



**Beginning of the  
Milky Way**

**GURJASHAN SINGH BHANDAL**

## Beginning of Milky Way

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# Beginning of the Milky Way

Gurjashan Singh Bhandal



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## ABOUT THE AUTHOR

Author, Gurjashan Singh Bhandal, a numismatist, was born in Chandigarh, Punjab, India. He is presently studying (2015) in Guru Nanak Public School Chandigarh. His dream is to provide free educational books and eBooks to crack entrance exams in India, written by him. Right now he is planning to write lessons from religious book for bringing transformation in life.

## ABOUT THE BOOK

This book includes the brief introduction about the Milky Way galaxy and our solar system. After reading the book you will know about each and every planet along with their moons, the sun, constellations of stars, lunar vehicles and how to make your own telescope.

The book includes fewer photographs which will let the reader think how it would be and the only things which are difficult to think are having photographs. The book will increase both your tendency to think and will increase your knowledge.

## DEDICATION

The book is dedicated to my father Jorawer Singh Bhandal and my maternal grandfather Sarjit Singh Saggu.





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## TOPIC 1

### **D**iscovery, **F**ormation and **V**isibility

The Milky Way is a very immense and interesting place which is home of our planet Earth and the birthplace of humanity.

Millions of years back the mass of The Milky Way was very large, large enough that it used to spin quickly and relatively due to molecular interaction and this led to the conservation of the angular momentum.

Thus, the body collapsed from roughly spherical shape to disc known as the Milky Way.

Most of the astronomers thought that the Milky Way contained all the stars, but Edwin Hubble- an American astronomer, showed The Milky Way was one of many galaxies.

Let's understand how large our Milky Way is. Imagine that White House is of the size of our earth, then whole U.S.A will be about the size of our solar system and our solar system is about the size of the Milky Way where 98 percent of the mass of U.S.A is a sun and left 2 percent is of earth and other planets including their moons. Well, you can now imagine how big the Milky Way is.

The Milky Way forms an arm spiraling shape around its center. From above and below it, it will look like round dish and from edges it will be thin.

We can't view the whole Milky Way from the Earth because we are living in it and only a part of it can be seen directly from naked eyes.

The stars can be clearly viewed and have constellations which are explained in topics later. There are three types of stars in the Milky Way having different temperature. The white and blue stars have very high temperature. Yellow stars have intermediate temperature. Red stars have relatively cool temperature and are also known as Cool Stars.

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The Milky Way wasn't as its today; it reached this size and shape by eating up several galaxies and still eating up.

Many astronomers believe that the center of The Milky Way is a black hole around which bodies are spinning and falling inside it. On Earth, a year is determined by the length of time it takes the planet to orbit the Sun. Every 365 days, we're right back where we started, generally speaking.

It makes sense then that our entire solar system is similarly orbiting the black hole at the center of the Milky Way. It just takes a little longer, to the tune of 250 million years for each rotation. In other words, we've made about a quarter of a single orbit since the dinosaurs died.



## TOPIC 2

### **Myths and Views**

Sumerians were people from southern Mesopotamia, modern day Iraq. They were people from one of the oldest civilization which helped mankind in discovery of wheel and plow. Sumerians had their views about the universe as well. The first recorded attempt to explain the creation of the universe and heavenly bodies was made by Sumerians in the third millennium BC. They visualized the universe as a flat Earth topped by tin vault and above the vault there is a heaven and below the land there is a hell. They thought between Earth and vault there is swirling atmosphere which can't be crossed. According to them the Sun and the Moon were controlled by the Gods.

Hindus thought that all the planets and stars were linked to a dolphin that swims through the water and The Milky Way forms abdomen of the dolphin. Another mythology of Greeks was that when son of Zeus was born, Zeus took him to his divine wife.

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During her sleep Zeus let the baby suckle her milk so that some spiritual powers enter his son. When he did so, his wife pushed the baby away and her milk was spurt which lead to formation of The Milky Way.

## TOPIC 3

### Velocity of the Milky Way

Our galaxy, the Milky Way is spinning at a rate of 225 kilometers per second. In addition the galaxy is travelling through space at the rate of 305 kilometers per second. This means that we are travelling at a total speed of 530 kilometers per second. In a minute we are 19000 kilometers away from the point we were before in space.

We know that moon is revolving around the earth and the earth is revolving around the sun. The sun is also revolving around the center of the Milky Way along with whole solar system. Milky Way is moving too!

The speed of the Milky Way is 1000 times the fastest airplane present on earth (6, 30, 000 meters per second). The Universe is an expanding body and there is apparent motion of galaxies due to this, every galaxy is having its own velocity relative to the average flow and many astronomers believe that The Milky Way is moving with the

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speed of 22, 68, 000 kilometer per hour with respect to local co-moving frame.

We cannot feel that the systems and bodies are moving because we are moving with them for example when sun moves it moves with taking whole solar system with it

## TOPIC 4

### Stars in the Milky Way

A star is a huge ball of gas held together by force of gravity. The central core of star is extremely hot and produces energy. The sun is a yellow star which has a relatively average temperature.

### Giant Star

These are the stars which are bright and hot and even 10 times bigger and 100 times brighter than the sun. Some of the stars are bright and large, but even cooler than the sun. *Antares* is a red giant, which is 500 times larger than the sun.

If the sun is replaced by *Antares* then we would not exist because its size is so huge that it would reach up to the fourth planet, Venus. Moreover, its gravitational field would have been so strong that the planets would be revolving below *Antares*.

## **C**olor **C**hanger **S**tar

The first recognized star which changed its color was *Mira* which means ‘the marvelous’. Once every 11 months *Mira* changes its color and becomes white. There are many stars which change their colors in 1000 days to a few couple of hours. We can also see stars which change their color unpredictably due to sudden explosions.

## **D**ouble **S**tar

These are the stars which are always found in groups or pairs and they are never alone. This is not due to any coincidence, but due to their bonding. The stars have permanent bonds with each other. The maximum number of stars in The Milky Way are double stars. There are stars which, when seen with naked eyes look like a single star, but with the help of a telescope they can be sorted out. *Mizar* is an example of a double star.

## TOPIC 5

### **B**eyond the **B**lack **H**ole

Most of the galaxy whose size is very large have a super massive black hole in their center and The Milky Way is one of them.

The center of the Milky Way is named as *sage-harius*, a massive source of radio waves believed to be a black hole of size as spread as mercury's orbit.

After we exit Milky Way galaxy than we are in local group which include more than 50 galaxies.

A galaxy group has about 50 galaxies bound together by their gravity and a galaxy cluster has 50 to a thousand galaxies bound by gravity.

We live in a country which is part of the earth. The earth is part of the solar system and the solar system is part of the Milky Way. Milky Way is surrounded by millions of galaxies which contain many stars and planets. Also, many astronomers believe that the universe is expanding too.

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