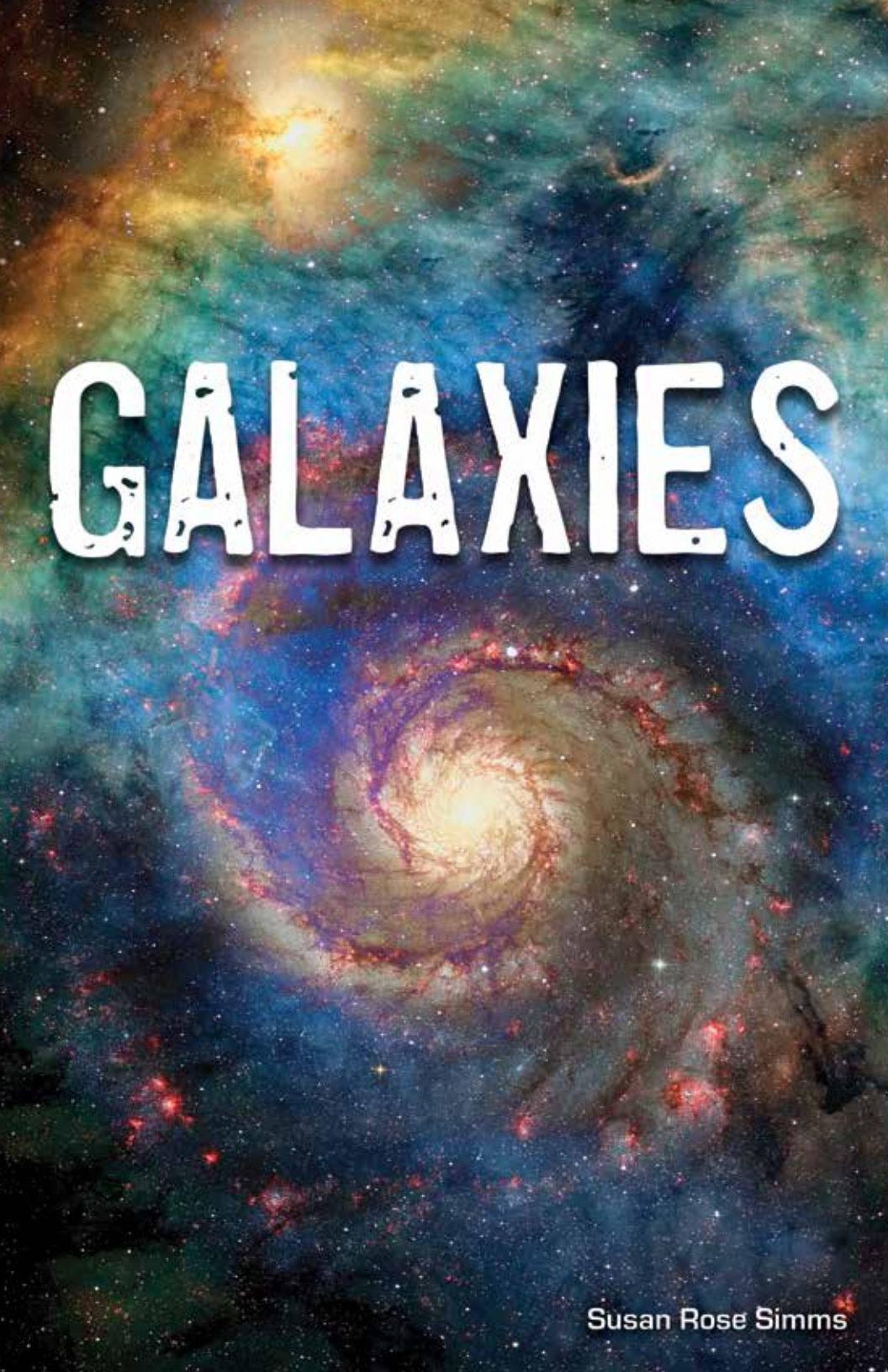
GALAXIES
Susan Rose Simms

# GALAXIES

Susan Rose Simms

high noon books

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CHAPTER 1

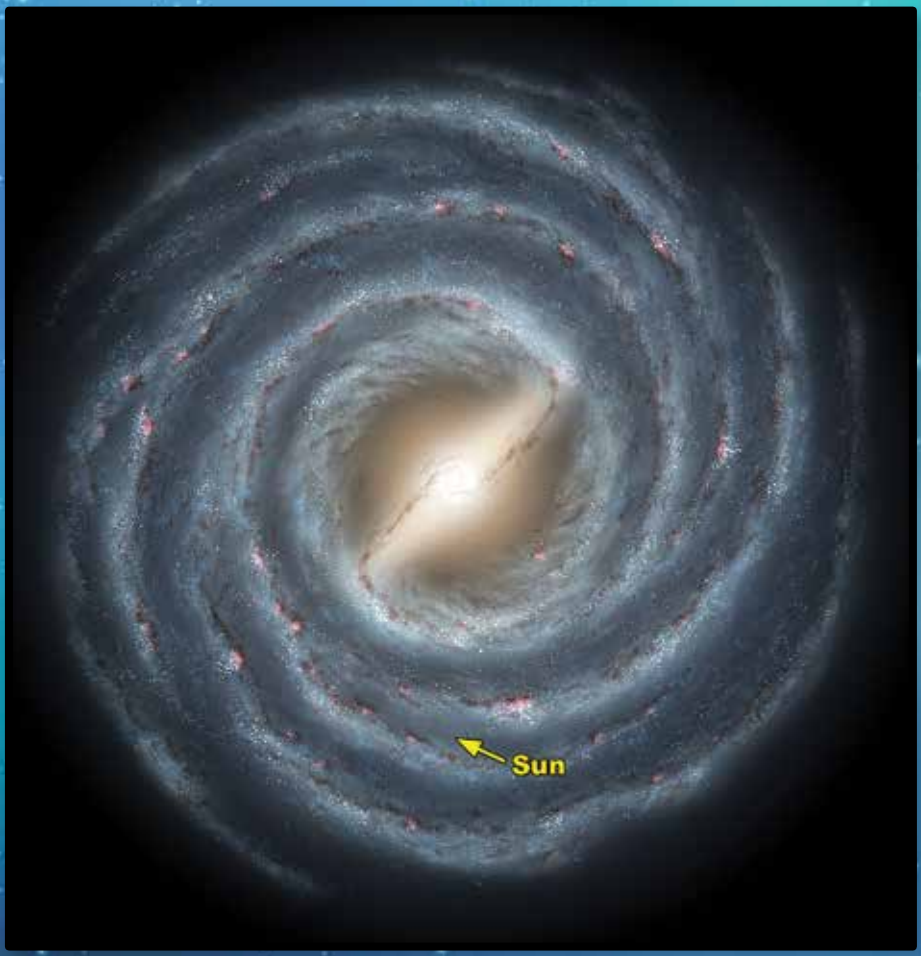
# OUR HOME GALAXY

A **galaxy** is a group of billions of stars, plus dust and gas. There are at least 100 billion galaxies in the universe, but there may be many more.

The Milky Way is the galaxy that contains Earth. Why is it called the Milky Way? The many stars give it a milky look.

*There are billions of stars in the Milky Way Galaxy, seen here from Earth.*

The Milky Way has more than 200 billion stars. Our sun is one of them. The sun is located in the outer part of the Milky Way.




*Our sun and Earth are located in the outer part of the Milky Way.*

The Milky Way is huge! There is a special way to talk about distance in space. Distance is measured in **light-years**.

A light-year is how far a beam of light travels in a year. The distance is about six trillion miles. The whole galaxy may be up to 200,000 light-years across.

