

10.2 Galaxies

- Galaxies are collections of **stars, gas, and dust** held together by gravity.
- Scientists believe there are about **125 billion** of these structures in our universe.



Galaxies

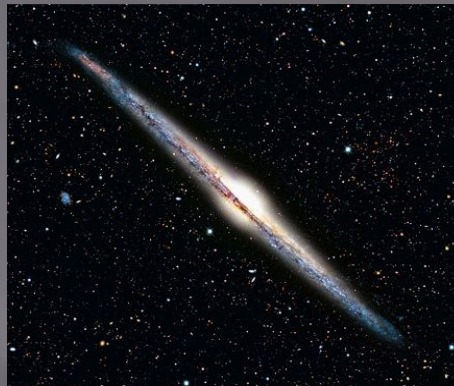
- ▣ There are 3 basic shapes of galaxies: a) **spiral**, b) **elliptical**, c) **irregular**.
- ▣ The **Milky Way** where our sun is located is a spiral galaxy.



Galaxy Shapes

Spiral

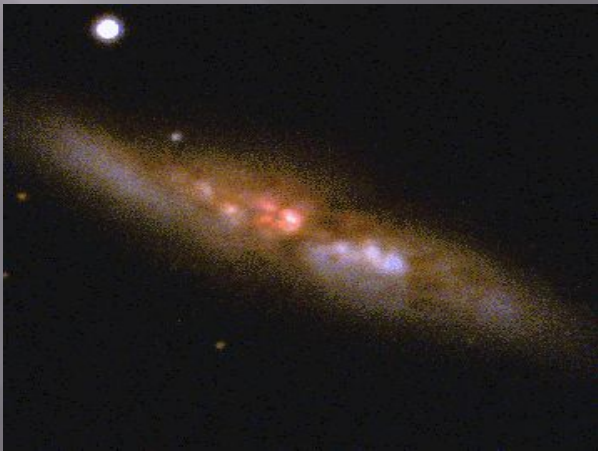
- ▣ These appear like **pinwheels** with many long arms spiralling out from the center.
- ▣ The center bulge is made up of **stars** formed long ago, while the circling disc is made up of **gasses and dust**. This area is called the **“halo.”**



Galaxy Shapes

Elliptical

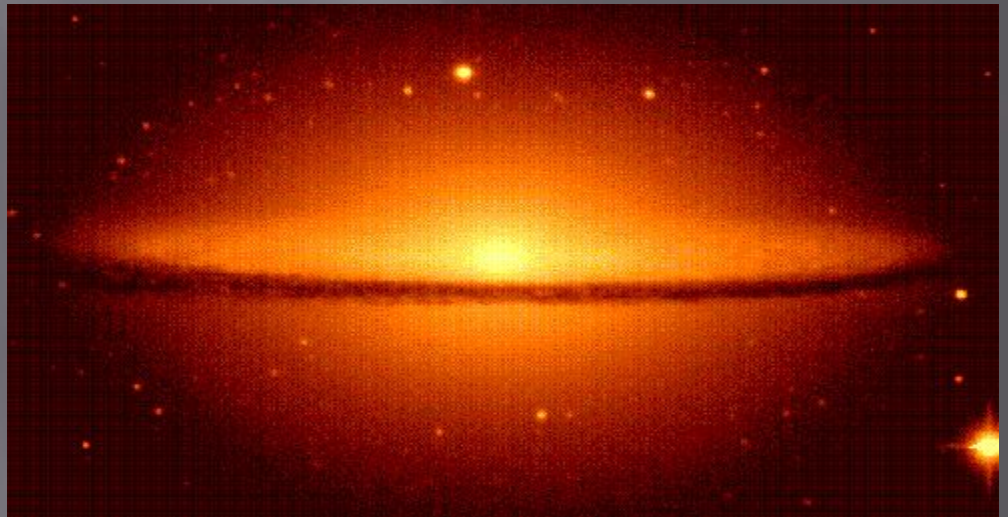
- ▣ These galaxies contain some of the **oldest stars** in the universe. They range in shape from a football field to a cigar.
- ▣ Over **half** of the galaxies are elliptical and many are also the **largest**.



Galaxy Shapes

Irregular

- ▣ These are made up of a mixture of **new** and **old stars**. They **do not** have distinguishing shapes like the elliptical or spiral galaxies.



Other Differences Between Galaxies

Galaxies can also differ in **size, mass, colour, brightness**, and **speed** they spin.

These differences are determined by;

- ✓ *number of stars*
- ✓ *amount and type of gas*
- ✓ *dust*

Some galaxies grow into **supergiants** while others remain **dwarf**.

Star Clusters

One type is called a “**globular cluster.**” These are composed of as many as **one million stars** held together by their mutual gravity in a **spherical shape.**



Star Clusters

The other type is called an “**open cluster.**”
These only contain between a **few hundred**
and **tens of thousands** of stars.



GLOBULAR STAR CLUSTER

Group of tens of thousands to hundreds of thousands of stars

Highly symmetrical ball of stars

Frequently contains bright red giant stars

Located in the halo or bulge of a galaxy

Composed of old stars that formed when the universe was younger

No longer forming in our galaxy, the Milky Way

OPEN STAR CLUSTER

Group of hundreds of stars

Irregularly shaped grouping of stars

Contains bright blue stars

Located in the arms of the Milky Way and other spiral galaxies

Composed of young stars that recently formed in the disks of galaxies

Continues to form in the arms of spiral galaxies, including the Milky Way

Group of stars held together by mutual gravitational attraction

All of its stars are the same age, having formed from the same cloud of gas and dust.

Stars in the cluster are at the same distance from Earth.

The star colors in a cluster indicate the age of the cluster.

Orbits the center of a galaxy