

Daily Routine

- ▣ Sit in your appropriate seat quietly
- ▣ Have all necessary materials out
- ▣ All back packs on the floor
- ▣ All cell phones on silent and away in backpacks
- ▣ All IPods off and headphones out of your ears
- ▣ Hats off
- ▣ No food or drink except for water
- ▣ All electronic devices away!!!

Bell Work

- ▣ How do you think our universe and galaxy were formed?

- ▣ What is the name of our galaxy?

Earth Science Announcements

Project Final Draft 11/12/2014

Extra Credit Opportunity

GALAXIES & THE BIG BANG

Looking beyond our realm of
understanding in space

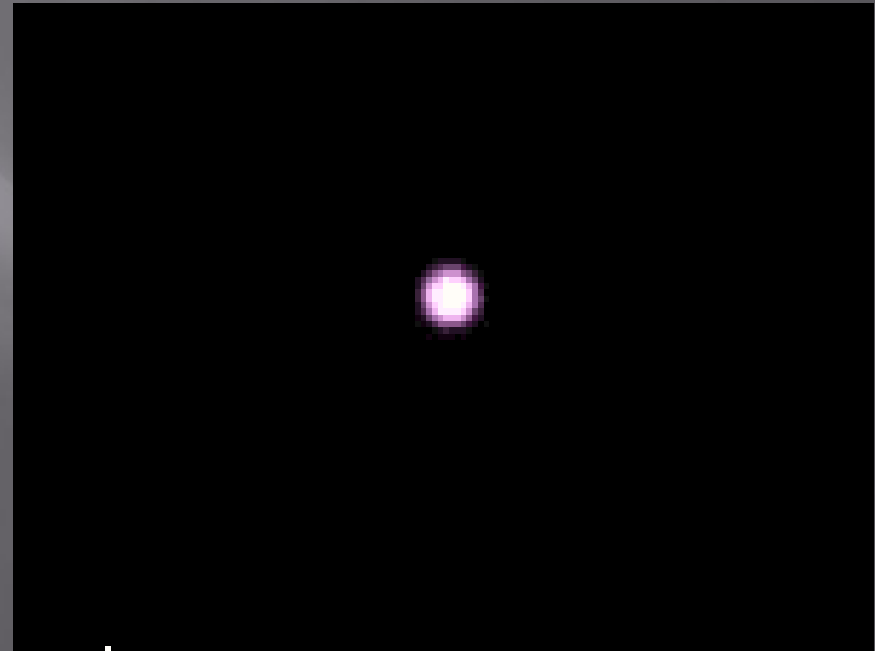
***Unit:* Stars & Galaxies**

***Topic:* Galaxies & The Big Bang**

- ▣ Objectives: *Day 4 of 4*
- ▣ I will be able to define a galaxy and classify the 3 different types of galaxies
- ▣ I will understand the Big Bang theory and the evidence supporting it

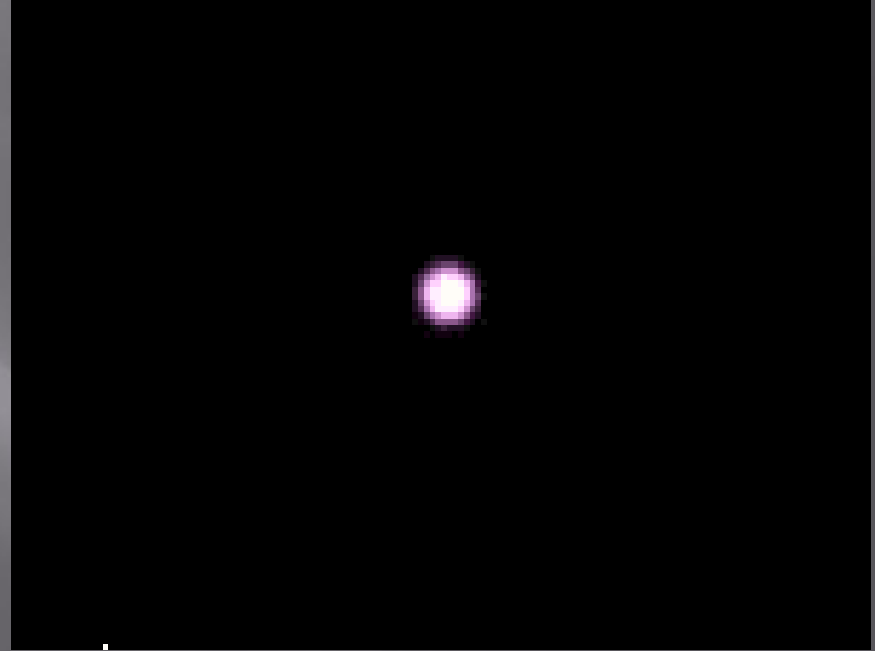
Big Bang Theory

- ▣ It is believed our universe formed 10–20 billion years ago
- ▣ All matter existed in an incredibly hot dense state of hydrogen and helium
- ▣ After it exploded, it expanded & cooled into stars & galaxies