*The Milky Way has a spiral shape.*

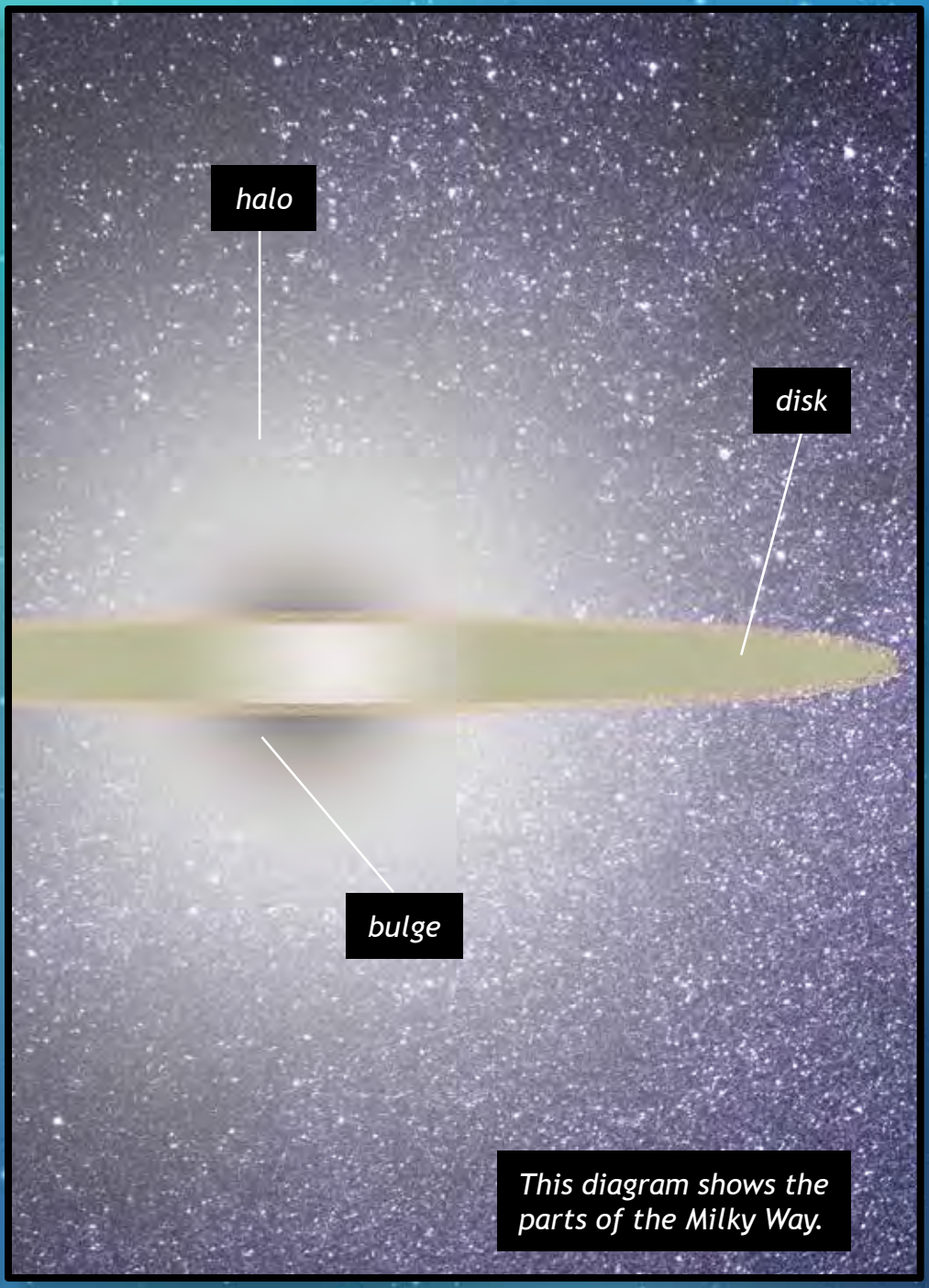
## GALAXY FACT

Galaxies come in many shapes and sizes. The Milky Way is a spiral shape.

Inside the Milky Way, the stars, gas, and dust form a ball shape. It's called a **bulge** (BULJ). It's at the center of the Milky Way.

