Neutron.

Neutron is a fundamental particle which is essential constituent of all nuclei except that of hydrogen atom. It was discovered by Chadwick.

(1) The charge of neutron: It is neutral

(2) The mass of neutron: 1.6750 × 10–27 kg

(3) Its spin angular momentum: $\frac{1}{2} \times \left(\frac{h}{2\pi} \right) J - s$

(4) Its magnetic moment: 9.57 × 10–27 J/Tesla

(5) Itshalf-life: 12 minutes

(6) Penetration power: High

(7) Types: Neutrons are of two type's slow neutron and fast neutron, both are fully capable of penetrating a nucleus and causing artificial disintegration.

A free neutron outside the nucleus is unstable and decays into proton and electron.

$${}_{0}n^{1} \rightarrow \underset{\text{Proton}}{{}_{1}H^{1}} + \underset{\text{Electron}}{{}_{-1}\beta^{0}} + \underset{\text{Antinutrin o}}{\bar{\nu}}$$

Thermal neutrons

Fast neutrons can be converted into slow neutrons by certain materials called moderator's (Paraffin wax, heavy water, graphite) when fast moving neutrons pass through a moderator, they collide with the molecules of the moderator, as a result of this, the energy of moving neutron decreases while that of the molecules of the moderator increases. After sometime they both attains same energy. The neutrons are then in thermal equilibrium with the molecules of the moderator and are called thermal neutrons.

Note: Energy of thermal neutron is about 0.025 eV and speed is about 2.2 km/s.