Big Bang Theory

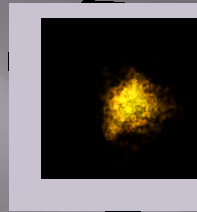
- ▣ The big bang theory or model states that all matter in the universe was released in a massive expansion of time and space about 10-20 billion years ago



The Big Bang Theory

13.7 billion years ago

Time started when all Matter began to expand outward and fill an empty universe with stars and galaxies

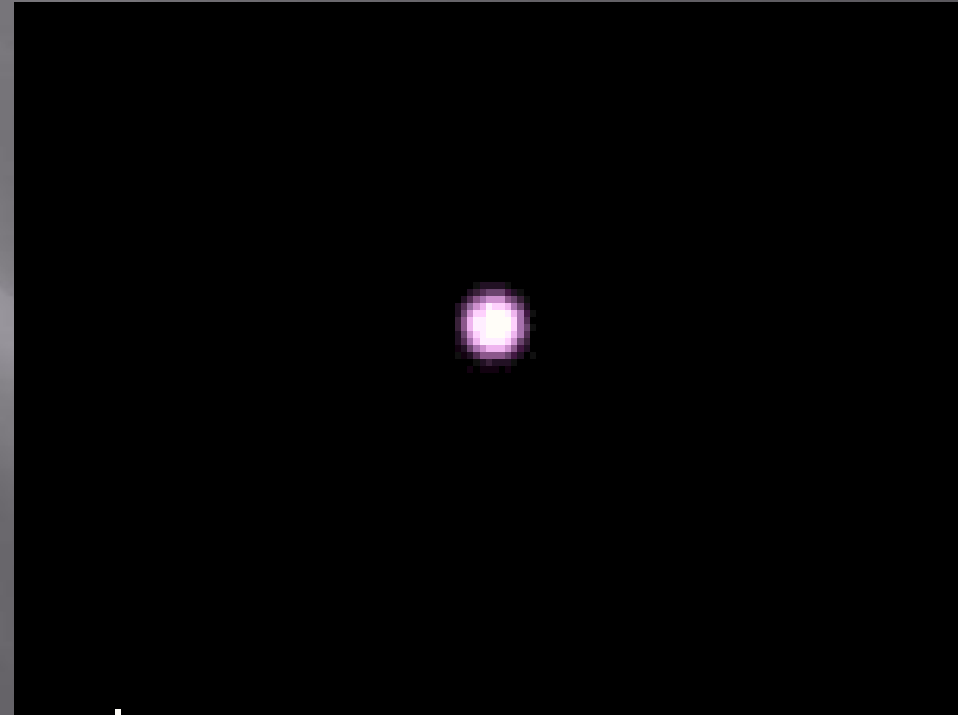


Over Time

Galaxies and stars continue to expand, moving farther apart and cooling in the process

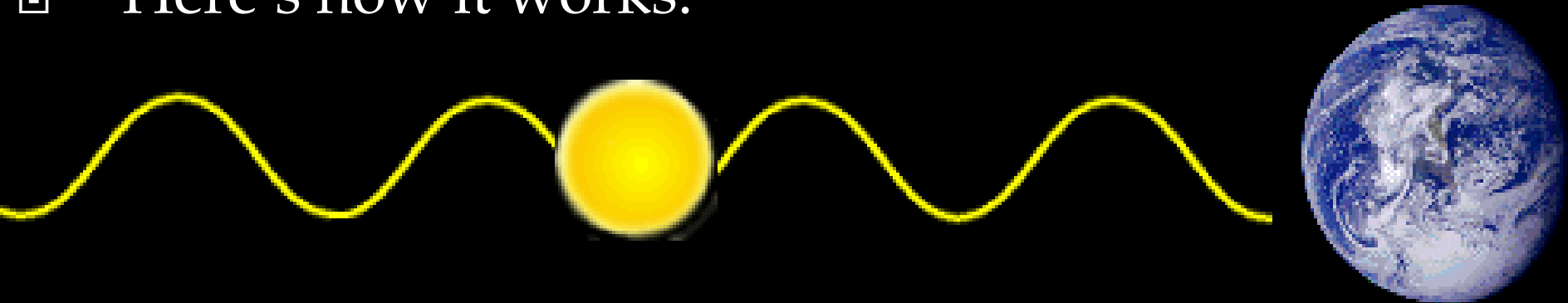
Evidence for the Big Bang Theory

- Evidence for the big bang theory came through two huge pieces of evidence:
- **Red Shift** and cosmic background radiation in the form of radio waves and microwaves



