



Size & Scale of the Universe

Glossary of Terms

Astronomical Unit (AU) – The average distance between Earth and the Sun, equal to $1.4960E+08$ km.

Parallax - The apparent displacement of an object caused by a change in the position from which it is viewed.

Parsec (pc) – A unit of distance used by astronomers. It is derived using the parallax of nearby stars due to Earth's orbit around the Sun. One parsec is the distance a star would be if it exhibits a parallax angle seen from Earth of 1 arc second (1 arc second = $1/3600$ of a degree). One parsec is equal to 206,265 AU, 3.262 light-years, or $3.0857E+13$ km.

Light-year (ly) – The distance that light travels in one year. It is equal to the speed of light ($3.0E+5$ km/s) times one year: $9.460E+12$ km, or 63,230 AU.

Luminosity – The total amount of light energy radiated by an object per unit time.

Brightness – The total amount of light energy detected from an object per unit time per unit area.

Star – A giant ball of gas held together by its own gravity that shines under its own power. At some time in its life, it generates its light and heat by nuclear reactions, specifically by the fusion of hydrogen into helium under conditions of enormous temperature and density. Star masses range from about $2.5E+28$ kg up to $2.0E+32$ kg ($1/80^{\text{th}}$ the mass of the Sun up to 100 times the mass of the Sun).

Planet – A round body held together by its own gravity that orbits a star and has cleared its orbital path of any objects of similar size. A planet-scale object that has not cleared its orbit of similar sized objects is called a *dwarf planet*. Planet-scale objects that orbit around another, larger planet-scale object are called *moons*. Planet-scale objects range in mass from about $3.0E+21$ kg up to $2.5E+28$ kg ($5.3E-4$ times the mass of Earth up to $4.1E+3$ times the mass of Earth).

Solar System – A large collection of various sized objects orbiting the Sun.

Solar Wind – A stream of charged particles (free electrons and ions) that come out of the Sun in all directions at very fast speeds, carrying the Sun's magnetic field with it.





Heliosphere – The region of space occupied by the Solar Wind.

Heliopause – The boundary of the Solar System marking where the Sun's influence ends (roughly 100 AU from the Sun). It is where the Solar Wind meets the interstellar medium.

Local Bubble – A bubble of diffuse and hot interstellar medium plasma roughly 300 lights-years in diameter. The plasma in this region is around 1,000 times less dense than the average density of the interstellar medium and the temperature of the plasma approaches 1 million degrees Kelvin. The Sun is located inside this bubble.

Solar Neighborhood – A region of space within the vicinity of the Sun (65 light-years in diameter) where the stars have random motions relative to each other but all travel together within the Milky Way Galaxy.

Galaxy – A giant group of stars (hundreds of millions or more) all gravitationally bound together.

Group – A small number (a few tens) of galaxies gravitationally bound together; sometimes called a *poor cluster*.

Cluster – A large number (hundreds to thousands) of galaxies gravitationally bound together.

Supercluster – A cluster of clusters. Clusters within superclusters are not necessarily bound together by gravity, and the sizes of superclusters, therefore, grow as a result of the expansion of the Universe.

Voids – The vast regions of space between clusters and superclusters where there are few, if any, galaxies.

