**Black Hole**: A black hole is a region of space in which the gravitational field is so powerful that nothing, not even light, can escape its pull after having fallen past its horizon, hence the term "Black Hole". Despite its interior being invisible, a black hole may reveal its presence through an interaction with matter that lies in orbit outside its horizon. One may detect gas that is being drawn into the black hole. The gas spirals inward, heating up to very high temperatures and emitting large amounts of radiation that can be detected. Such observations have resulted in the general scientific consensus that black holes do exist in our universe.

**Close binary**: A binary star is a star system consisting of two stars orbiting each other. For each star, the other is its companion star. Binary star systems are very important in astrophysics, because observing their mutual orbits allows their mass to be determined. In close binaries, the two stars can be so close that material from each star can be pulled towards the other, drawing the stars into elongated shapes.

**Cosmic Rays**: Cosmic rays are energetic particles originating from space that impinge on Earth’s atmosphere. Almost 90% of all the incoming cosmic ray particles are protons, about 1% are helium nuclei, and about 1% are electrons. The term “ray” is a misnomer, as cosmic particles arrive individually, not in the form of a ray or beam of particles. The origins of these particles range from energetic processes on the Sun all the way to as yet unknown events in the farthest reaches of the visible universe. In 1931, a cosmic ray particle detected as Dugway, Utah, was found to be fast enough to have an energy comparable to a well-hit tennis ball at about 95 mph.

**Diffraction**: Diffraction is normally taken to refer to various phenomena which occur when a wave encounters an obstacle. It is described as the apparent bending of waves around small obstacles and the spreading out of waves past small openings. The complex light and dark patterns in the intensity of a diffracted wave are a result of the superposition, or interference, of different parts of a wave that traveled to the observer by different paths.

**Galaxy**: A galaxy is a massive, gravitationally bound system consisting of stars, an interstellar medium of gas and dust, and dark matter. The name is from the Greek root galaxies, meaning “milky,” a reference to the Milky Way galaxy. Typical galaxies range from dwarfs with as few as ten million stars up to giants with one trillion stars. The Milky Way is the view from Earth of our home galaxy. There are more than 100 billion galaxies in the observable universe.

**Interference**: In physics, interference is the addition or superposition of two or more waves that result in a new wave pattern. Consider two waves that are in phase (their troughs and crests line up). The resultant wave will have amplitude sum of the amplitudes of the two waves. This is known as constructive interference. If the two waves are out of phase (one wave crest coincides with another wave trough), they will tend to cancel out (destructive interference). The resultant amplitude is the difference of the two amplitudes. Fringes in the Michelson Interferometer correspond to alternating constructive and destructive interferences.

**Light year**: A light year is a unit of length, equal to just under six trillion miles. A light-year is the distance that light travels in a vacuum in one year at the speed of 983,571,057 ft/s (299,792,458 m/s).

**Magnetic fields**: In our Galaxy, magnetic fields are trapped and confined by matter and permeate the space between stars. Magnetic fields can exert a force on moving electric charges and deflect them from their original direction. Cosmic Rays we detect have typically been roaming the Galaxy for millions of years under the influence of the Galaxy's irregular magnetic fields. When Cosmic Rays are detected on Earth, their arrival directions do not provide any information about where the particles actually come from. Changing magnetic fields are also probably responsible for the acceleration of Cosmic Rays.

**Photo-detector**: A photo-detector is an electronic device that converts light into electrical signals. Some photo-detectors are so sensitive they respond to a single photon to produce an electric pulse.

**Photon**: The photon is the elementary particle responsible for electromagnetic phenomena. It is the carrier of electromagnetic radiation of all wavelengths, including gamma rays, K-rays, ultraviolet light, visible light, infrared light, microwaves and radio waves. The photon differs from many other elementary particles, such as the electron and the quark, in that it has zero mass. Therefore, it travels (in a vacuum) at the speed of light, c = 983,571,057 ft/s. The photon has both wave and particle properties (“wave–particle duality”). Photons show wave-like phenomena, such as refraction by a lens and destructive interference when reflected waves cancel each other out; however, as a particle, it can only interact with matter by transferring its total amount of energy. This is different from a wave, which may gain or lose arbitrary amounts of energy.

**Planetary system**: A planetary system consists of the various non-stellar objects orbiting a star such as planets, moons, asteroids, meteoroids, comets, and cosmic dust. The Sun together with its planetary system, which includes Earth, is known as the Solar System. Planetary systems are generally believed to form as part of the same process which results in star formation. Accepted theories today argue that a disk forms by gravitational collapse of a cloud and then evolves into a planetary system by collisions and gravitational capture.

**Scintillation**: Scintillation or twinkling are generic terms for rapid variations in apparent brightness or color of a distant luminous object viewed through the atmosphere. It is caused by small-scale fluctuations in air density usually related to temperature changes. Normal wind motion transporting such fluctuations across the observer’s line of sight produces the irregular changes in intensity characteristic of scintillation.

**Supernova**: A supernova is a stellar explosion. They are extremely luminous and cause a burst of radiation that often briefly outshines an entire galaxy before fading from view over several weeks or months. During this short interval, a supernova can radiate as much energy as the Sun will emit over its life span. The explosion expels much or all of a star’s material at a velocity of up to a tenth the speed of light, driving a shock wave into the surrounding interstellar medium. This shock wave sweeps up an expanding shell of gas and dust called a supernova remnant. The expanding shock waves from supernova explosions can trigger the formation of new stars. On average, supernovae occur about once every 50 years in a galaxy the size of the Milky Way. The expanding shock waves from supernova explosions can trigger the formation of new stars as well as create high energy cosmic rays and gamma rays.