Red Shift

- ▣ **Red shift** showed that all galaxies and stars are moving away from each other and in fact expanding
- ▣ If objects are expanding then at one point they must have been closer together
- ▣ Here's how it works:



We see light from a star that has a fixed position to us, like this

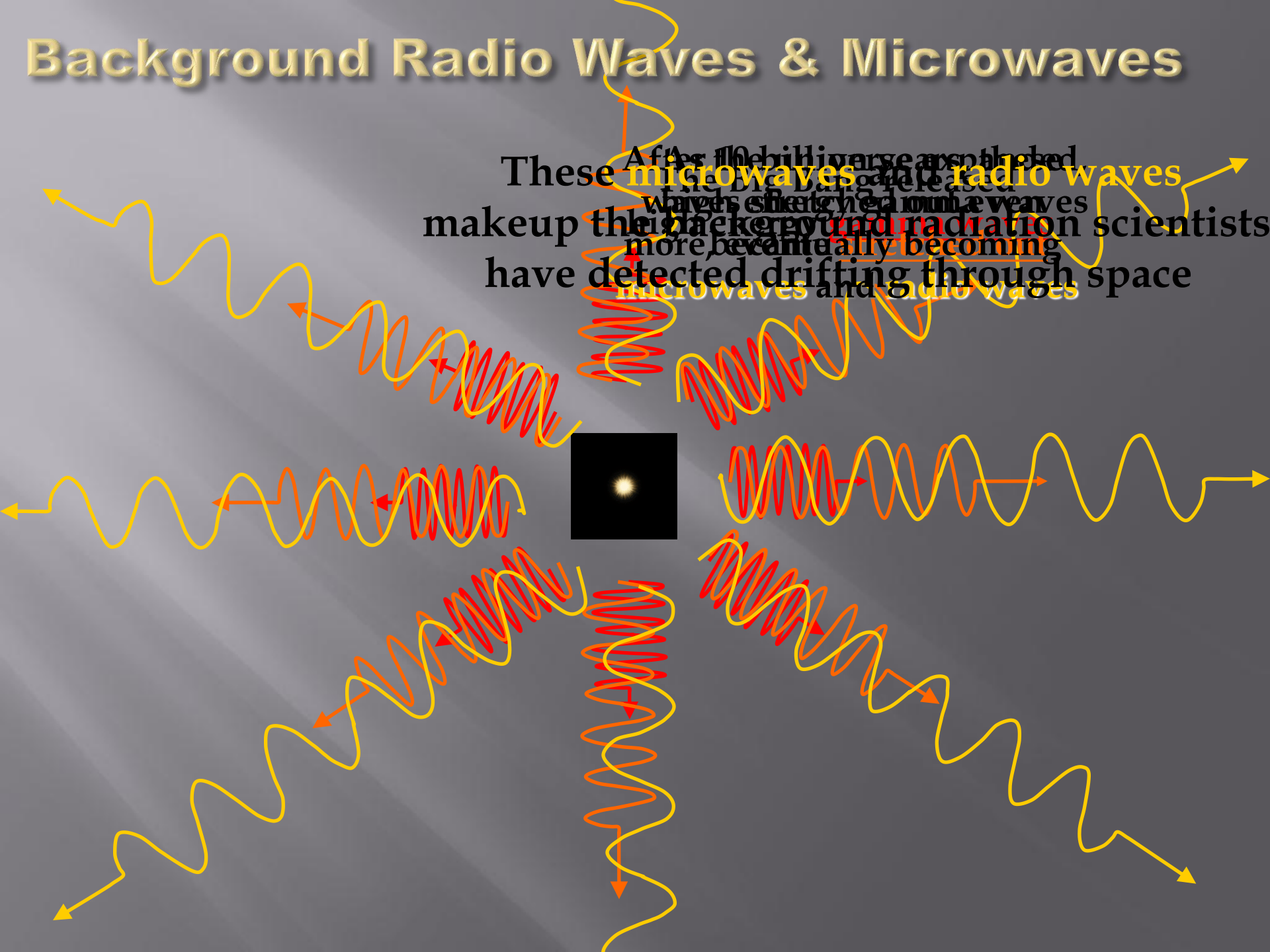
Background Radiation

- ▣ When Scientists look out into space, they detect cosmic background radiation left over from the Big Bang
- ▣ This radiation is just “drifting” in the background of space and is one of the reasons we get static on our TV’s and Radio’s



Background Radio Waves & Microwaves

After the Big Bang, as the universe expanded, the high-energy gamma rays released were stretched into microwaves and radio waves. These microwaves and radio waves make up the background radiation scientists have detected drifting through space.



