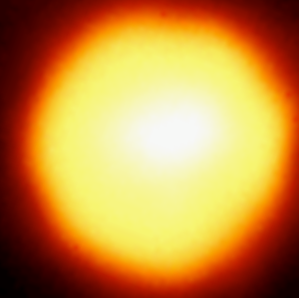


Pluto and Charon

Images used by astronomer Clyde Tombaugh to **discover Pluto**. The left photo was taken six days before the right photo. The background stars appear the same in both photos, but a planet (like **Pluto**, arrows) **moves** relative to those stars.



Pluto was discovered in 1930 and **its largest moon, Charon**, in 1978. Our view of Pluto and Charon has improved greatly over the years thanks to better technology. Pluto and Charon are smeared together in Charon's discovery image from 1978 (below, left), but are well separated in a Hubble Space Telescope view from the 1990s (above).

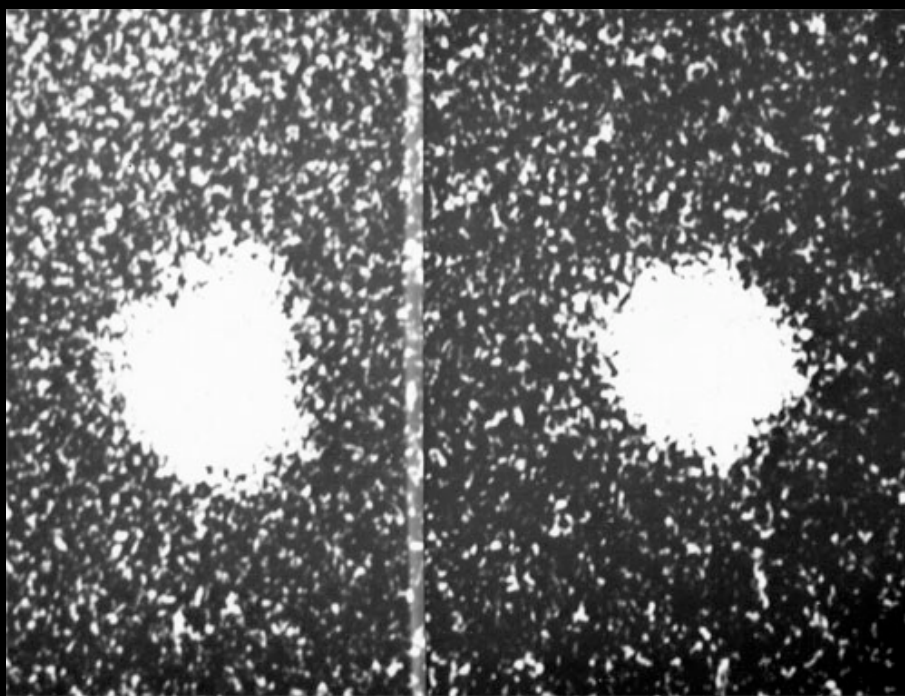


Image credit: R. Albrecht (ESA/ESO), NASA

Pluto has **two smaller moons** (far right) named **Nix** and **Hydra**. *Pluto* They were discovered using the Hubble Space Telescope in 2005.

Image credit: NASA, ESA, H. Weaver (JHU/APL), A. Stern (SwRI), and the Hubble Space Telescope Pluto Companion Search Team



Due to its small size, Pluto is sometimes called a **dwarf planet**. The Pluto-Charon system is also sometimes referred to as a **double planet** because Pluto is only twice the diameter and ten times the mass of Charon. For comparison, Earth is four times the diameter and eighty-one times the mass of the Moon.

