

Astronomy Introduction

Astronomy

- Natural science that is the study of celestial objects, the physics, chemistry, mathematics and evolution of these objects and phenomena that originate outside/beyond the atmosphere of earth. Examples: supernovae, gamma ray bursts, black holes, neutron stars, pulsars, cosmic background radiation.
- Astronomy is the oldest science. Humans are curious and want to understand the universe.

Astrophysics

- Astrophysics is a branch of astronomy that deals with the physics of the universe, including physical properties of celestial objects, as well as their interactions and behavior. Examples: galaxies, stars, planets, cosmic microwave background.
- Theoretical and observational astrophysics.

Cosmology

- Cosmology is the study of the origin, evolution, and eventual fate of the universe.
- Modern cosmology is dominated by the Big Bang Theory, which attempts to bring together observational astronomy and particle physics.
- Example: If the Big Bang occurred 13.7 billion years ago, what existed before that? Is the universe finite or infinite? Is the universe expanding?

Astrology

- Astrology claims that there is a relationship between astronomical phenomena and events in the human world. Many ancient cultures have attached importance to astronomical events from celestial observations. Example: Chinese, Indians, Mayans, Mesopotamia, Chaucer, Christopher Marlowe and Shakespeare.
- Astrology is now viewed as pseudoscience since there is no mechanism of action by which position and motion of stars affects people.

Scientific Method

- 1. Observation (qualitative & quantitative)
- 2. Questioning (how? Why? When?)
- 3. Hypothesis (explanation, educated guess)
- 4. Prediction (If p, then q)
- 5. Experiment (to test the hypothesis)
- 6. Conclusion (experiment prove/disprove)

Theory

- A theory is a framework of ideas and assumptions used to explain a set of observations and make predictions about the real world.

S.I.

- Length: meter
- Time: second
- Temperature: kelvin
- Mass: kilogram

Astronomical Unit

- 1 astronomical unit is the distance from the earth to the sun. The mean distance is 1.5×10^{11} meters.

Light year

- One light year is the distance that light travels in one year.
- $D = 3 \times 10^8 \text{ m/s}$ times 31,557,600 seconds = 9.47×10^{15} meters.