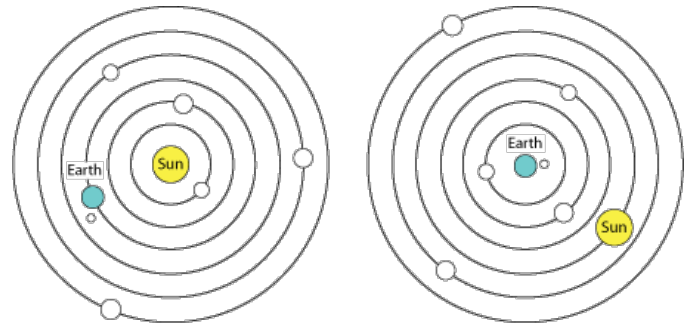


Heliocentric versus Geocentric Models of the Universe

The night sky has been a subject of human curiosity from the earliest civilizations on earth. From Babylonians, Egyptians, Greeks, and Indus all had a fascination for the celestial objects and the elite of the intellectuals built theories to explain the miracles of the heavens. Earlier they were accepted to be from the gods, and later the explanation took more logical and scientific forms.



However, it was not until the Greeks development that proper theories about the earth and the rotation of the planets emerged. Heliocentric and geocentric are two explanations of the arrangement of the universe, including the solar system.

The geocentric model says that the earth is at the center of the cosmos or universe, and the planets, the sun and the moon, and the stars circles around it. The early heliocentric models consider the sun as the center, and the planets revolve around the sun.

More about Geocentric

The most predominant theory of the structure of the universe in the ancient world was the geocentric model. It says that the earth is at the center of the universe, and every other celestial body rotates around the earth.

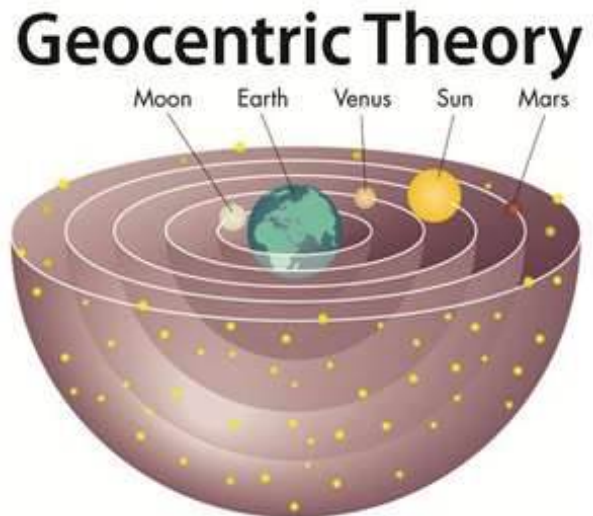
The origin of this theory is obvious; it is the elementary naked eye observation of the movement of the objects in the sky. The path of an object in the sky always seems to be in the same vicinity and repeatedly it rises from east and sets from west approximately at the same points on the horizon. Also, the earth always seems to be stationary or motionless and still. Therefore, the closest conclusion is that these objects move in circles around the earth.

Greeks were strong supporters of this theory, especially the great philosophers Aristotle and Ptolemy. After the death of Ptolemy, the theory lasted for more than 2000 years unchallenged.

More about Heliocentric

The concept that the sun is at the center of the universe, also first emerged in Ancient Greece. It was the Greek philosopher Aristarchus of Samos who proposed the theory in 3rd century BC, but was not taken seriously because of the influence of the Aristotelian view of the universe and lack of proof of the theory at that time.

It was during the Renaissance era that mathematician and Catholic cleric, Nicholas Copernicus, developed a mathematical model to explain the motion of the heavenly bodies. In his model, the sun was at the center of the solar system and the planet moved around the sun, including the earth. And the moon was considered to move around the earth.



This changed the way of thinking about the universe and differed from the religious beliefs at that time. The major feature of the Copernican theory can be summarized as follows:

1. The motion of the celestial bodies is uniform, eternal, and circular or compounded of several circles.
2. The center of the cosmos (solar system) is the Sun.
3. Around the Sun, in the order of Mercury, Venus, Earth and Moon, Mars, Jupiter, and Saturn moves in their own orbits and the stars are fixed in the sky.
4. The earth has three motions; daily rotation, annual revolution, and annual tilting off its axis.
5. The retrograde motion or the backward motion of the planets is as explained by the Earth's motion.
6. The distance from the Earth to the Sun is small compared to the distance to the stars.

Heliocentric versus Geocentric: what is the difference between the two models?

- In the geocentric model, the earth is considered as the center of the universe, and all celestial bodies move around the earth (planets, moon, sun and the stars).
- In the heliocentric model, the sun is considered as the center of the universe, and the celestial bodies move around the sun.

Questions:

1. What does the geocentric model say about the universe?
2. What does the heliocentric model say about the universe?
3. Why did early astronomers believe in the geocentric model?
4. Who developed the heliocentric model?
5. Why do you think the Copernican Theory step 3 only include planets up through Saturn?
6. What is the major difference between the geocentric and heliocentric models?

Double click on the black box below and watch the short video:

