Dark matter is a mysterious form of matter that does not emit, absorb, or reflect electromagnetic radiation, making it invisible and undetectable by conventional means. Its existence is inferred from its gravitational effects on visible matter, such as stars and galaxies.

Dark matter plays a crucial role in the structure and behavior of galaxies by providing the gravitational glue that holds them together. Without dark matter, galaxies would not have enough mass to explain their observed rotation curves and gravitational interactions. Dark matter forms a vast cosmic scaffolding, shaping the distribution of galaxies and clusters on large scales.

Scientists detect and study dark matter through its gravitational effects on visible matter and through indirect methods such as gravitational lensing, where the bending of light by dark matter reveals its presence. They also search for dark matter particles in laboratory experiments, underground detectors, and high-energy particle colliders. Despite extensive efforts, the nature of dark matter remains one of the most significant unsolved mysteries in astrophysics and particle physics.