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Bell Work

- ▣ Explain how red shift works to help provide evidence for the Big Bang Theory

- ▣ What is the Big Bang Theory?

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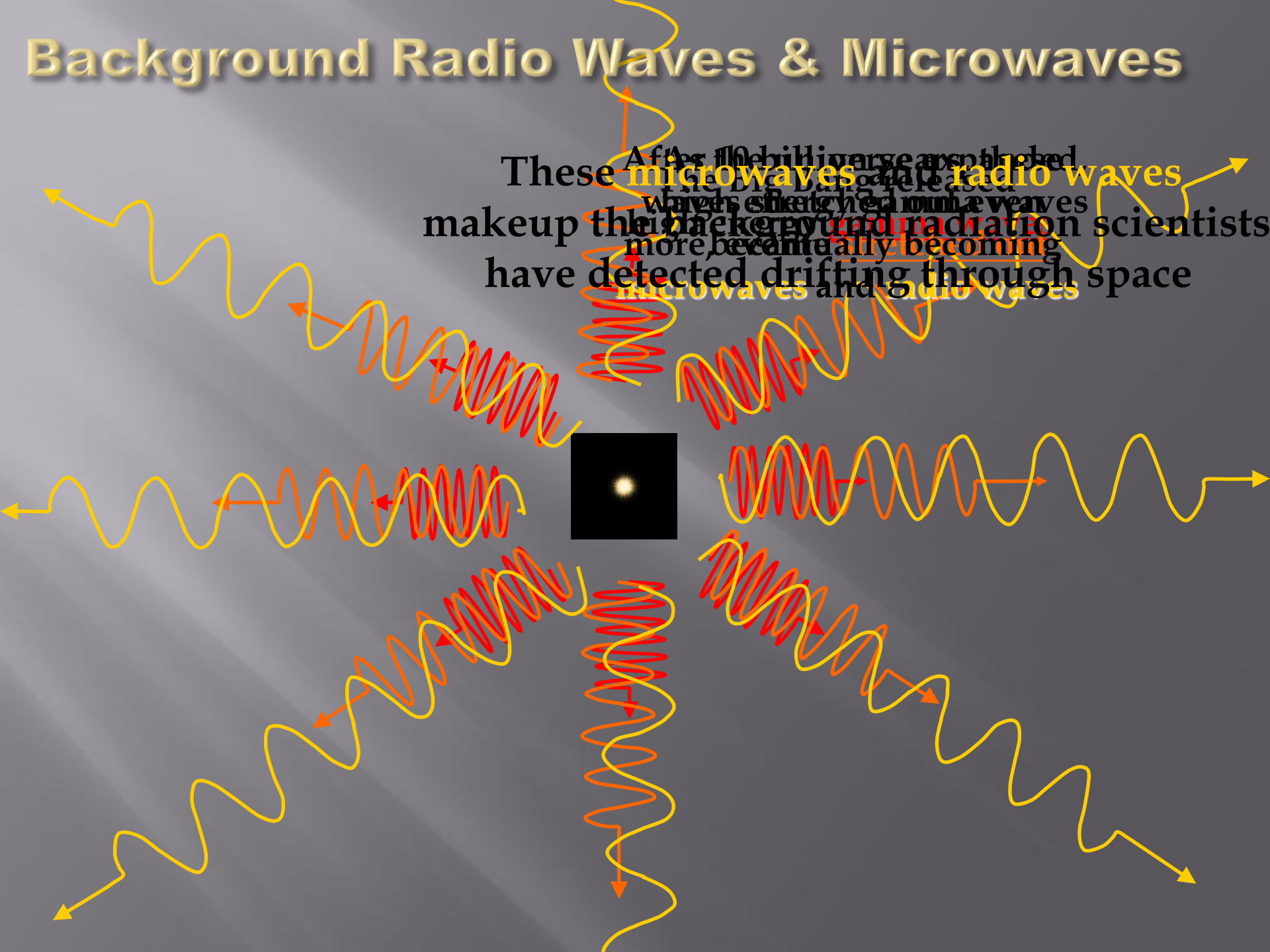
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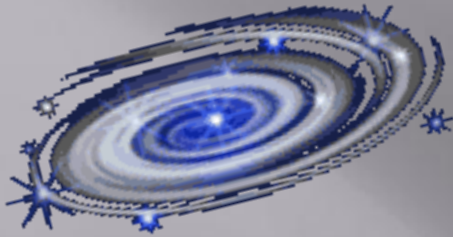
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Background Radio Waves & Microwaves

After the Big Bang, as the universe expanded, the high-energy gamma rays stretched out into waves that are now microwaves and radio waves. These waves make up the background radiation scientists have detected drifting through space.





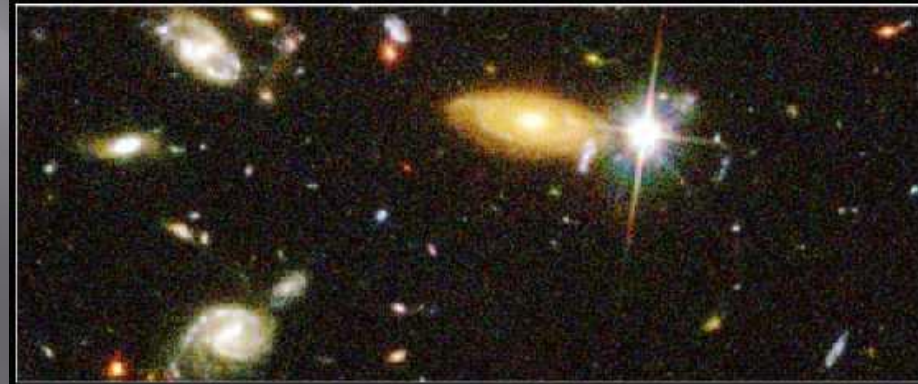
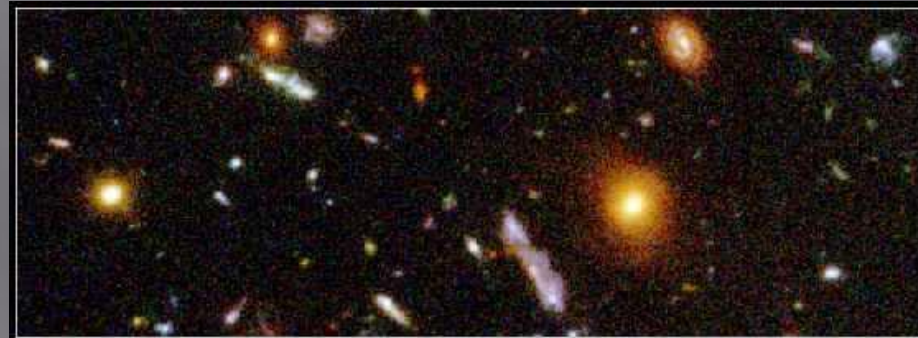
Galaxies

- ▣ We are on earth, all going around the sun
- ▣ However, does the sun orbit anything?
- ▣ The sun is one star among many in our Galaxy
- ▣ A galaxy is a group of billions of stars, gas and dust held together by gravity



Billions and Billions

- ▣ When we look out into deep space we see billions of galaxies
- ▣ Each galaxy contains billions of stars
- ▣ So space is made mostly up of star and galaxies



