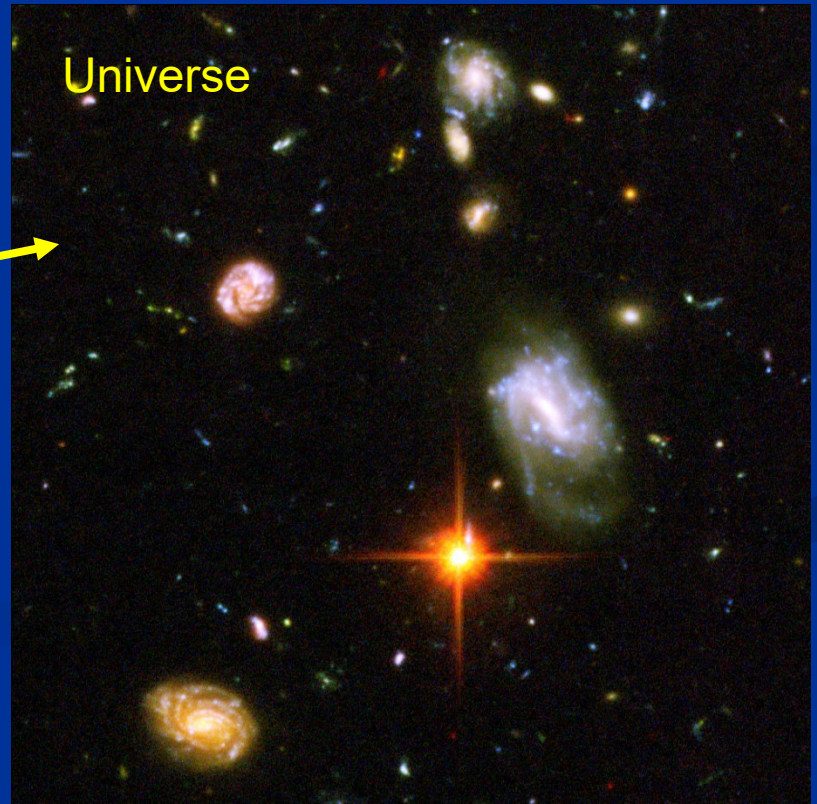
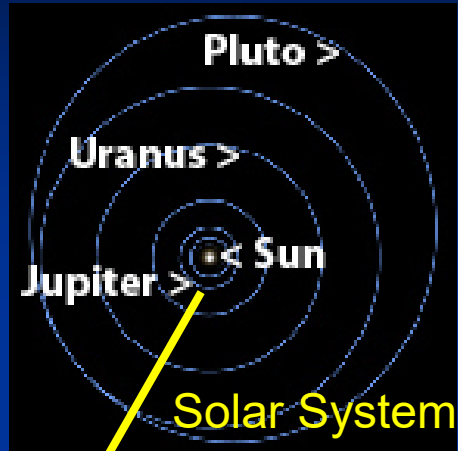


The background of the image is a deep black space filled with numerous bright, multi-colored stars (white, yellow, blue, and orange) of varying sizes and brightness. In the center of the image, there is a prominent, glowing spiral galaxy with a bright yellow and orange core and blueish-purple spiral arms. The overall scene is a rich, detailed representation of a starry universe.

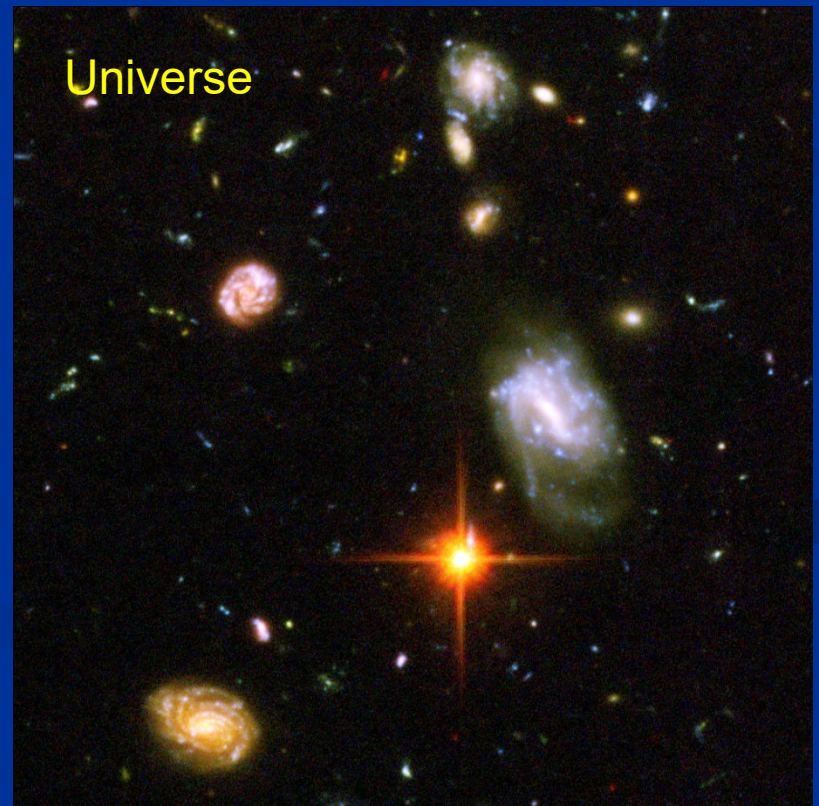
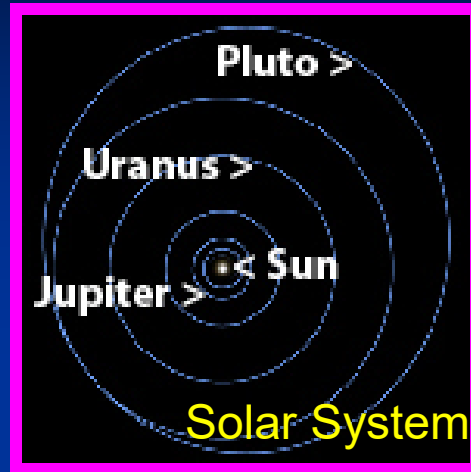
Astronomical!

The Size of the Universe

What's the Difference?