A round, flat disk of stars circles the bulge. The disk has mostly young, bright stars, gas, and dust. They're set in spiral arms that reach out from the bulge.

The outer part of a galaxy is the **halo** (HAY•loh). The Milky Way's halo contains single stars and groups of old stars.




*This diagram shows the parts of the Milky Way.*

CHAPTER 2

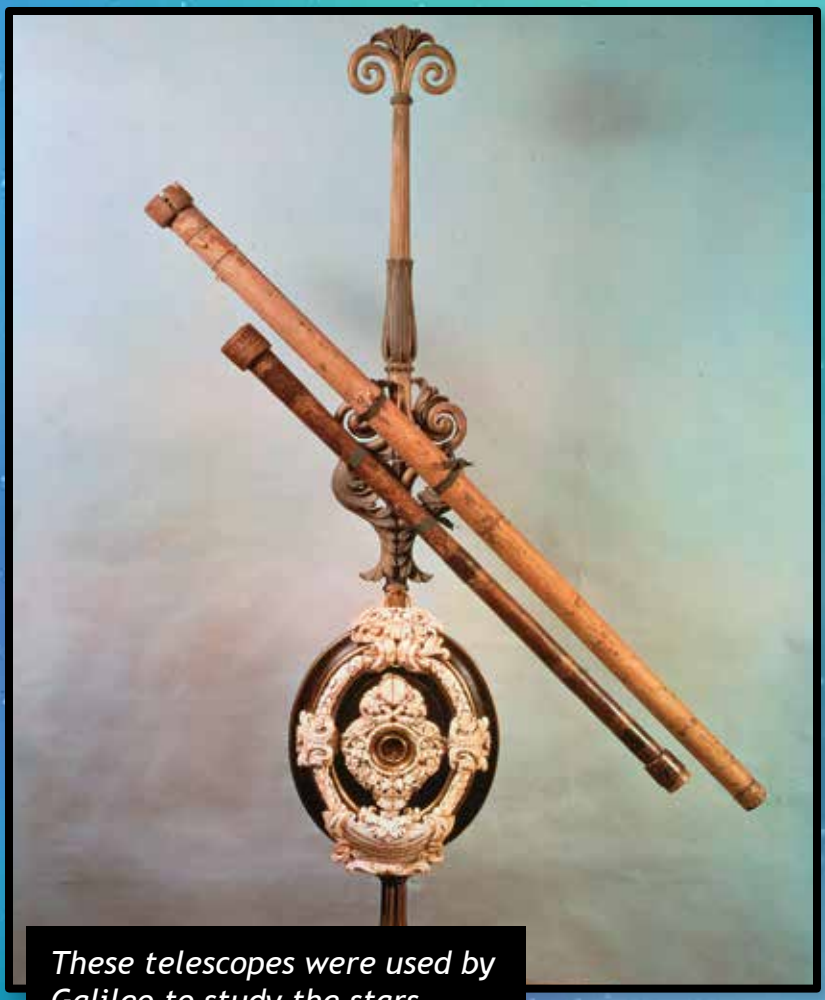
# DISCOVERING GALAXIES

People who study stars, planets, and galaxies are called **astronomers** (uss•TRON•uh•merz). Today, astronomers use powerful computers and cameras to gather information. Long ago, astronomers didn't have these.

*Early astronomers used this tool to model the movements of objects in the sky.*

*The astrolabe was used by early astronomers. It measured how high the sun and stars were in the sky.*

