Definitions and Concepts for CAIE Physics A-level

Topic 11: Particle Physics

Alpha Particles: A type of particle consisting of two protons and two neutrons. Alpha particles are emitted in alpha decay and are strongly ionising, but weakly penetrating.

Atomic Mass Unit: A unit used to express atomic masses. One AMU is equal to the one twelfth of the mass of a carbon atom.

Beta Particles: An electron or positron. Beta particles are emitted during beta decay and have medium ionising and penetrating capabilities.

Beta-Minus Decay: The process of a neutron inside a nucleus turning into a proton, and emitting a beta-minus particle (an electron) and an antineutrino.

Beta-Plus Decay: The process of a proton inside a nucleus turning into a neutron, and emitting a beta-plus particle (a positron) and a neutrino

Electron: A negatively charged fundamental particle that is found in energy levels surrounding a nucleus.

Hadron: Particles that undergo strong interactions, they are made up of quarks so include mesons and baryons.

Isotopes: A form of an element with the same number of protons but different numbers of neutrons.

Leptons: A group of elementary subatomic particles, consisting of electrons, muons and neutrinos.

Meson: A particle consisting of one quark and one antiquark. Pions and Kaons are examples of mesons.

Nucleon Number: The number of neutrons and protons in the nucleus.

Neutron: A neutrally charged nucleon, found in the nucleus of an atom. Neutrons are a form of hadron.

Positron: A positively charged particle that is the antiparticle of an electron.

Proton: A positively charged nucleon, found in the nucleus of an atom. Protons are a form of hadron.

Proton Number: The number of protons present in the nucleus of a given element.

Quark: Fundamental particle that interacts with other quarks via the strong interaction, it will change flavour via the weak interaction and annihilate with antiquarks to form photons via the electromagnetic interaction. They come in 6 flavours: up, down, charm, strange, top, bottom.

Rutherford Scattering: An experiment involving firing alpha particles at a thin gold foil and observing their deflections. It showed the existence and nature of the nucleus.

Weak Interaction: The force that causes flavour change in quarks and leptons, it is responsible for beta decay.