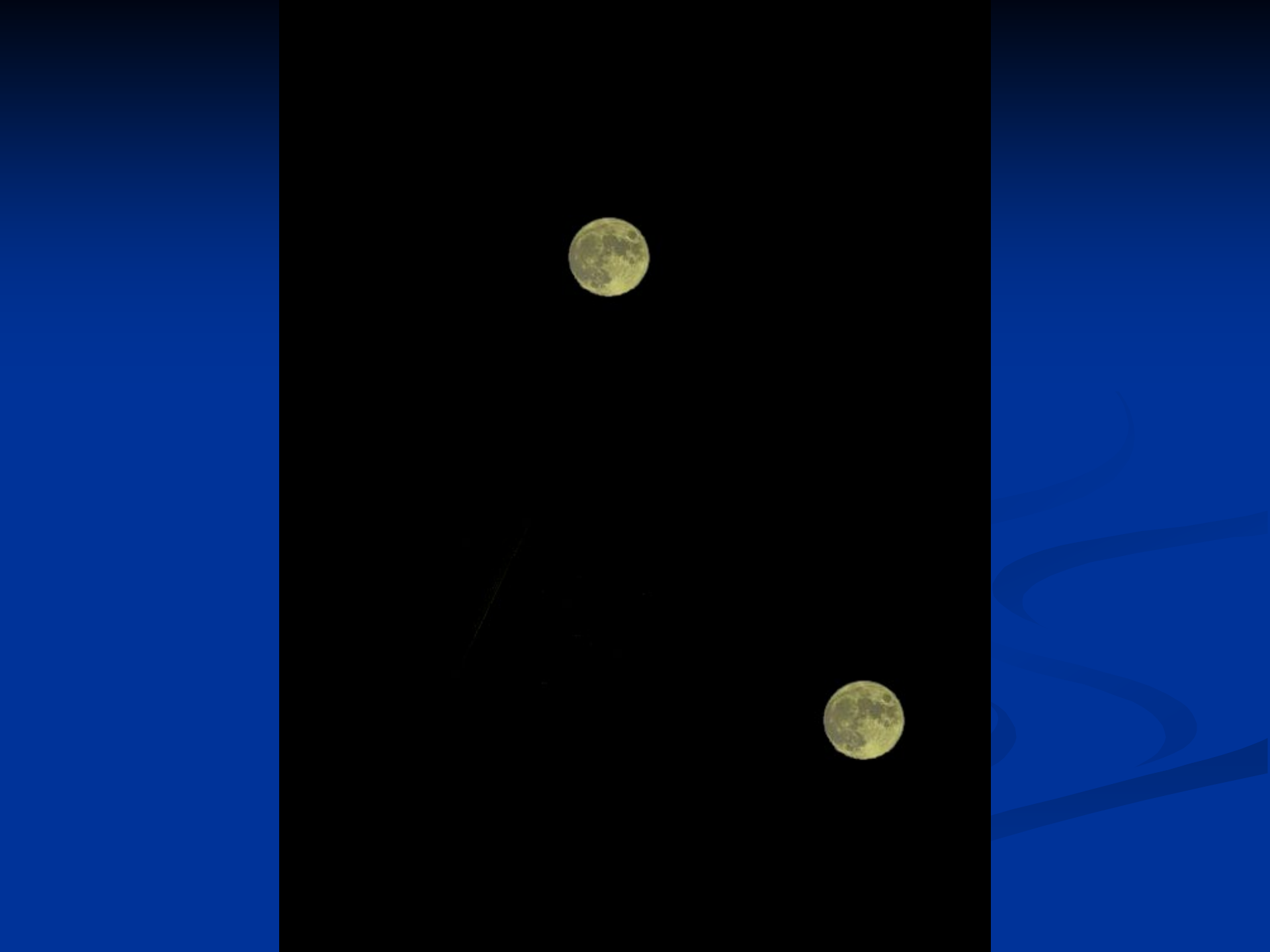


The Solar System

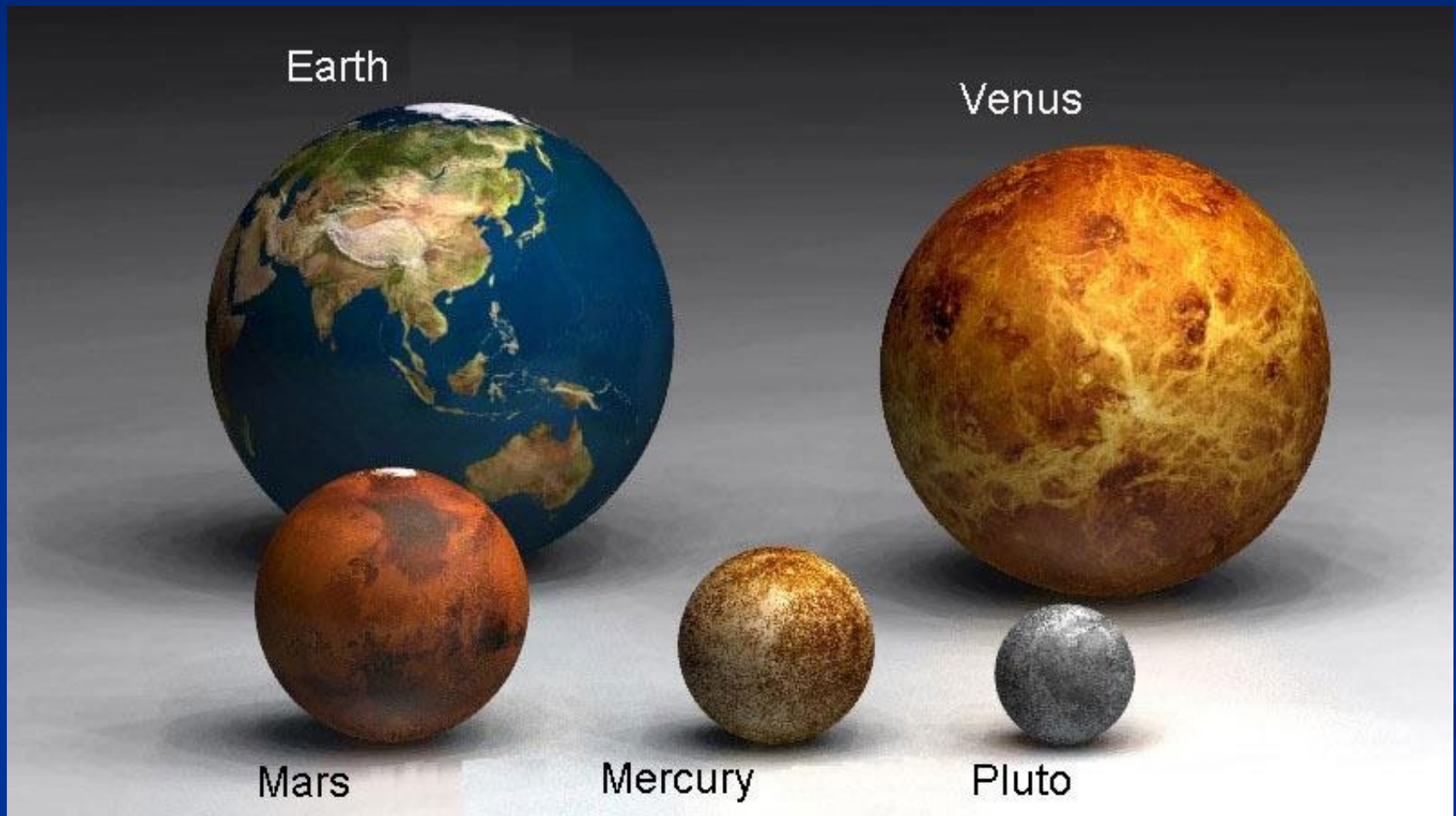




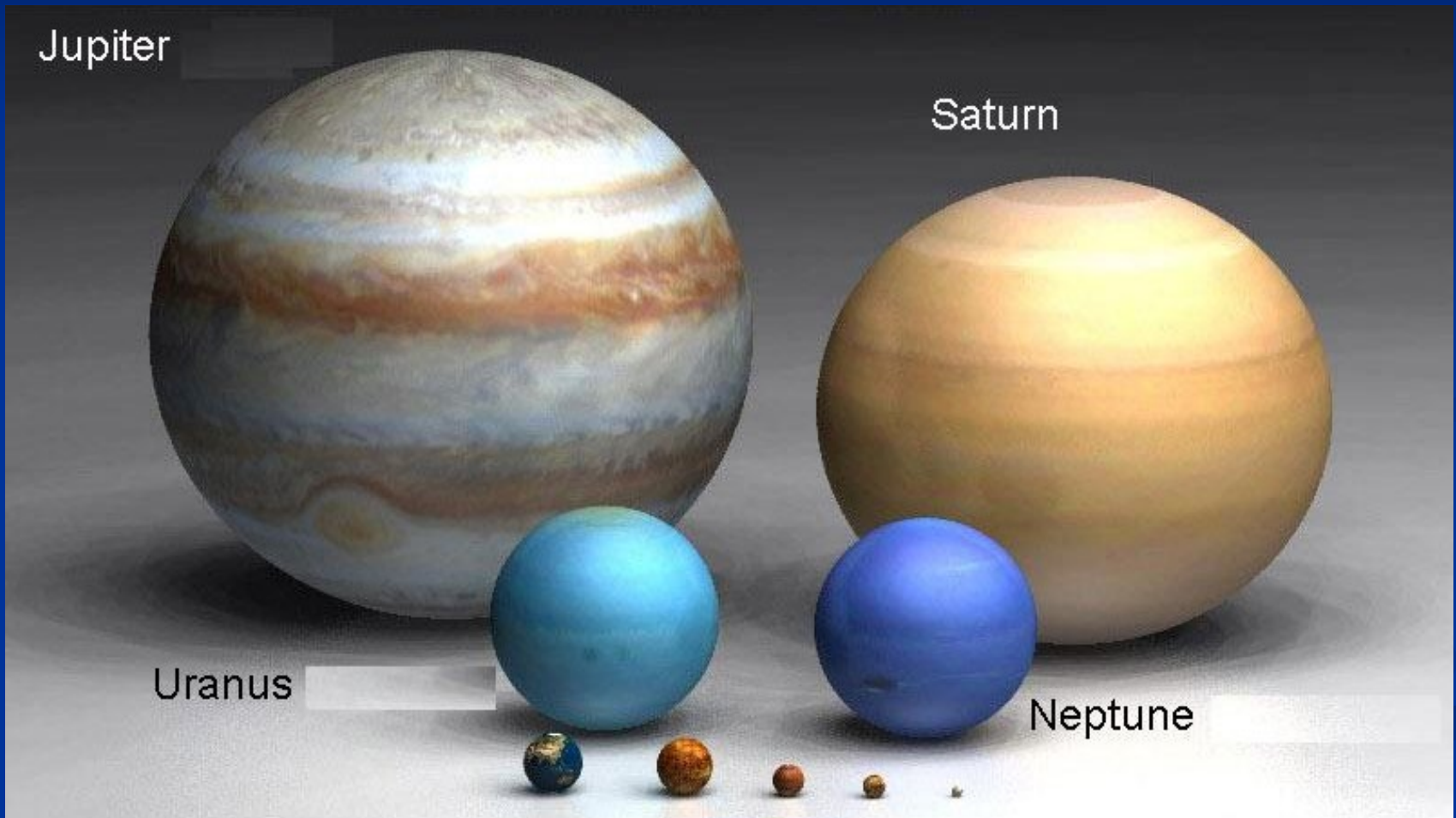




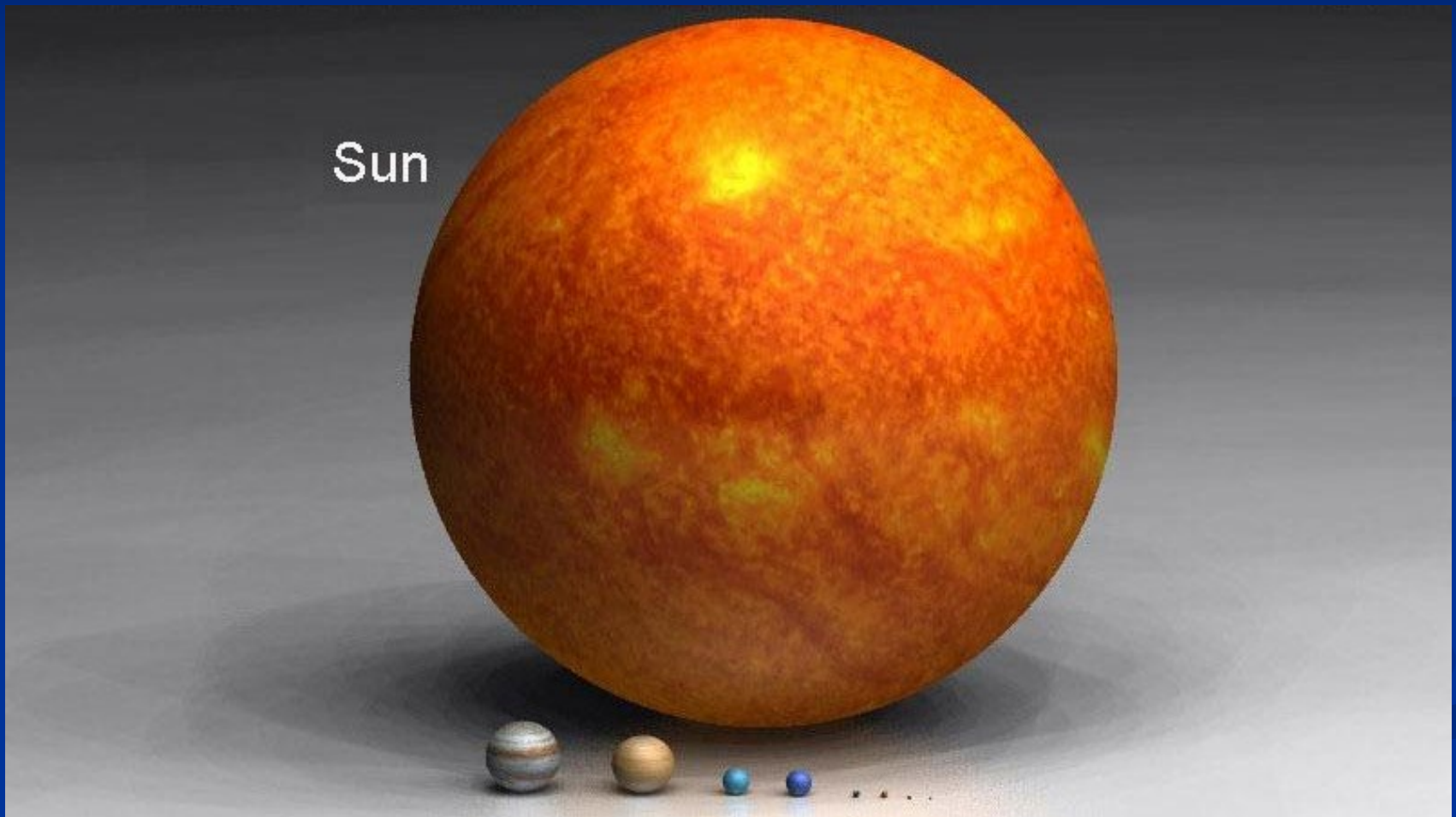
The Size of the Planets



The Size of the Planets



The Size of the Planets





Astronomical Term

Astronomical Unit (AU)

- Mean distance from the Earth to the Sun
- 92,955,807 Miles
