

FYI

Types of Galaxies



Figure 1-7: Image of the spiral galaxy M104 — the Sombrero galaxy—viewed edge-on



Figure 1-8: Image of the spiral galaxy M81—the spiral galaxy in Ursa Major—viewed at a nearly face-on inclination



Figure 1-9: Image of a spiral galaxy, NGC 4013, viewed edge-on

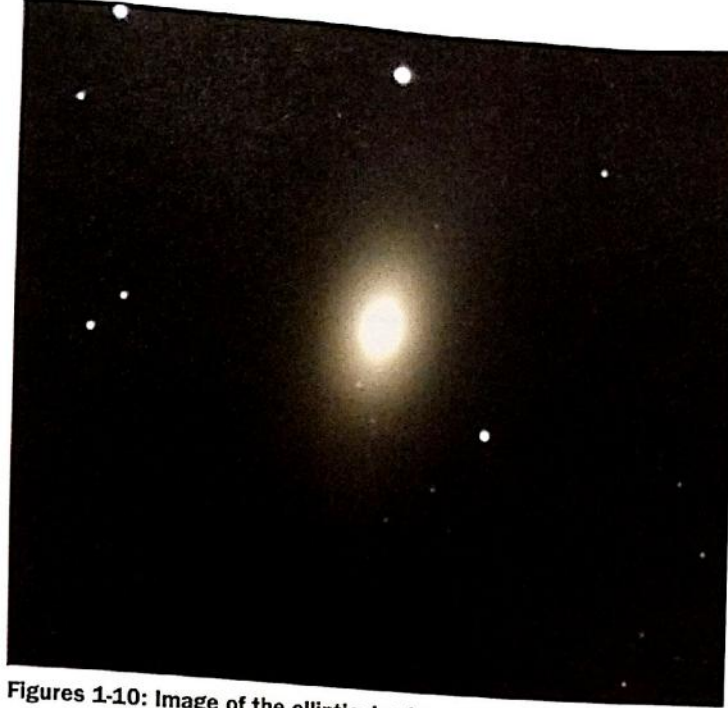
Astronomers classify galaxies into three main types: spiral, elliptical, and irregular. These classifications are based on galaxies' apparent shapes, which may or may not correspond to different ways that they formed—an issue that still remains unclear.

Type 1 — Spiral Galaxies

Spiral galaxies look like flattened disks of gas, dust, and stars with bright central bulges. The entire disk is surrounded by a fainter spherical **halo**.

Many spiral galaxies have visible **spiral arms** that sweep out gracefully from the center of the galaxy. The arms of the disk are mostly made of cool gas and dust, and are the sites of star formation. The bright visible light we can observe from spiral galaxies is mainly produced by stars.

Identifying a spiral galaxy is not always as simple as just observing spiral arms. When spiral galaxies are inclined (tilted with respect to our line of sight) such that we view them from the side, or edge-on (rather than face-on), we cannot see the spiral structure in the arms, but we can see the lane of dust that characteristically runs along the disk. The dust absorbs light from the inner regions of the galaxy, making it appear as a dark band across the galaxy.



Figures 1-10: Image of the elliptical galaxy NGC 4621



Figures 1-11: Image of the elliptical galaxy M87



Figure 1-12: Image of an irregular galaxy, NGC 1427A

Type 2 — Elliptical Galaxies

Elliptical galaxies appear much like the bulge and halo of spiral galaxies. Elliptical galaxies are so named because they are somewhat football shaped, although some appear more spherical. They usually contain very little cooler gas and dust, but can contain substantial amounts of x-ray-emitting hot gas. The lack of cool gas means that there is very little or no ongoing star formation in elliptical galaxies. Therefore, most of the stars in elliptical galaxies are older than those in spiral galaxies; this results in ellipticals having overall redder colors than spirals.

Type 3 — Irregular Galaxies

Galaxies that are neither spiral or elliptical are called **irregular galaxies**. These are more common in the far reaches of the observable universe, leading astronomers to believe that irregular galaxies were more prevalent in the early universe than today.

Some astronomers think that irregular galaxies may be the result of two galaxies having collided with each other, or of one galaxy having been pulled apart by the gravity of other massive galaxies nearby.

Checking In

1. What are common features of all types of galaxies?
2. What are the differences among the three major categories of galaxies?