrics, and to briefly note how the community is moving forward on this front while still embracing key elements seen in both the tuning fork and the galaxy morphology classification grid.[7]

II. CONCLUSION

Thus, we conclude that galaxy classification may not be according to tunning fork morphological classification. It could be merging of or mixing of two different type of galaxies may be including spiral or bared spiral galaxies. Galaxies we can say anything about origin of universe Inflation + hot Big Bang.

REFERENCES

[1] Galaxy formation and Evolution, Houjun Mo, Frank Van den Bosch, Simon White. Cambridge University Press.
[2] Alister W Graham Manrs (2019)
[3] N. Werner. B. R. McNamara, E. Churazov, E. Scannapieco Astrophysics of galaxies 2018
[4] Alessandro Boselli Alessandro Boselli and Giuseppe Gavazzi 2006 PASP 118 517
[5] R. C. Brüns and P. Kroupa Astronomy & Astrophysics 547, A65 (2012)

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[6] Joel Almedia Natural Science 16, 6 (2024)
[7] M. Bernardi, A. Meert,V. Vikram,M. Huertas-Company, S. Mei, F. Shankar and R. K. Sheth MNRAS 443, 874–897 (2014)