- Handy for measuring distances in the Solar System.



Distances in AU

■ Planets

Mercury: 0.387 AU
Venus: 0.723 AU
Earth: 1.000 AU
Mars: 1.524 AU

Jupiter: 5.203 AU
Saturn: 9.582 AU
Uranus: 19.201 AU
Neptune: 30.07 AU

■ Other

Ceres: 2.767 AU
Pluto: 39.53 AU
Eris: 67.958 AU
Sedna: 85 AU

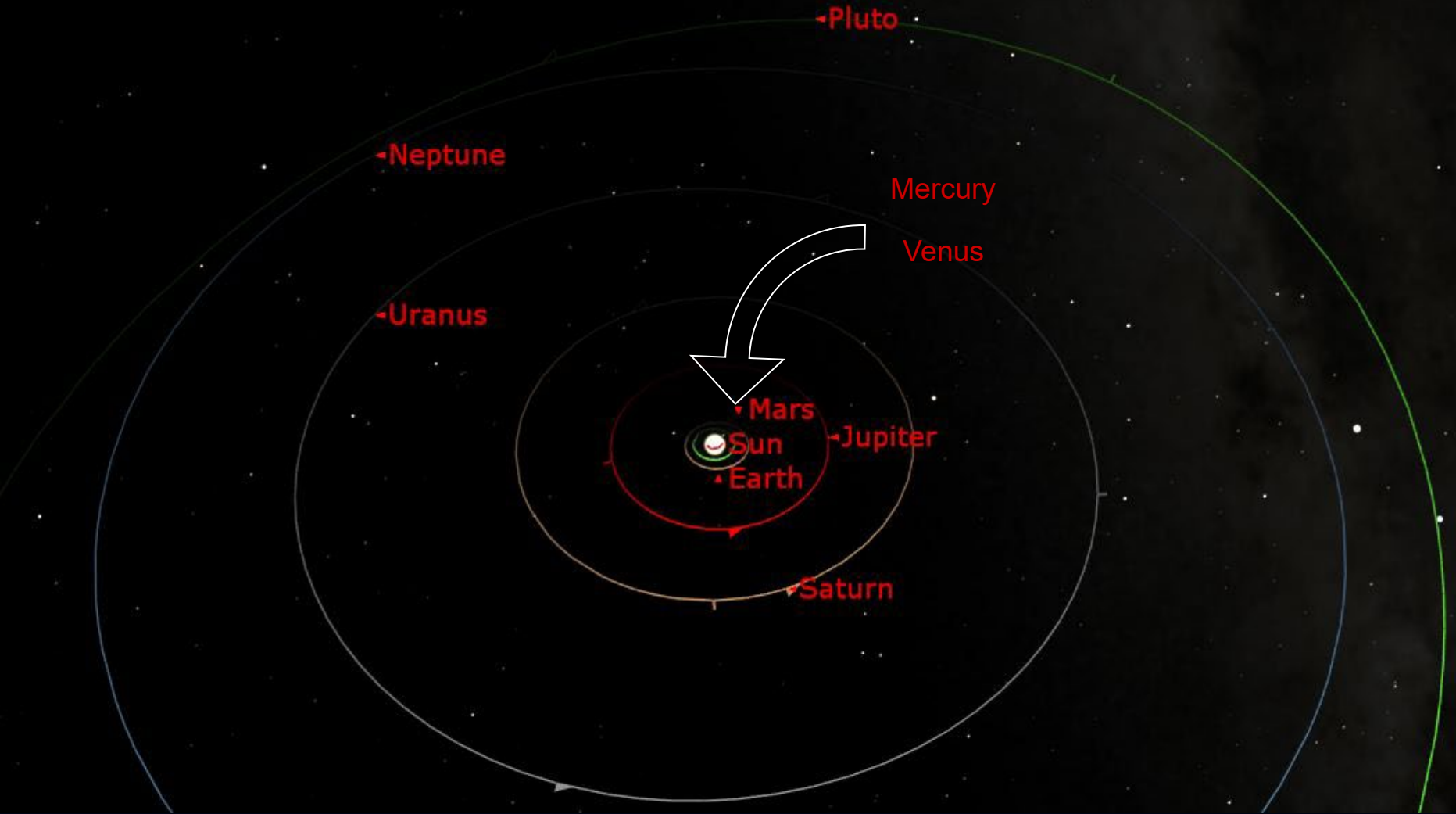


A Boeing 747 Cruising at 550 MPH.

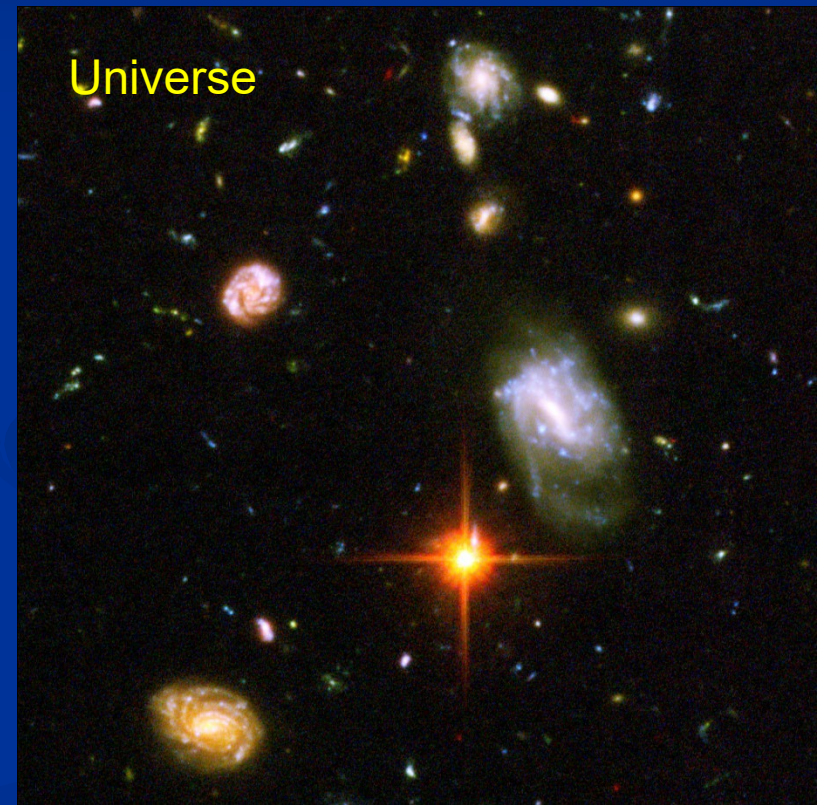
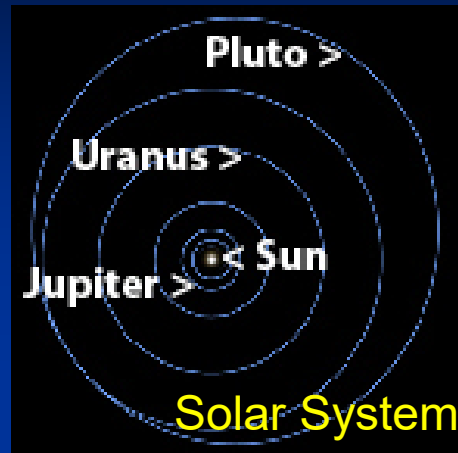
- To travel from San Francisco to New York takes about 6 Hours.
- To travel all of the way around the Earth takes less than 2 days.
- To get from Earth to the Sun would take 18 Years!
- To get from the Sun to Pluto would take 700 Years!
- To get to the nearest star would take 4,718,913 years