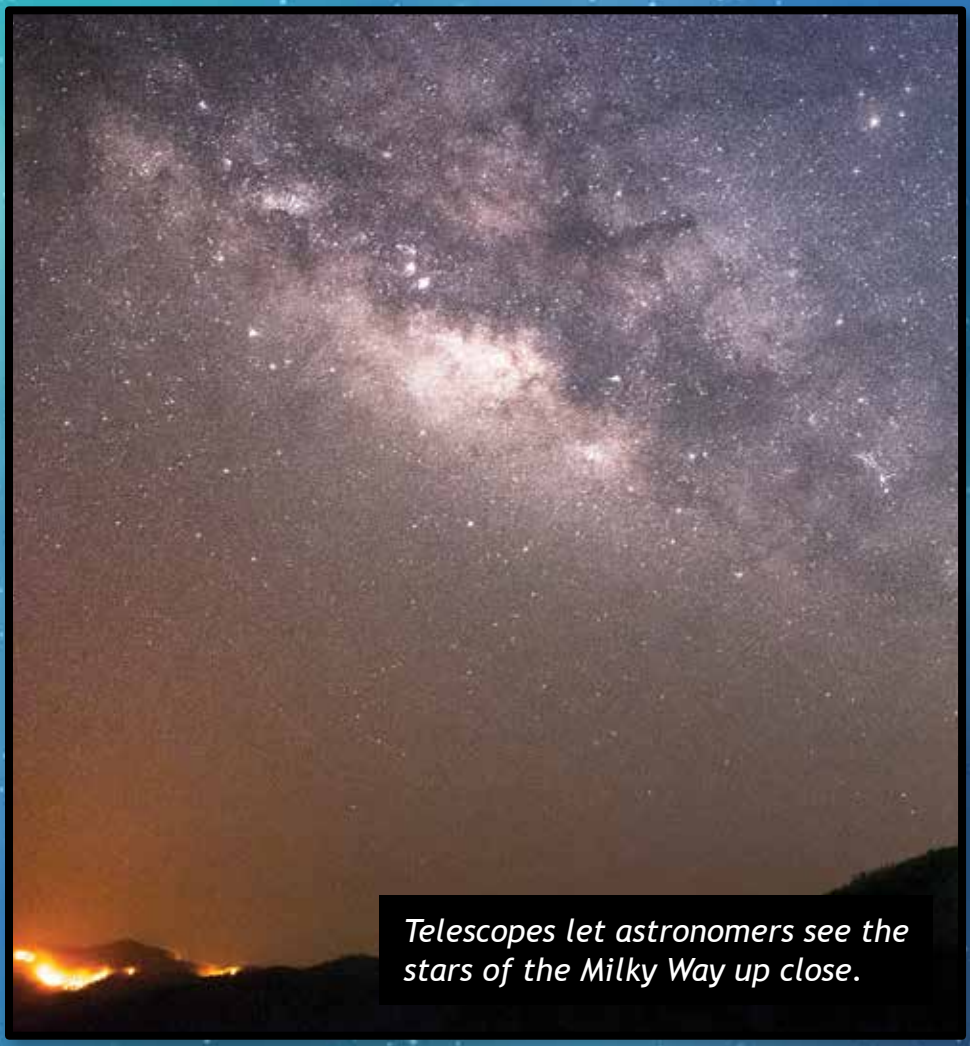
Early astronomers had simple tools. They used charts to map the positions of stars in the sky. They had instruments that showed how high the sun, moon, stars, and planets were.



*These telescopes were used by Galileo to study the stars.*

In 1609, the astronomer Galileo (gal•ih•LAY•oh) made a new telescope. It made things look 20 times bigger than before. He could see the stars of the Milky Way.

