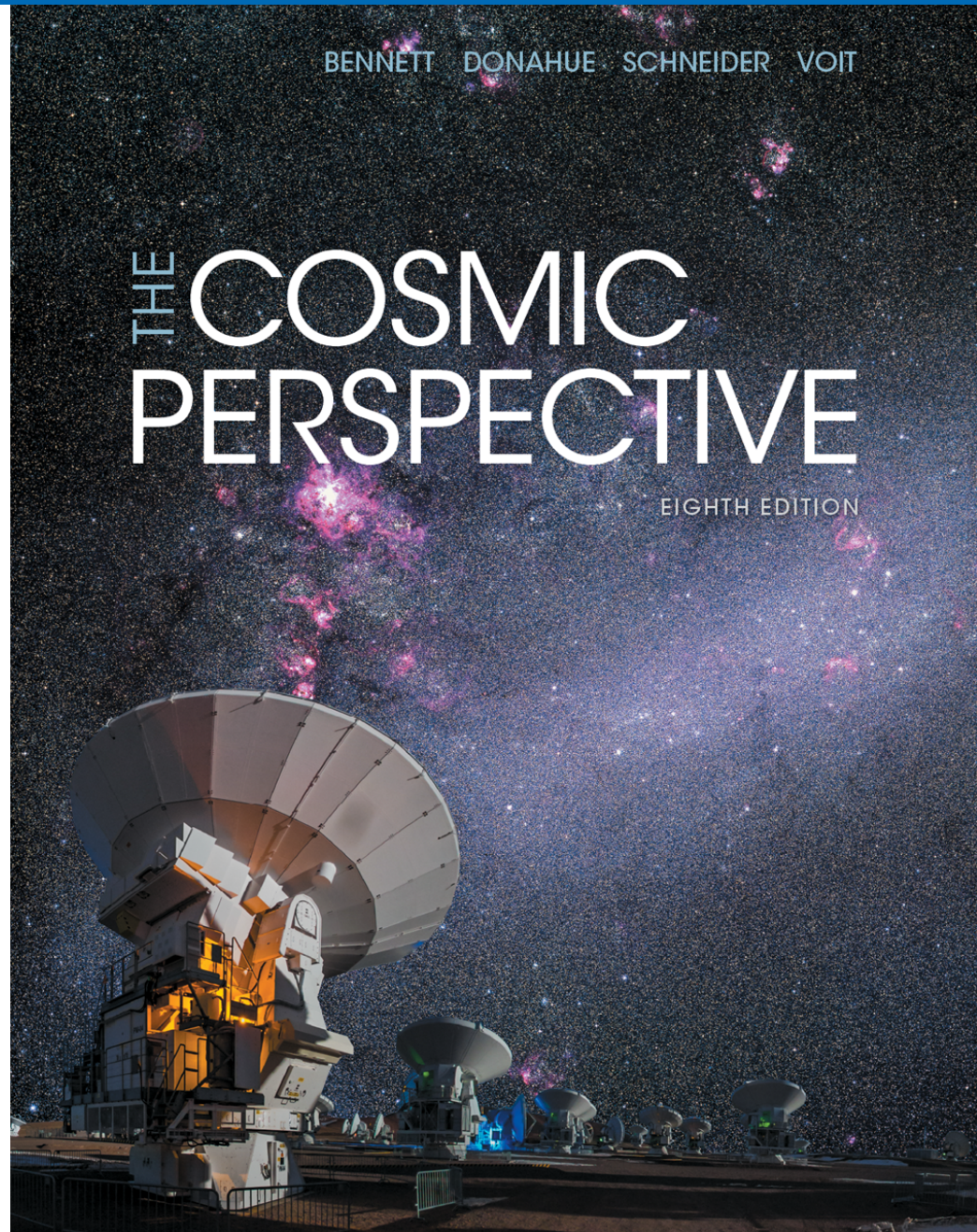


Chapter 1: A Modern View of the Universe



1.1 The Scale of the Universe

- What is our place in the universe?
- How big is the universe?

The Milky Way Galaxy is

- a) the Sun, the planets, and all other objects orbiting the Sun.
- b) a disk-shaped collection of more than 100 billion stars, including the Sun.
- c) the total of all energy and matter in the universe.
- d) all the stars visible in the night sky.

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Which of the following has the various objects listed in order from smallest to largest?

- a) the solar system; the Milky Way; the Local Group
- b) the Local Group; the Milky Way; the solar system
- c) the solar system; the Local Group; the Milky Way
- d) the Milky Way; the Local Group; the solar system
- e) the Local Group; the solar system; the Milky Way

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b) the Local Group; the Milky Way; the solar system

c) the solar system; the Local Group; the Milky Way

d) the Milky Way; the Local Group; the solar system

e) the Local Group; the solar system; the Milky Way

Most of the material that makes up Earth and all life on Earth, including humans, was formed

- a) in the Big Bang.
- b) inside the Sun.
- c) inside stars that died before Earth formed.
- d) in the atmospheres of nearby stars that are still shining and spraying material out into the galaxy.

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When we look at the most distant observable objects in the universe, we see them

- a) as they were about 4.5 billion years ago.
- b) as they were about 14 billion years ago.
- c) as they are now.
- d) as they were at some time in the past, depending on which direction we are looking.

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What is the observable universe?