Solar System



The Galaxy

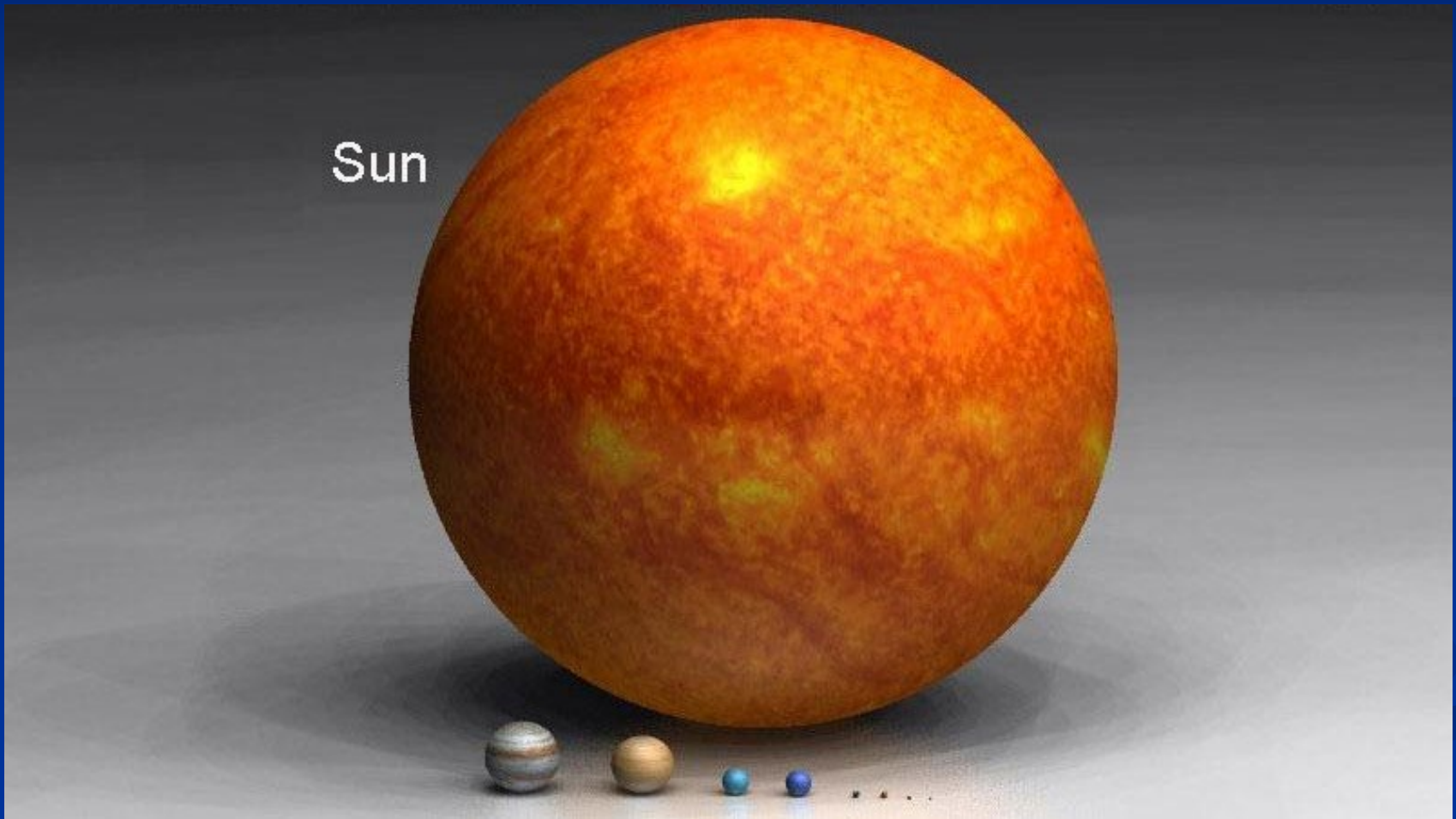


Milky Way Galaxy

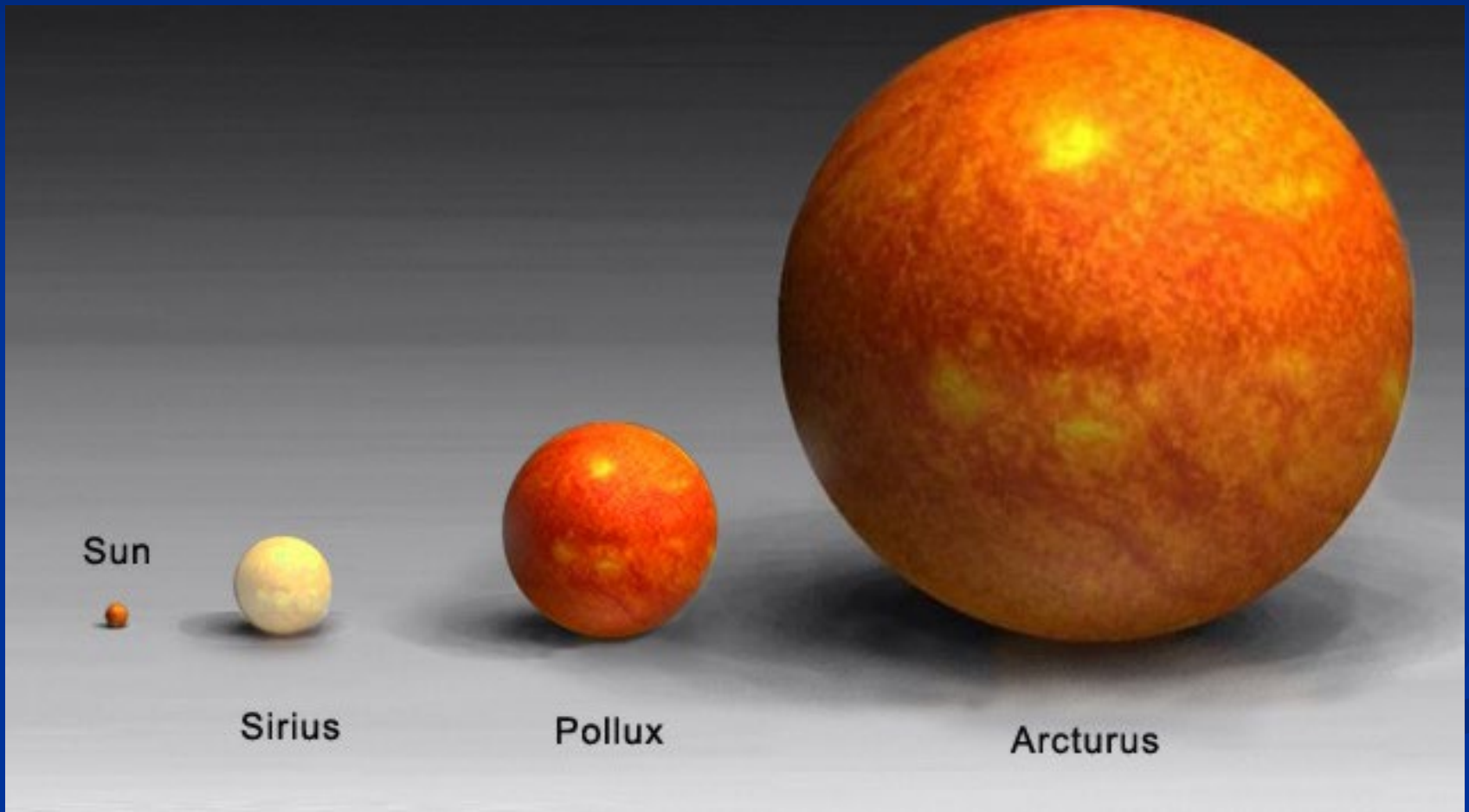




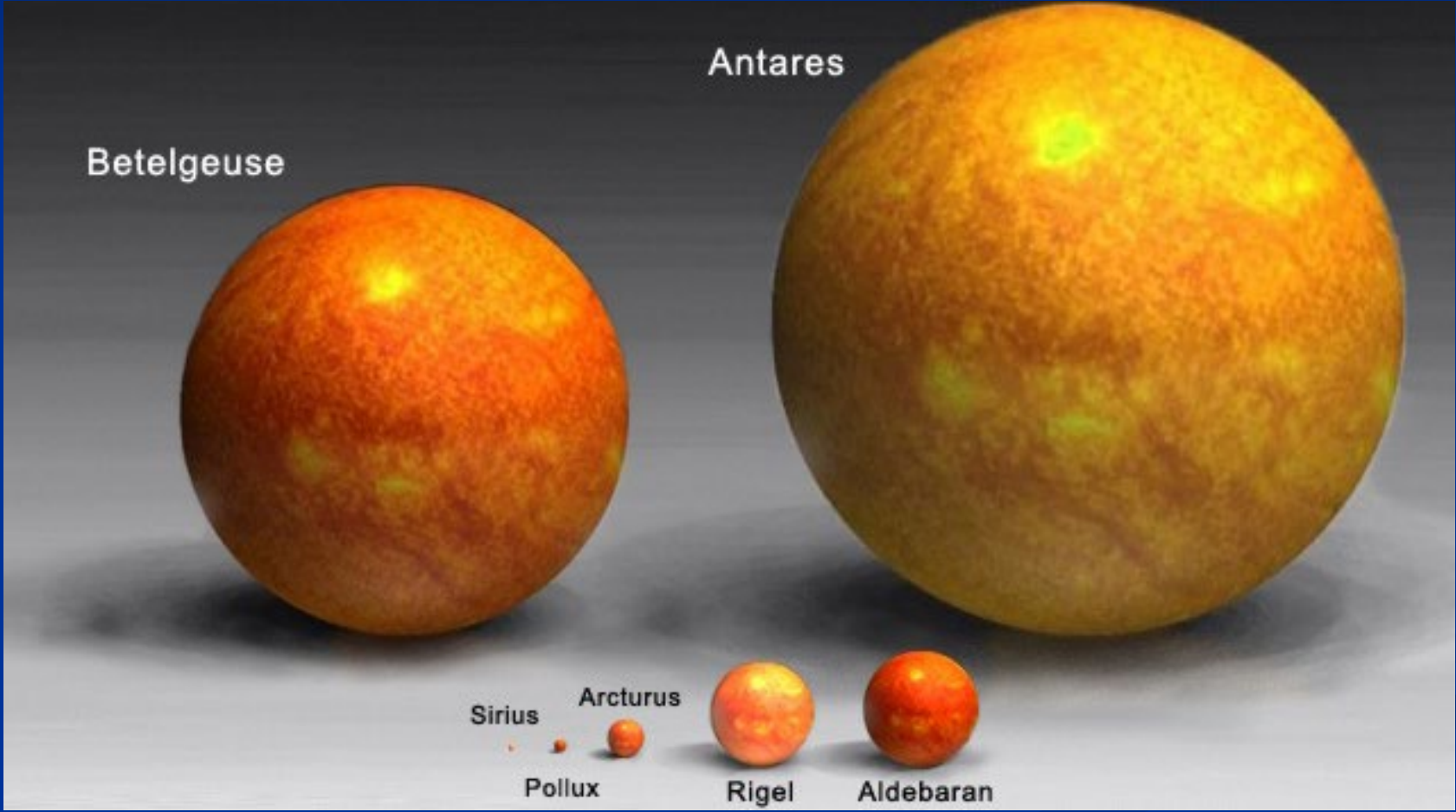
The Size of the Sun



The Size of the Sun



The Size of the Sun



Astronomical Term

Light Year.

- It is a distance measure, not a time measure
- A light year is the distance light travels in one year.
- Light travel at 186,000 Miles Per Second and can go around the world more than 7 times in one second.
- Equal to 63,240 AU.



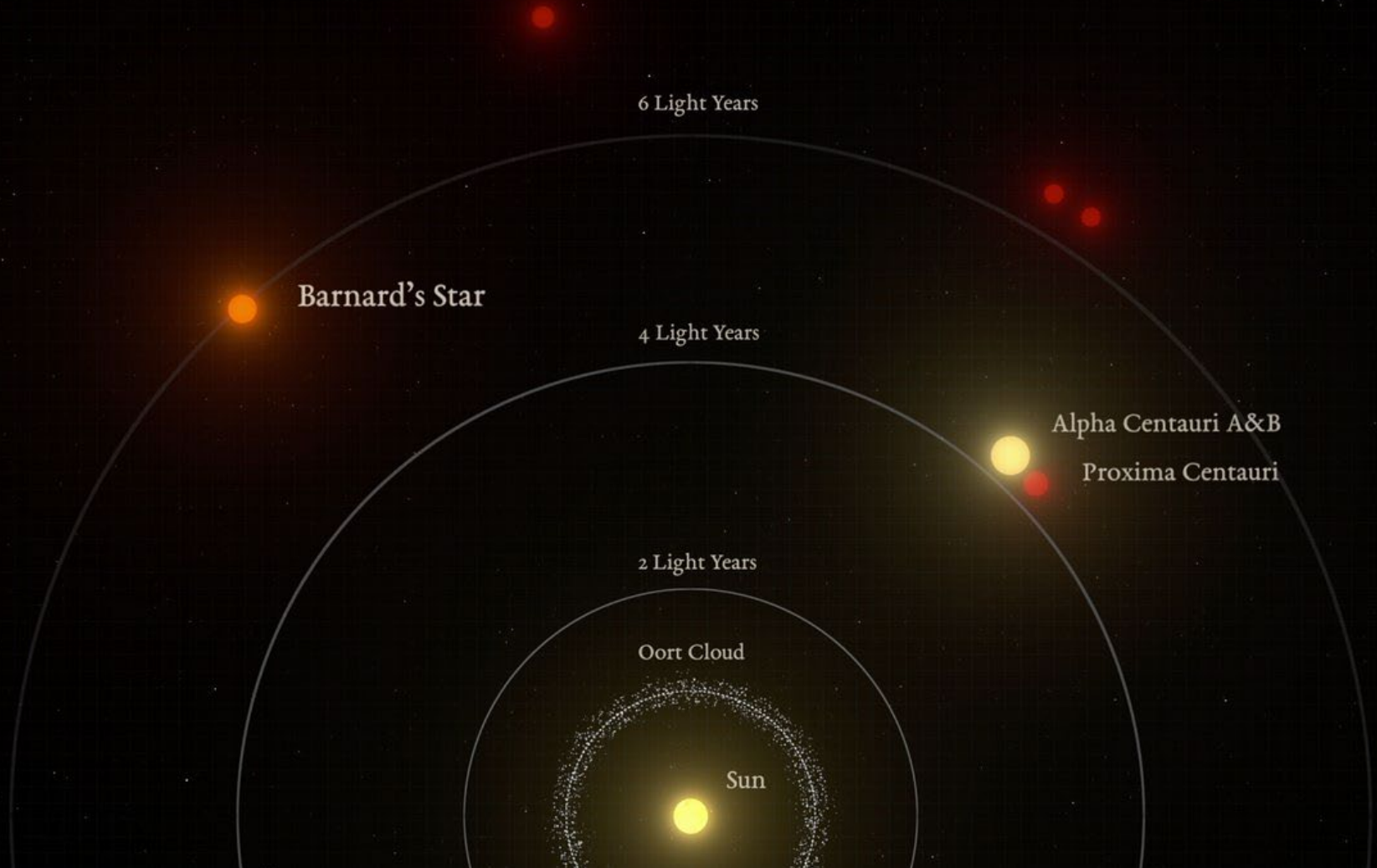
Astronomical Term

Parasec

- parallax + second
- The distance to an object having a parallax of one second as seen from points separated by one astronomical unit
- Equal to 3.26 light-years



Distance to the Nearest Stars



The Distance Between Suns

Shrinking the Sun to the size of a golf ball.



The distance to the nearest star (Proxima Centauri) would be 770 miles.



Distance Across Our Galaxy



100,000 light-years



How Big is One Billion?