Hubble Deep Field Details

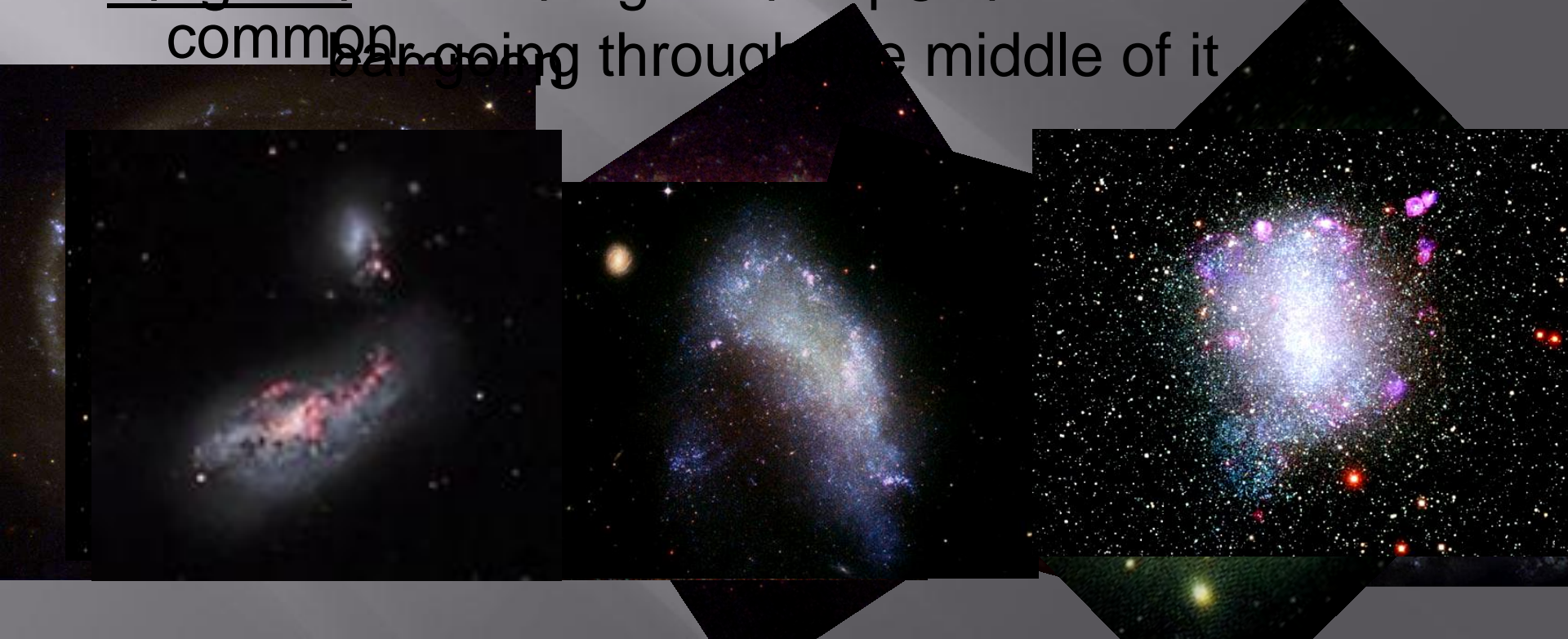
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PRC96-01b · ST ScI OPO · January 15, 1996 · R. Williams (ST ScI), NASA

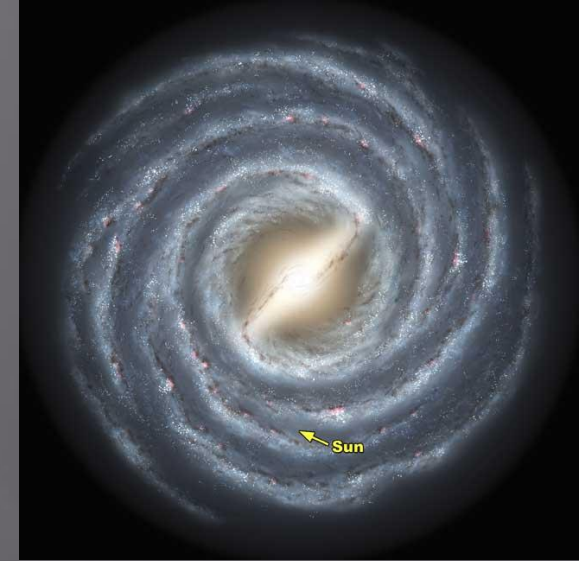
Galaxies: 4 Types

- ▣ A galaxy is a group of billions of stars, gas and dust held together by gravity
- ▣ We classify galaxies into 4 types:

Elliptical galaxies are the most common, dense with stars and more regular in shape. Spiral galaxies are the next most common, with a central bulge and a bar going through the middle of it.

