



Astronomy & Astrophysics : An Introductory Survey

A lecture series by Prof. G. Srinivasan

A 'Golden Jubilee Celebration' Event of the Astronomical Society of India



Lecture 9 : Spiral Structure of Galaxies

Nearly 60% of the galaxies in the present universe have well defined spiral arms. Recently formed clusters of massive stars, as well as giant molecular clouds, are closely associated with these spiral arms. In the 1960s, an important idea was advanced concerning the nature of these spiral patterns, namely, that they represent the maxima of a 'density wave'.

The spiral arms of the galaxies are regions of higher density and move around the galaxy more slowly than the individual stars and interstellar material. This is similar to a slow-moving truck driving down a fast lane and causing a 'slowly moving' traffic jam. The density of the cars behind the truck would be high and this region of high density will move with the truck. While the traffic jam behind the truck remains a feature that slowly moves forward, the individual cars involved in the jam are constantly changing. As one car manages to overtake the truck, another will come up from behind to take its place. The traffic jam remains, even though individual cars are only involved in it for a short period of time.

This lecture explains how the beautiful spiral patterns are generated in the galaxies much in the same way as the above-mentioned traffic jam.

For the curious -

P. O. Lindblad, 1960, Stockholms observatoriums annaler, **21**(4)

C. C. Lin & F. H. Shu, 1964, Astrophysical Journal, **140**, 646

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