- A Rich Uncle leaves you One Billion Dollars
- He puts it in a trust that will pay you \$10,000 per day.
- How long will it take to receive one billion dollars?

**IT WOULD TAKE
278 YEARS AND 288
DAYS!**



How Many Stars in our Galaxy?

400 BILLION Stars!!!

400,000,000,000

How Many Stars in our Galaxy?

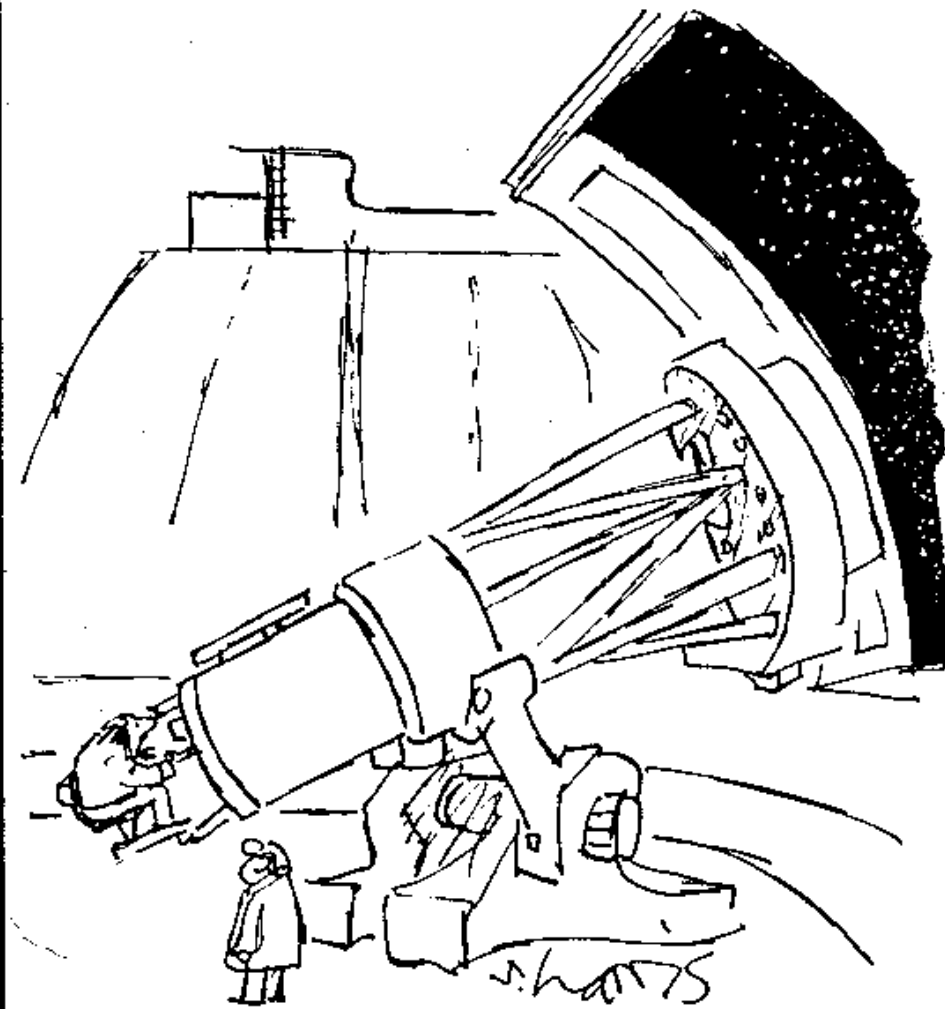
- ❖ Take a Football Field
- ❖ Build a 8 foot wall all around it
- ❖ Fill the field with birdseed



400 BILLION Seeds



400 BILLION Stars



“Let’s see, now ... picking up where we left off ...
one billion, sixty-two million, thirty thousand,
four hundred and thirteen ... one billion, sixty-
two million, thirty thousand, four hundred and
fourteen ... ”

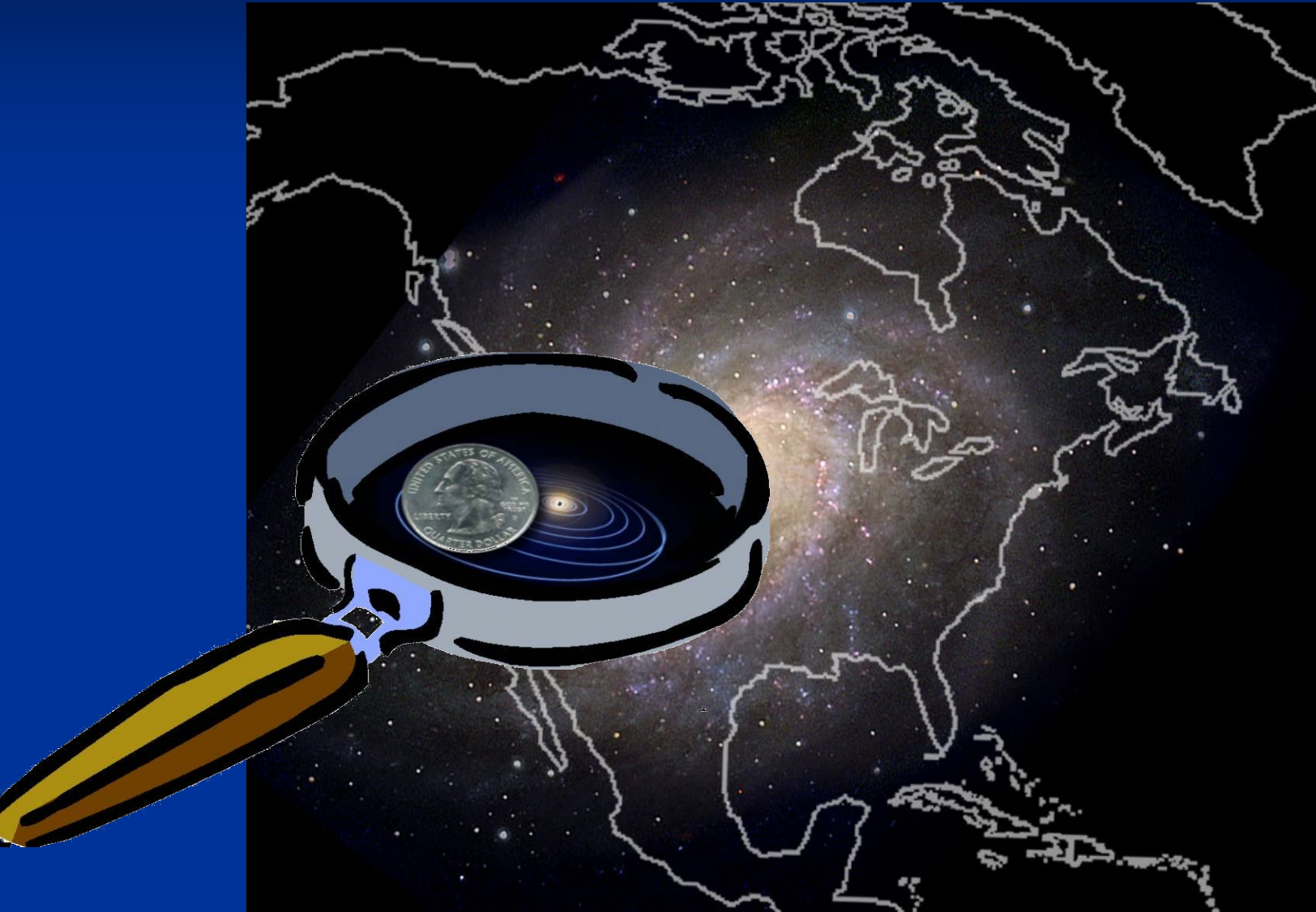
The Size of the Galaxy

Imagine the Solar System so small that that distance from the sun to Pluto is the diameter of a quarter.

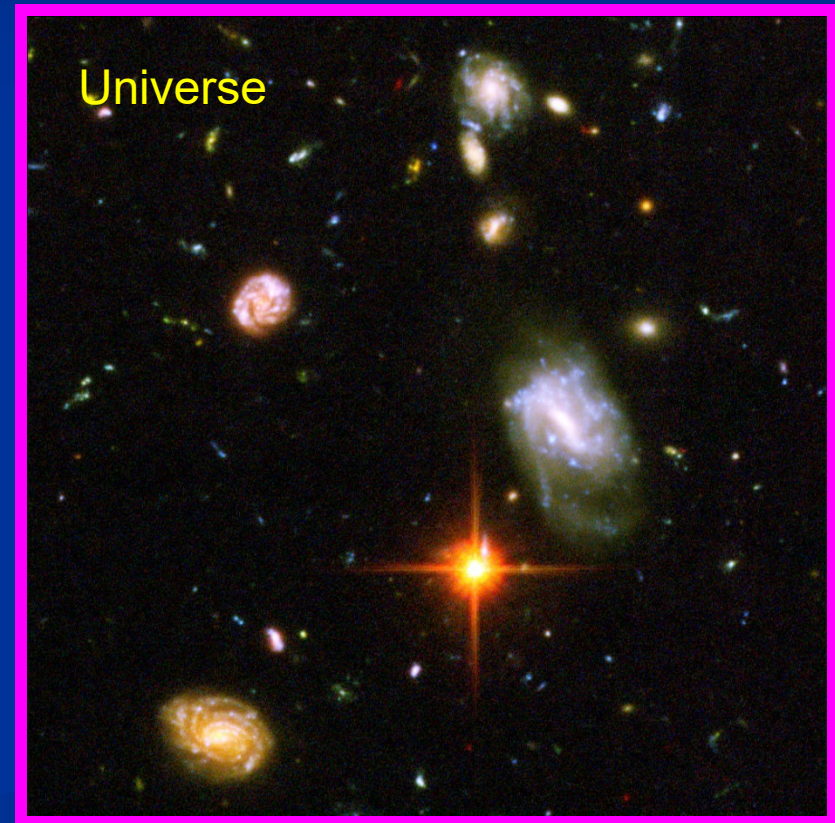
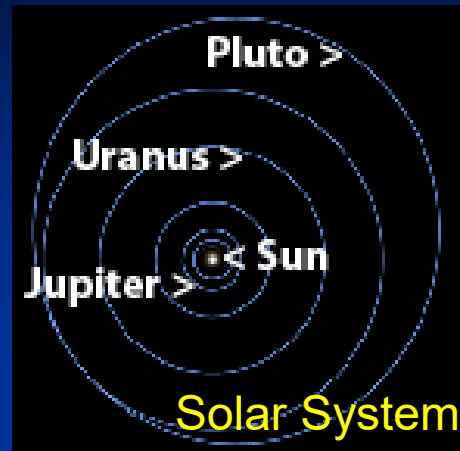


THEN...

...the Galaxy would be the size of North America



The Universe



M31 Andromeda Galaxy



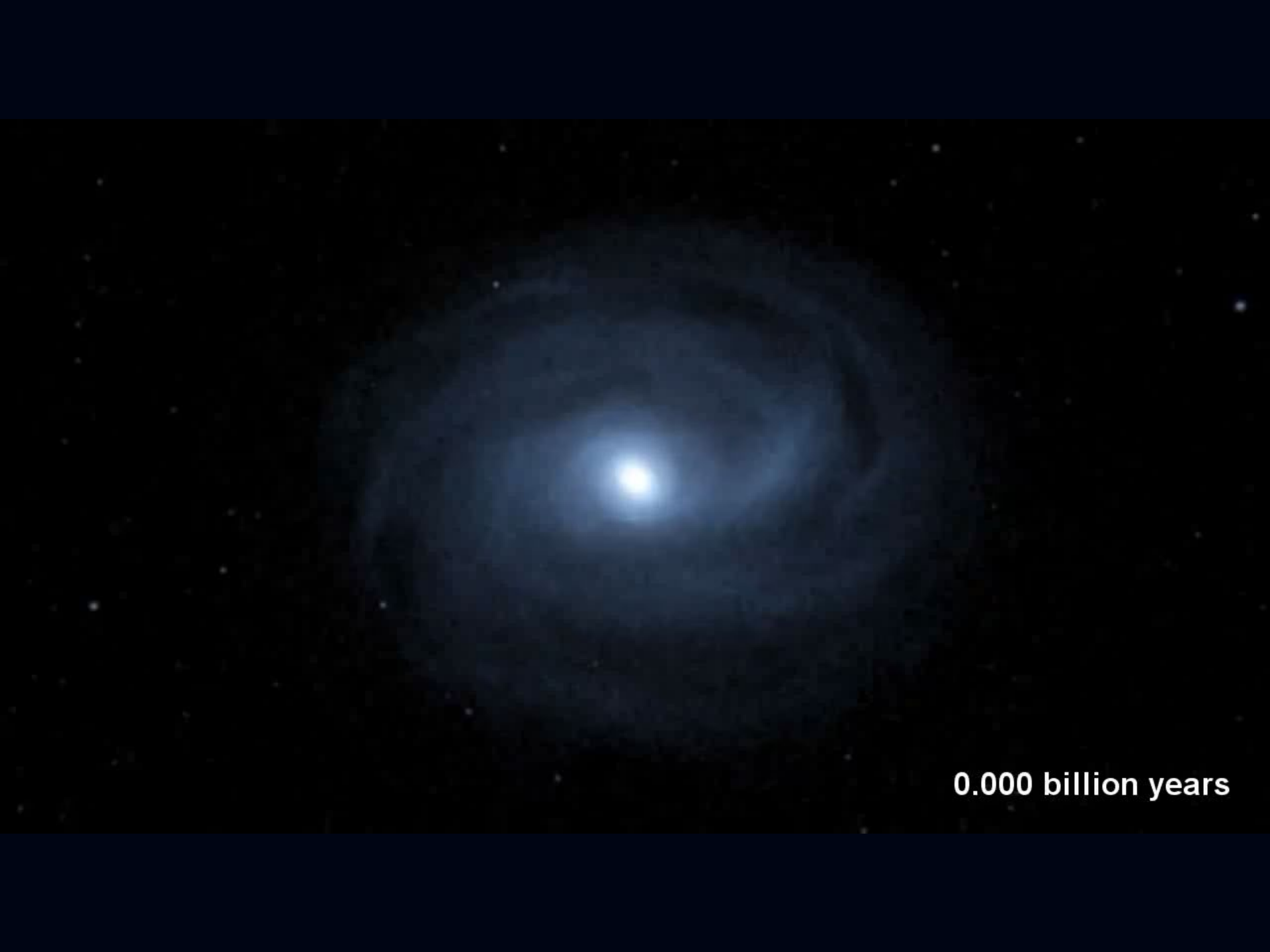
The Nearest Galaxy to the Milky Way
is the Andromeda Galaxy

2,300,000 Light Years



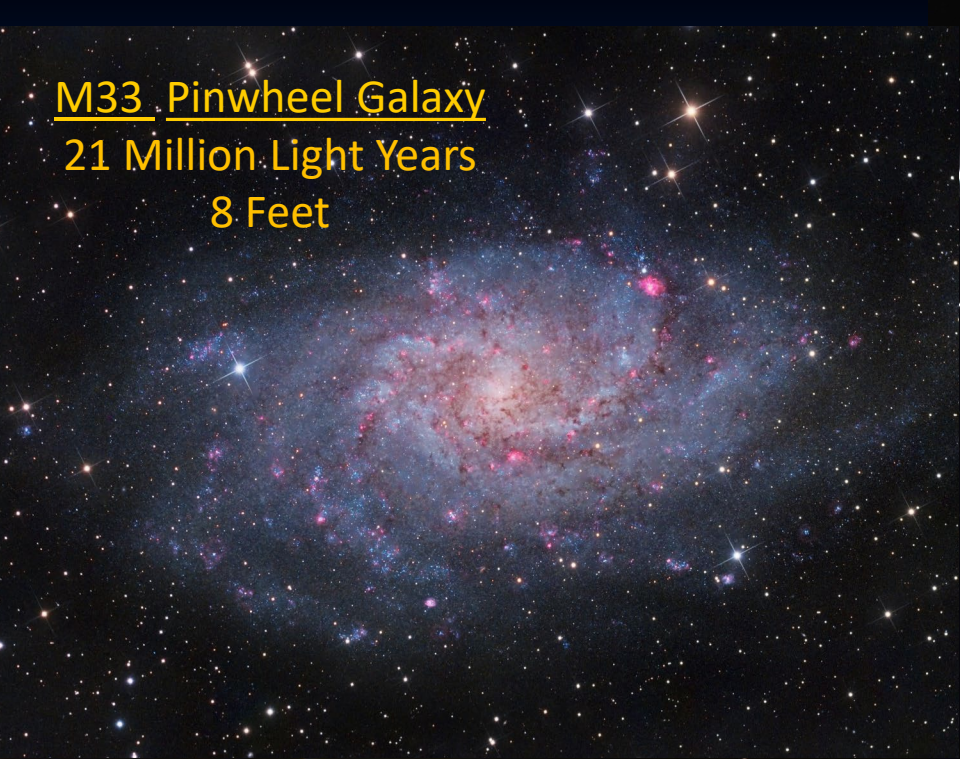
Andromeda and Milky Way Galaxies will collide

- Hurtling together at 245,000 MPH
- Will Collide in about 4 Billion Years
- Collision will take billions of years
- Earth will have been burned up by the Sun by then
- Most stars won't collide - there is too much distance between them.

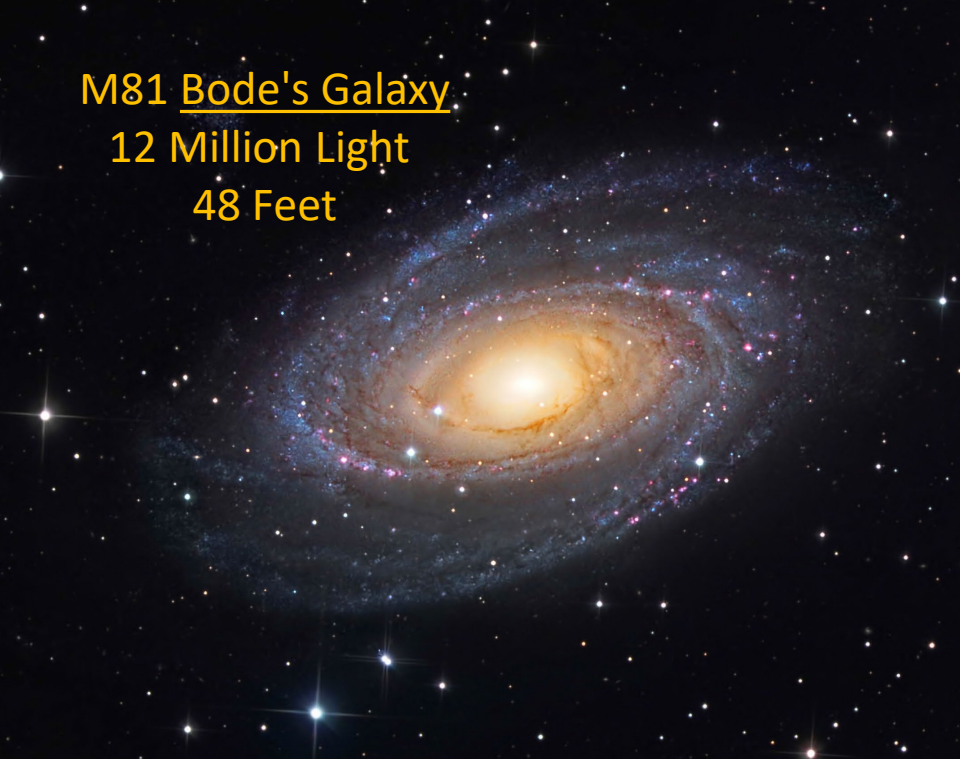


0.000 billion years

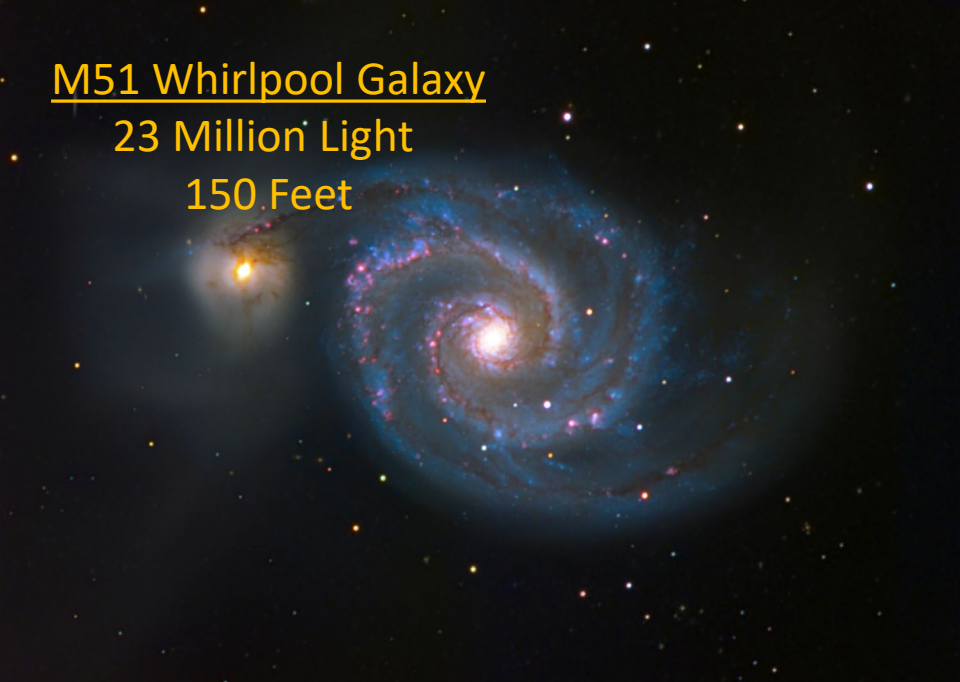
M33 Pinwheel Galaxy
21 Million Light Years
8 Feet



M81 Bode's Galaxy
12 Million Light
48 Feet



M51 Whirlpool Galaxy
23 Million Light
150 Feet



M104 Sombrero Galaxy
29 Million Light
201 Feet







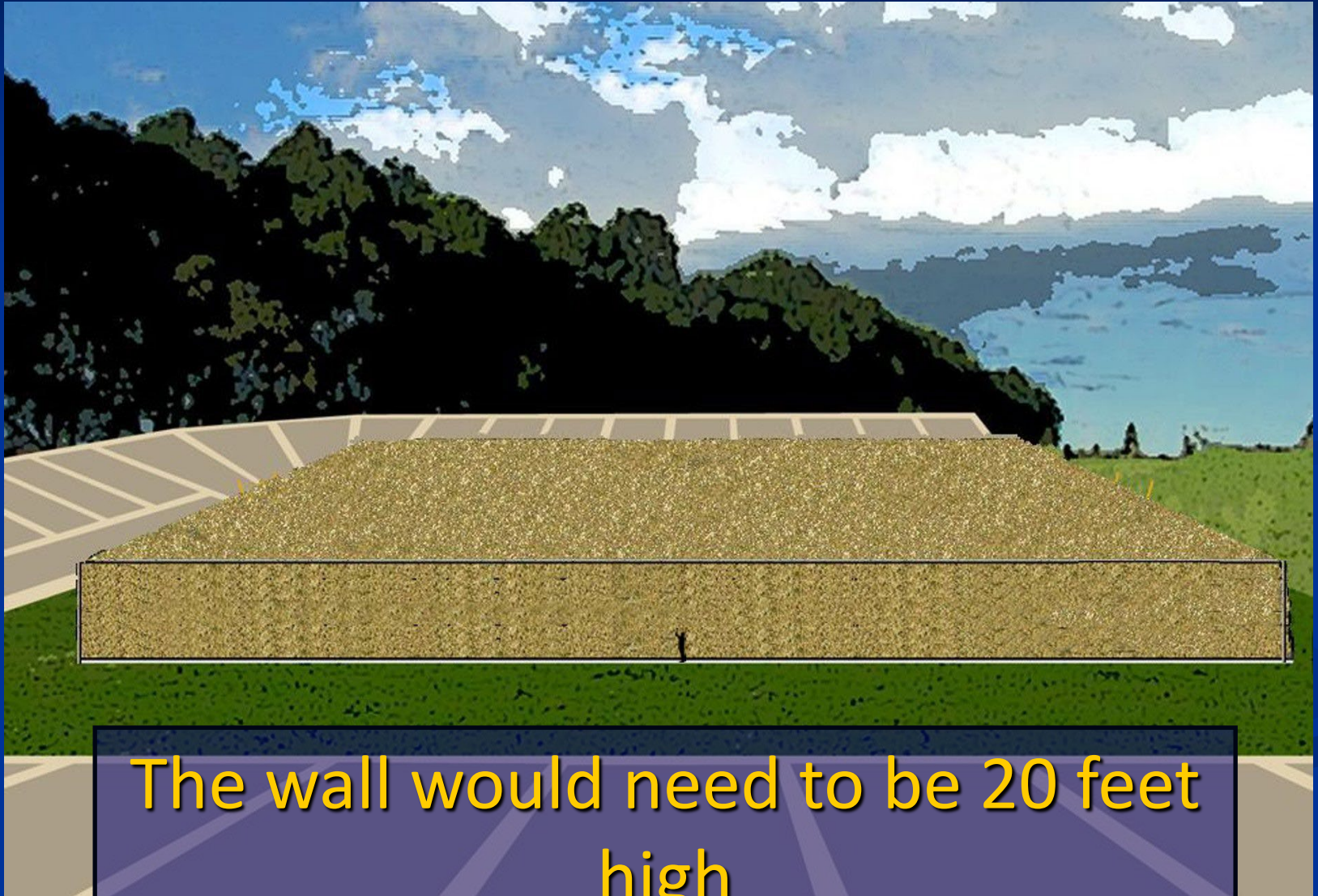
A visualization of the cosmic web, showing a complex network of blue and purple filaments and nodes against a dark background. The nodes represent galaxy clusters, and the filaments represent the large-scale structure of the universe.

How Many Galaxies in the Universe?

2 trillion Galaxies!!!

2,000,000,000,000

How Many Galaxies in the Universe?



The wall would need to be 20 feet high

How Fast Are You Moving When Sitting Still?

- Earth Rotation – 1000mph toward the East.
- Earth's orbital motion 66,000mph
- The Sun orbits the Milky Way in 225 Million Years meaning a speed of 483,000mph.
- The Solar System motion relative to the Universe is 1,300,000mph.



A glowing planet with rings, similar to Saturn, is centered in the image. A dark, reflective sphere is positioned in front of the planet's rings. The word "Questions?" is written in a bold, yellow, sans-serif font across the center of the image, overlapping the planet and the sphere. The background is a dark, gradient blue and purple, suggesting a cosmic or space theme.

Questions?