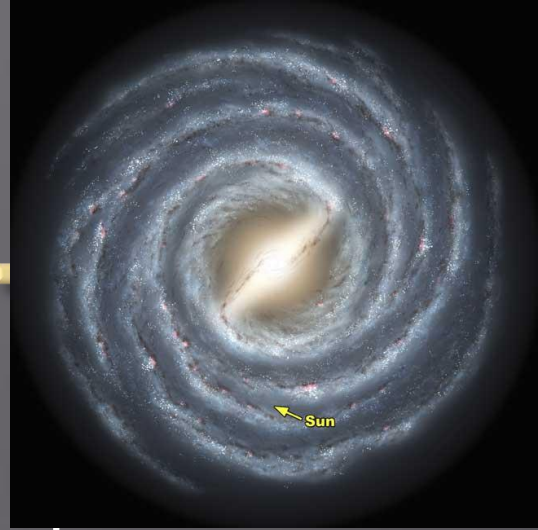


Milky Way Galaxy

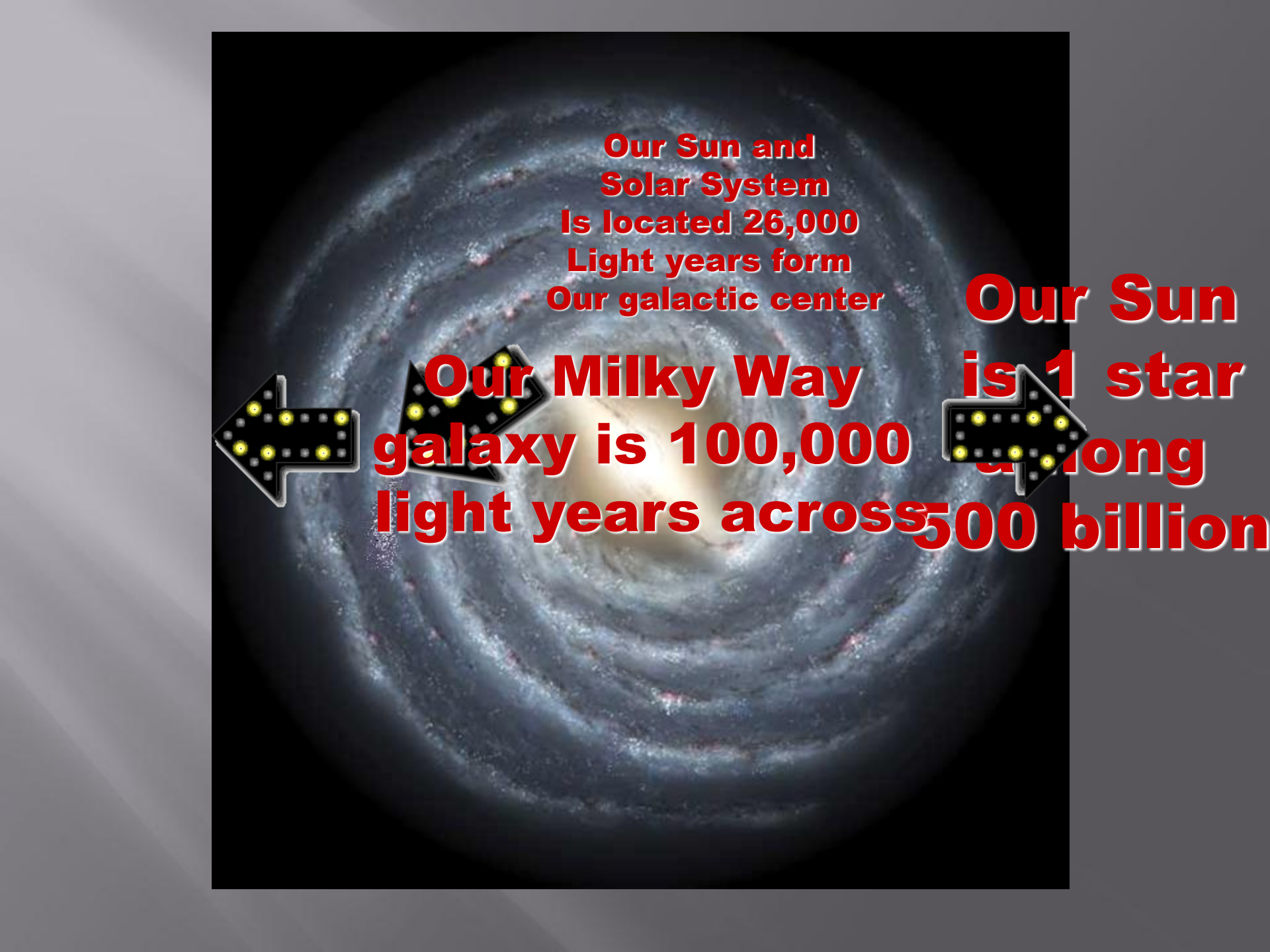


- ▣ Contains around 500 billion stars
- ▣ The visible disk of stars is about 100,000 light years across
- ▣ The sun is located 30,000 light years out from its center
- ▣ All stars orbit around the central region
- ▣ Based on a distance of 30,000 light-years and a speed of 235 kilometers a second, the sun orbits around the center of the galaxy once every 240 million years

Milky Way Continued..