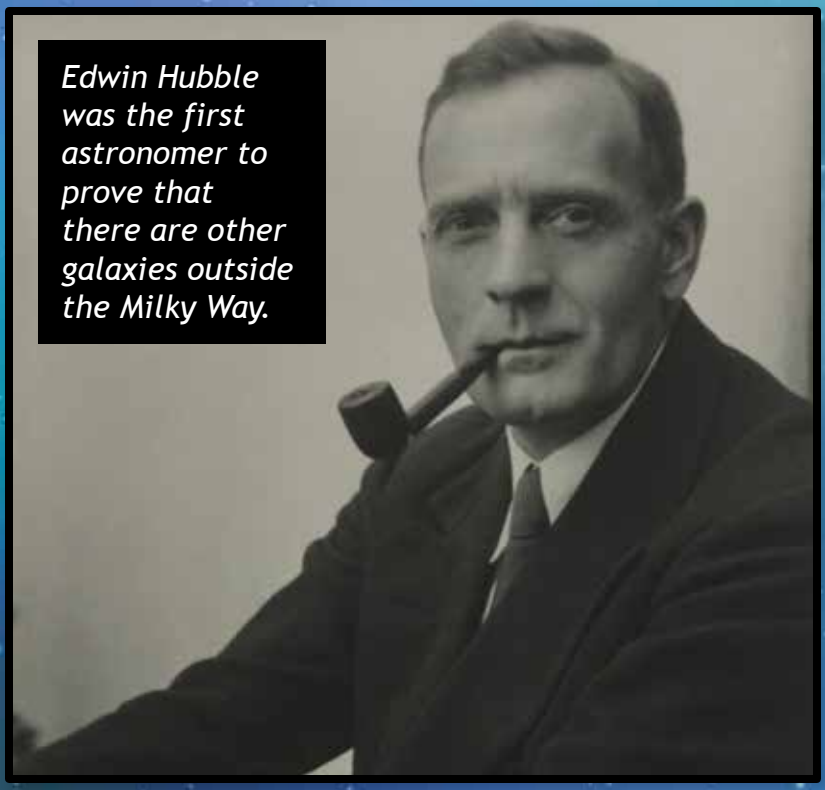
More astronomers studied this group of stars. They also studied planets. They found clues that helped them measure the speed of light.



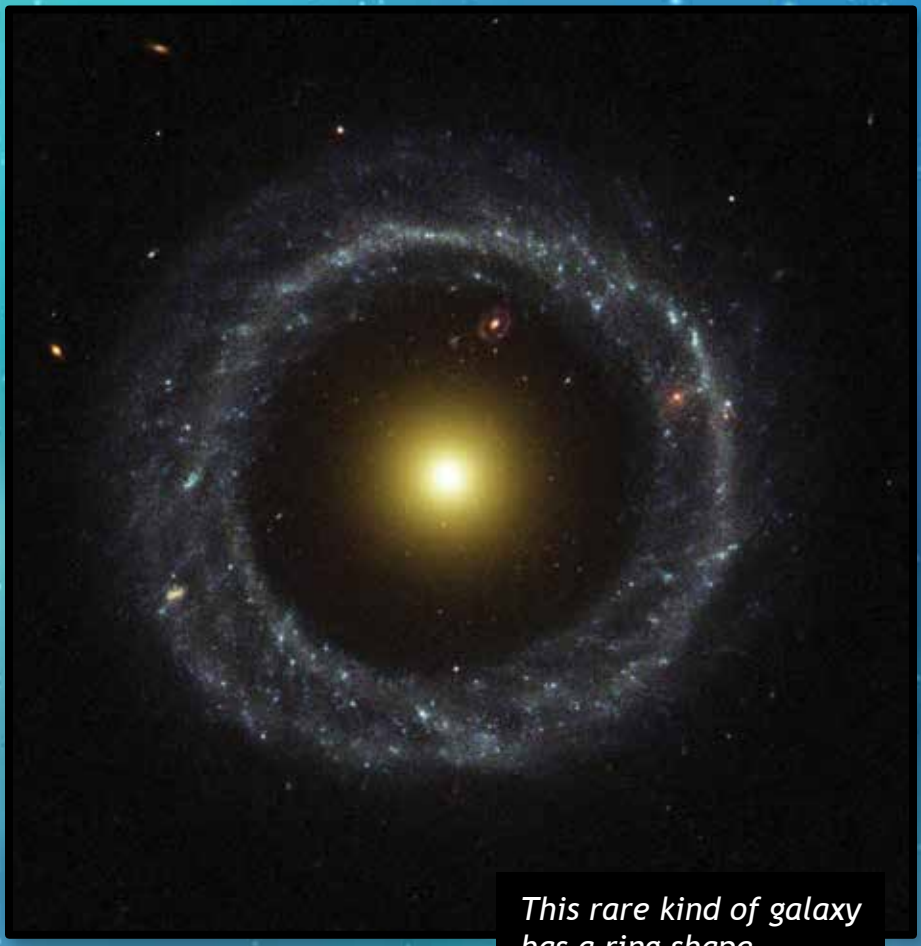
*Telescopes let astronomers see the stars of the Milky Way up close.*

Over hundreds of years, telescopes became even better. Astronomers used them to see more of outer space.