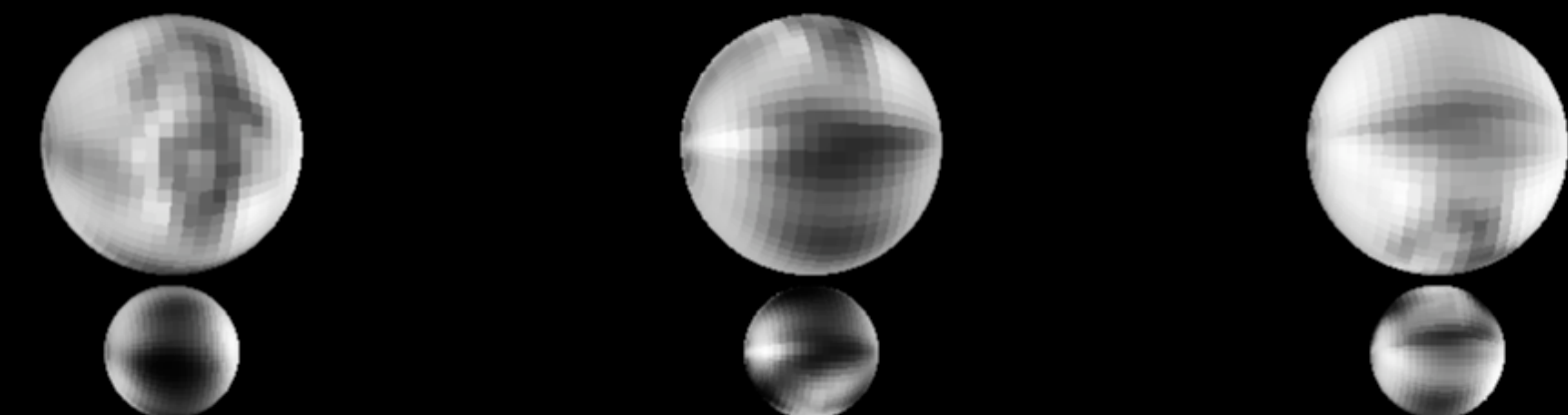
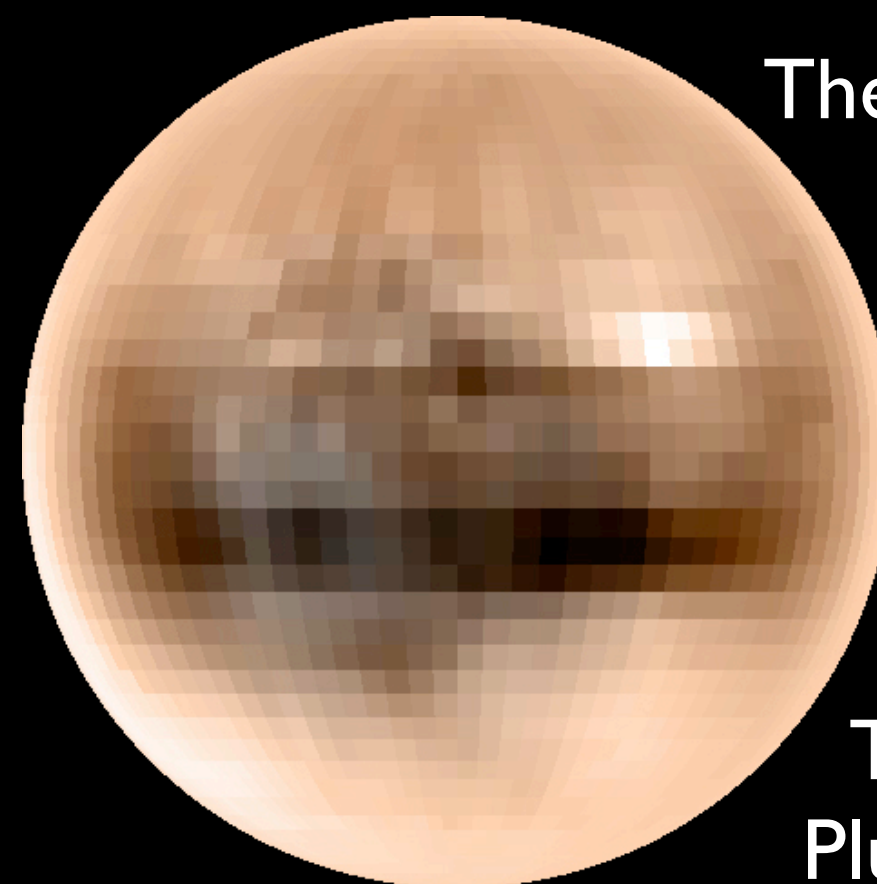
Discovery images of Charon (courtesy USNO). Above left: Charon at maximum apparent separation from Pluto, producing an obvious bulge. Above right: Charon in front of Pluto as seen from Earth, producing no bulge.

1 Plutonian day = 6.39 Earth days

1 Plutonian year = 248 Earth years

*Pluto is one of the largest objects in the **Kuiper belt**, which consists of "icy asteroids" orbiting beyond Neptune. The total mass in the Kuiper belt could be 100 times the total mass in the asteroid belt, but that would still be **considerably less than the mass of the Earth**.*

The images below and at left are the **highest-resolution maps** of the surfaces of Pluto and Charon **available in 2008**.



Images courtesy of Marc W. Buie (Lowell Observatory) and Eliot Young (Southwest Research Institute)

They were made with the **Hubble Space Telescope** by watching Pluto and Charon repeatedly pass in front of each other and then using the resulting changes in brightness to construct surface maps. If you're reading this after 2015, you've hopefully seen better photos of the Pluto system taken by the **New Horizons spacecraft**.

Welcome to a scale model of our solar system. In the model, this circle shows

the **relative size** of the Sun. Look for other panels to the west, each with its own planet.

Can you spot Pluto and Charon silhouetted against the Sun? Their correct sizes and separation in this scale model are shown in the center at left. Nix and Hydra are too small to see at this scale, but they orbit about two and three times farther from Pluto than Charon does.

*Pluto's orbit around the Sun is so elongated that **at times Pluto is closer to the Sun than Neptune**. Its orbit is also highly tilted relative to the other planets. In terms of this scale model where the separations between panels show the relative distances of the planets' orbits around the Sun, Pluto can be found anywhere up to 300 meters above or below ground during its orbit.*