- ▣ The Milky Way is usually classified as a spiral galaxy
- ▣ It is difficult to know for sure because it is impossible to see our galaxy from the outside
- ▣ You can see the Milky Way stretching across the night sky as a faint band of light
- ▣ All of the stars you can see in the night sky belong to the Milky Way

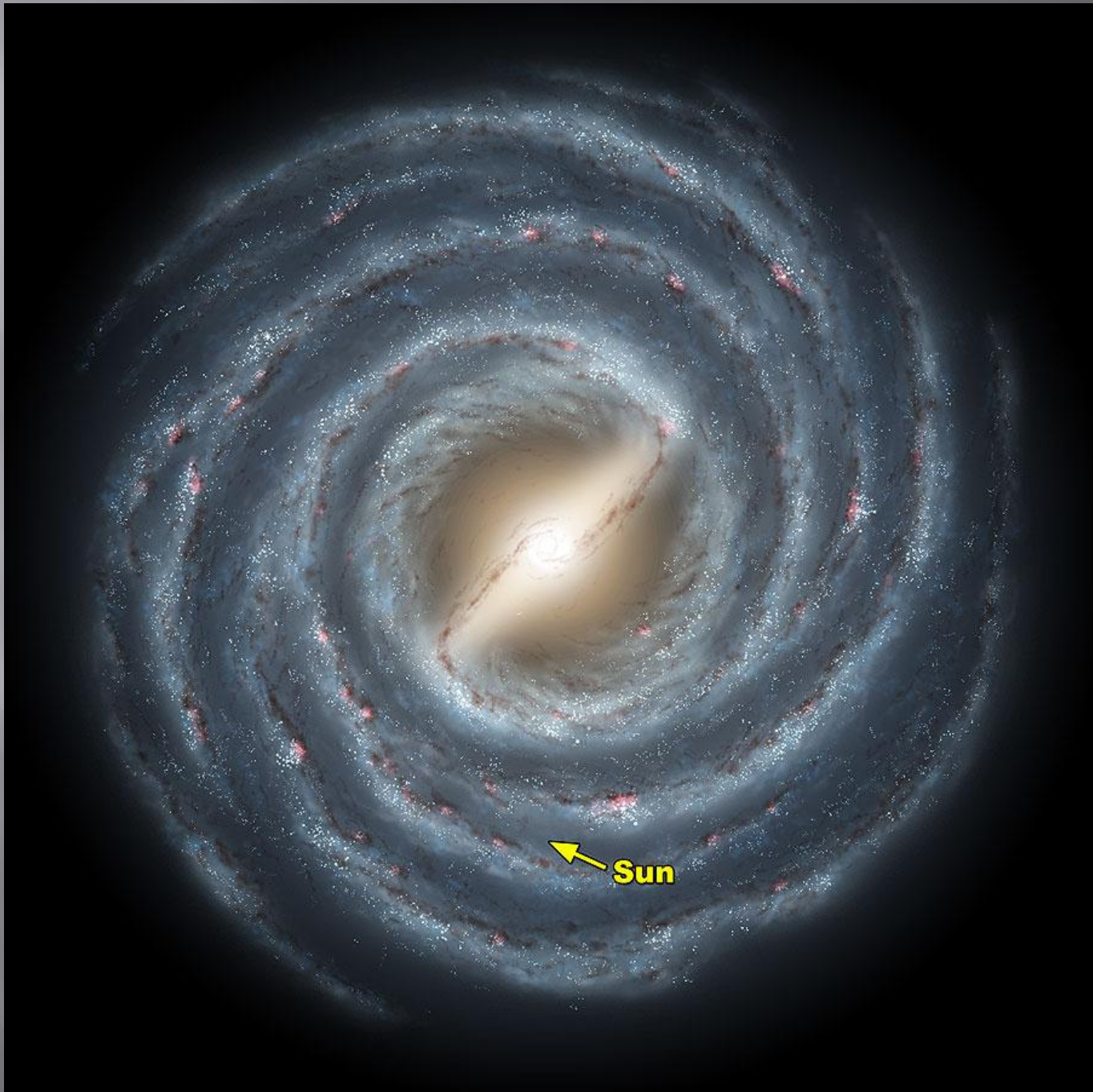


**Our Sun and
Solar System
Is located 26,000
Light years from
Our galactic center**

**Our Milky Way
galaxy is 100,000
light years across**

**Our Sun
is 1 star
among
500 billion**





Sun