

# **Spiral Galaxies : the Spiral Track of Gravitational Points**

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**SUMMARY.** Recent observations show that merging galaxies usually result in a disc structure. The reason for that is explained by the Merging Theory.

## **INTRODUCTION.**

In 2014 observations of radio telescopes showed that mergers of galaxies usually result in the shape of a disc [1].

Before that, there was a general scientific agreement that galactic mergers will result in elliptical galaxies, not in discs.

What's the reason for this surprising result?

Each galaxy has got a peculiar motion. This movement will be constant in a certain straight direction as long as no force from outside will act upon the galaxy. The higher the velocity and the higher the mass of a galaxy, the higher will be the linear momentum of this galaxy.

Let's regard two galaxies approaching in a single plane of two dimensions.

For better imagination we suppose the total mass of each galaxy being united in its very centre as a mass point or gravitational point. Each galaxy has got a mass of about the same quantity.

We imagine the straight movement of the gravitational points of both galaxies being parallel to each other, in the beginning, and into opposite direction.

## **APPROACHING OF GRAVITATIONAL POINTS.**

While approaching both galaxies will interact by gravity. The more the distance will decrease the more the gravity will increase, more precisely by the square of decreasing distance. The gravitational points will be attracted by each other, therefore the tracks of the galaxies will converge instead of being parallel.

Two galaxies at high speed and great distance will bend their tracks at a certain degree, but after passing each other the distance will increase again. This will result in a momentary approach without any merger.

On the other side, if velocity and distance of the approaching gravitational points are low enough, merger will happen. The gravitational force towards each other will exceed the inertial force of the linear momentum, and the flight paths of the gravitational points will get closer by passing each other, resulting in the merger of both galaxies.

The gravitational points will not collide. Because of the conservation of the original linear momentum, the gravitational force towards the other gravitational point will be modified by the linear momentum, acting as a vector into the direction of present movement. This interaction of forces will cause the gravitational points to pass each other.

As soon as the gravitational force is exceeding the linear momentum, the distance of the gravitational points will decrease continuously.

The result of two gravitational points passing each other at continuously decreasing distance will be a double spiral figure.

## **CONCLUSION. DISCUSSION.**

Thus two gravitational points of merging galaxies are bound to build a double spiral figure which is forming the framework of the future spiral galaxy.

**This way also the galactic disc is determined** in the plane of the spiral, consisting of stars and gas and dust.

The details about the development of a galactic disc from a galactic merger, and about the development of a permanent spiral galaxy starting from a merger disc are described by the so-called Merging Theory in 2013 [2].

A complete theory of galactic mergers has to take into account that galaxies usually do not meet in parallel tracks nor in a single plane of two dimensions.

The Merging Theory describes galaxies approaching in the three dimensions of space, in any direction whatever, at different velocities and masses.

Step by step a spiral galaxy will develop from the merger disc and from the spiral tracks of the very cores of precursor galaxies. Each stage is supported by real examples of early galaxies. Also the reason is shown for symmetrical and regular spiral arms, in despite of different masses of precursor galaxies.

The plane of the disc will be a compromise between the flight paths of the precursor galaxies.

In summary the observations of merger discs [1] are the bearing out of the Merging Theory [2].

## **REFERENCES.**

[1] Ueda J et al 2014 ApJS 214 1

[2] Westenberger W 2013 Spiral Galaxies: Origin by Gravitational Vectors. Merging Theory.  
[www.vixra.org/abs/1311.0122](http://www.vixra.org/abs/1311.0122)