In the 1920s, astronomer Edwin Hubble showed that the universe was growing. He found other galaxies far away. Now astronomers had a better idea of the size of the universe.



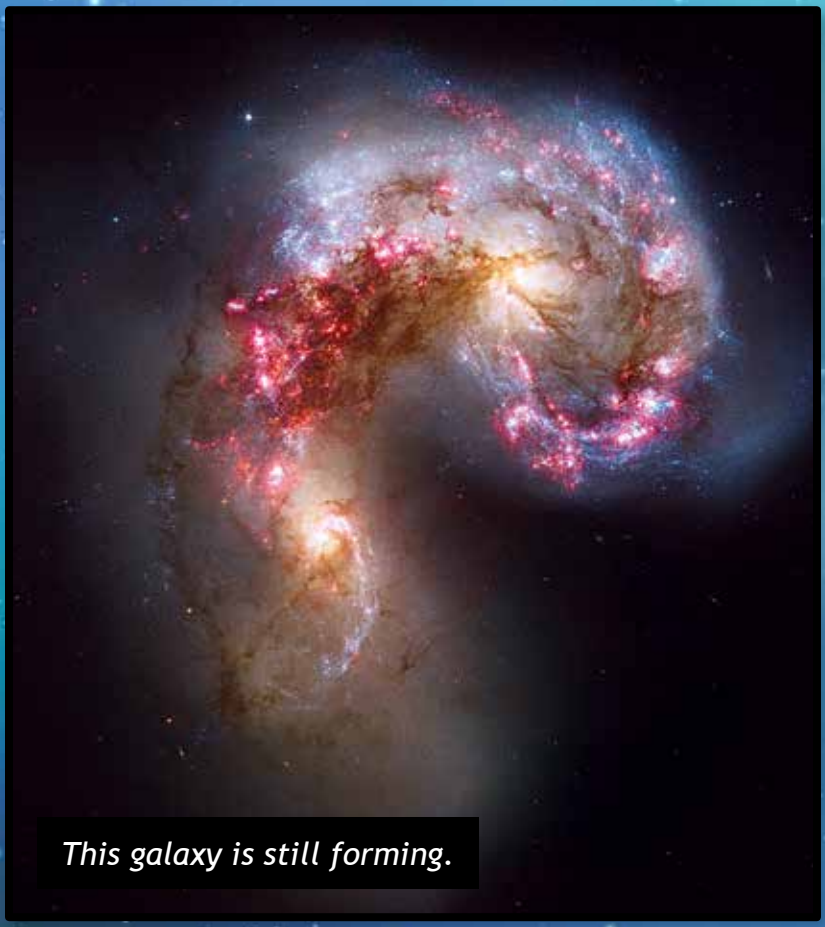
*Edwin Hubble was the first astronomer to prove that there are other galaxies outside the Milky Way.*



*This rare kind of galaxy has a ring shape.*

Galaxies have grown as the universe has aged. Their shapes and sizes have changed. They have moved farther apart. Galaxies have more stars and less gas than they had when they were young.

Early galaxies were large clouds of gas and **dark matter**. Dark matter is a material that has not yet been directly seen by astronomers.



*This galaxy is still forming.*

Astronomers believe dark matter exists, because they can see the effects of its **gravity** (GRAV•ih•tee) in space. Gravity is a force that attracts objects to one another.

*This is an artist's idea of what the Big Bang looked like.*

## GALAXY FACT

Most astronomers use the Big Bang theory to explain how the universe began. They believe the Big Bang happened 13.8 billion years ago. At that time, the universe started as a tiny, thick fireball and exploded outward.