- a) the sum total of all matter and energy
- b) all the stars and planets that can be observed with the naked eye
- c) everything close enough to us for its light to have reached us during the last 14 billion years
- d) the Milky Way Galaxy and its neighboring galaxies

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- d) the Milky Way Galaxy and its neighboring galaxies

Which of the following has astronomical distances listed in order from smallest to largest?

- a) 1 AU, 1 light-year, the size of the solar system
- b) 1 AU, the size of the solar system, 1 light-year
- c) 1 light-year, 1 AU, the size of the solar system
- d) 1 light-year, the size of the solar system, 1 AU
- e) the size of the solar system, 1 AU, 1 light-year

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- d) 1 light-year, the size of the solar system, 1 AU
- e) the size of the solar system, 1 AU, 1 light-year

Which of the following distances is approximately equal to the distance from the Sun to Earth?

- a) 8 light minutes
- b) 1 light-second
- c) 300,000 km
- d) 93,000,000 km

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The International Astronomical Union does not classify Pluto as a planet because

- a) it is too far from the Sun to be a planet.
- b) it is too small to be a planet.
- c) it has not cleared its orbital neighborhood of other objects.
- d) it's composition is not planetary.

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The distance to the nearest star to the Sun is

- a) about 8 light-minutes.
- b) about 4 light-years.
- c) about 100,000 light-years.
- d) about 14 billion light-years.

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- a) about 8 light-minutes.
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The diameter of the Milky Way is about

- a) 4.5 billion light-years.
- b) 100,000 light-years.
- c) 3000 light-years.
- d) 100,000 AU.
- e) 3000 AU.

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- a) 4.5 billion light-years.
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- c) 3000 light-years.
- d) 100,000 AU.
- e) 3000 AU.

If the Sun were reduced to the size of a grapefruit, Earth on the same scale would be

- a) the size of a marble, about 100 meters away from the Sun.
- b) the size of a marble, about 15 meters away from the Sun.
- c) the size of a marble, about 5 meters away from the Sun.
- d) the size of the tip of a ballpoint pen, about 5 meters away from the Sun.
- e) the size of the tip of a ballpoint pen, about 15 meters away from the Sun.

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- e) the size of the tip of a ballpoint pen, about 15 meters away from the Sun.**

1.2 The History of the Universe

- How did we come to be?
- How do our lifetimes compare to the age of the universe?

If the age of the universe were compressed to one year, with the Big Bang on January 1, about when did the solar system form?

- a) in January
- b) in February
- c) in September
- d) in December

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- b) in February
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If the age of the universe were compressed to one year, with the Big Bang on January 1, about when did the Milky Way Galaxy form?

- a) in January
- b) in February
- c) in September
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If the age of the universe were compressed to one year, with the Big Bang on January 1, about when did the Milky Way Galaxy form?

- a) in January
- b) in February**
- c) in September
- d) in December

If you could count all the stars in the Milky Way Galaxy at a rate of one star per second, it would take

- a) about 4.5 billion years.
- b) about 100,000 years.
- c) about 3000 years.
- d) about 1 year.

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- c) about 3000 years.**
- d) about 1 year.

1.3 Spaceship Earth

- How is Earth moving through space?
- How do galaxies move through the universe?

Which of the following ranks your different astronomical motions from slowest to fastest?

- a) rotation of Earth; motion of the Sun around the center of the Milky Way; motion of Earth around the Sun
- b) motion of the Sun around the center of the Milky Way; motion of Earth around the Sun; rotation of Earth
- c) motion of Earth around the Sun; rotation of Earth; motion of the Sun around the center of the Milky Way
- d) rotation of Earth; motion of Earth around the Sun; motion of the Sun around the center of the Milky Way

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- b) motion of the Sun around the center of the Milky Way; motion of Earth around the Sun; rotation of Earth
- c) motion of Earth around the Sun; rotation of Earth; motion of the Sun around the center of the Milky Way
- d) rotation of Earth; motion of Earth around the Sun; motion of the Sun around the center of the Milky Way**

Your speed due to Earth's rotation is

- a) more than 100,000 km/hour.
- b) about 10,000 km/hour.
- c) about 1,000 km/hour.
- d) about 100 km/hour.

Your speed due to Earth's rotation is

- a) more than 100,000 km/hour.
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- c) about 1,000 km/hour.**
- d) about 100 km/hour.

Ever since the Big Bang,

- a) galaxies have been gradually falling back toward each other.
- b) space has been static and galaxies are not moving very much relative to each other.
- c) space has continued to expand with all stars and galaxies moving away from each other.
- d) space has continued to expand with clusters of galaxies moving away from each other, but stars remaining in galaxies and galaxies remaining in clusters.

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The Sun completes one revolution of the Milky Way galaxy every

- a) year.
- b) 100,000 years.
- c) 230,000,000 years.
- d) 4.5 billion years.
- e) 14 billion years.

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Earth's axis of rotation is tilted about 23.5 degrees relative to

- a) the axis of its orbit around the Sun.
- b) the axis of the Sun's orbit in the Milky Way.
- c) the axis of the orbit of the Moon.
- d) the central axis of the Local Group.
- e) the north pole.

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- e) the north pole.

1.4 The Human Adventure of Astronomy

- How has the study of astronomy affected human history?

Which of the following astronomical endeavors has *not* affected human history?

- a) the Copernican revolution
- b) Newton's laws of motion
- c) space travel
- d) the development of computers
- e) All of the above have affected human history.

Which of the following astronomical endeavors has *not* affected human history?

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- c) space travel
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