Nuclear fission is a nuclear reaction in which the nucleus of an atom splits into two or more smaller nuclei, along with the release of energy. This process is usually accompanied by the emission of neutrons and gamma rays. The term "fission" comes from the Latin word "fissio," meaning to split.

The key points of nuclear fission are as follows:

Initiation: Nuclear fission is often initiated by bombarding a heavy atomic nucleus (such as uranium-235 or plutonium-239) with a neutron. The collision of the neutron with the nucleus can cause the nucleus to become highly unstable.

Splitting of Nucleus: When the heavy nucleus absorbs the neutron, it becomes so unstable that it splits into two or more smaller nuclei. This process releases a significant amount of energy.

Neutron Emission: Along with the smaller nuclei, several neutrons are emitted during the fission process. These neutrons can go on to initiate further fission reactions in nearby nuclei, creating a chain reaction.

Energy Release: The energy released during nuclear fission is a result of the mass defect, where the total mass of the smaller nuclei produced is slightly less than the mass of the original nucleus. This mass difference is converted into energy according to Einstein's famous equation, E=mc².

Nuclear fission is a fundamental process used in nuclear power plants to generate electricity. Controlled fission reactions are maintained in a controlled environment, and the released energy is harnessed for various applications. It is also the process underlying the functioning of nuclear weapons, where an uncontrolled chain reaction leads to a powerful explosion.