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D I A G R A M S H E E T

AQA AS Level Physics

Companion to: Particles and radiation - Particle interactions Explanation Sheet

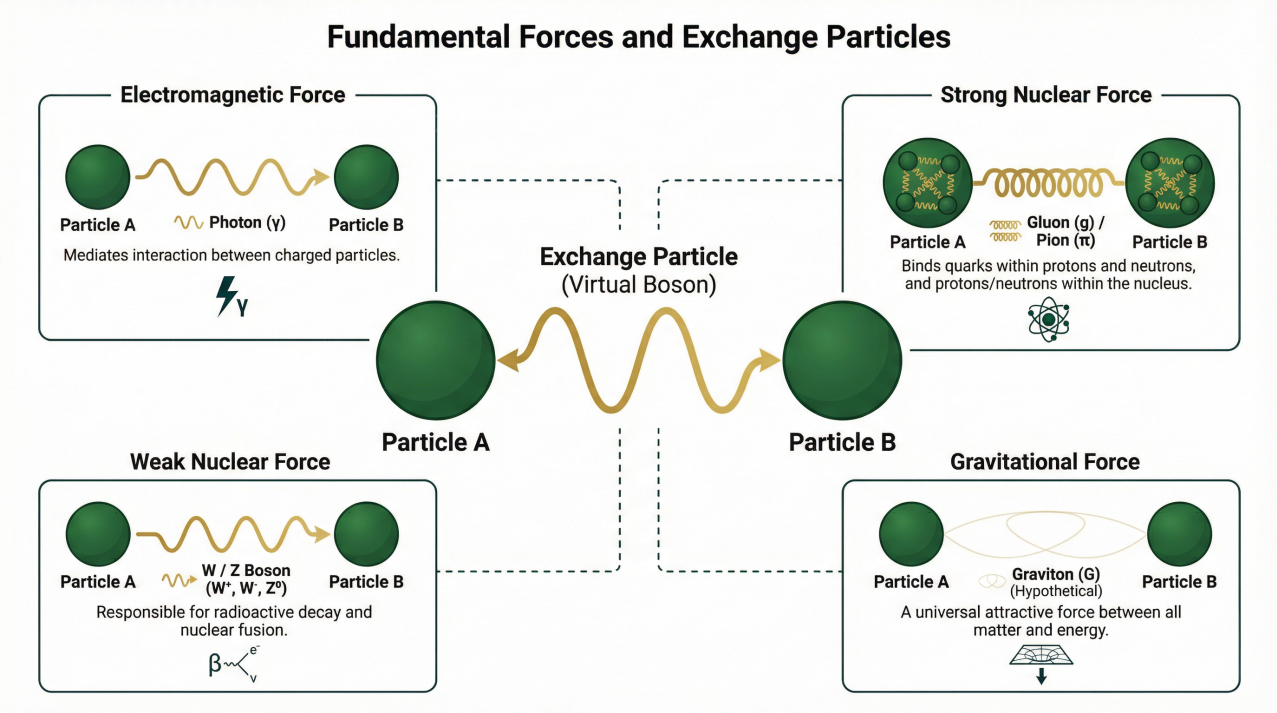
AS LEVEL

Particles and radiation - Particle interactions

Figures in this Sheet

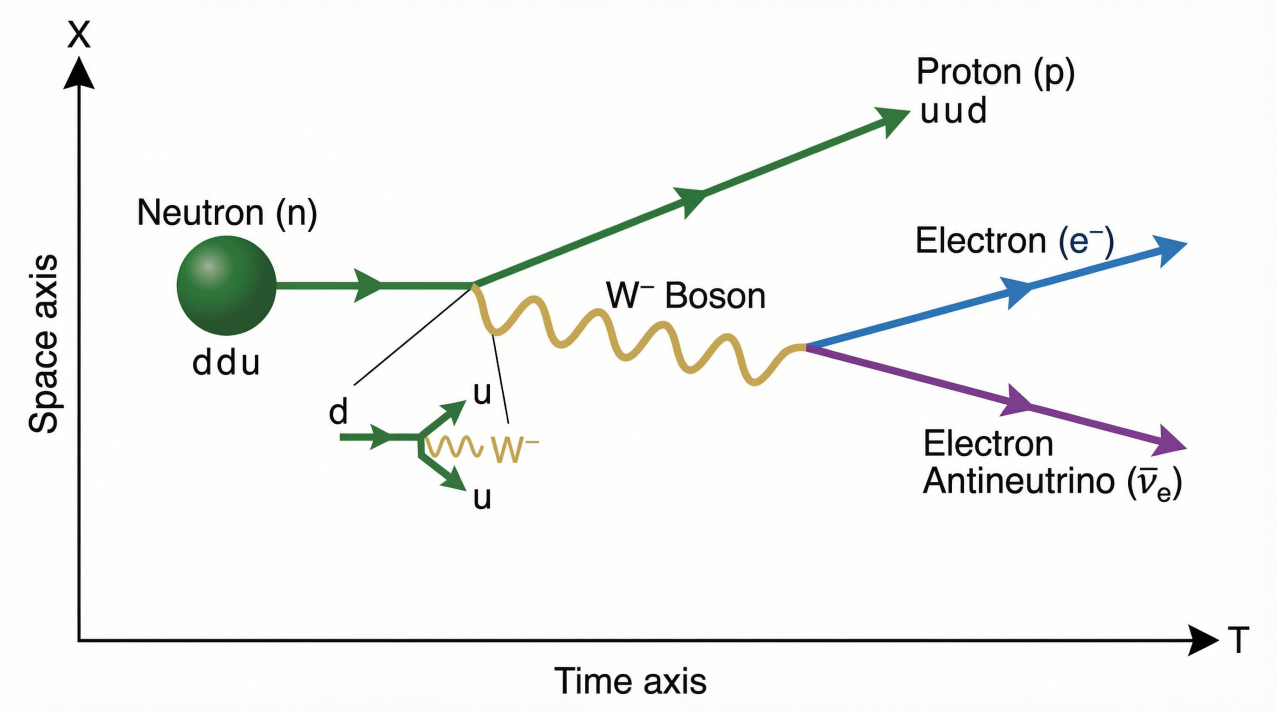
Particles and radiation - Particle interactions — Diagram Sheet

Figure 1: Fundamental Particle Interaction via Exchange Particles



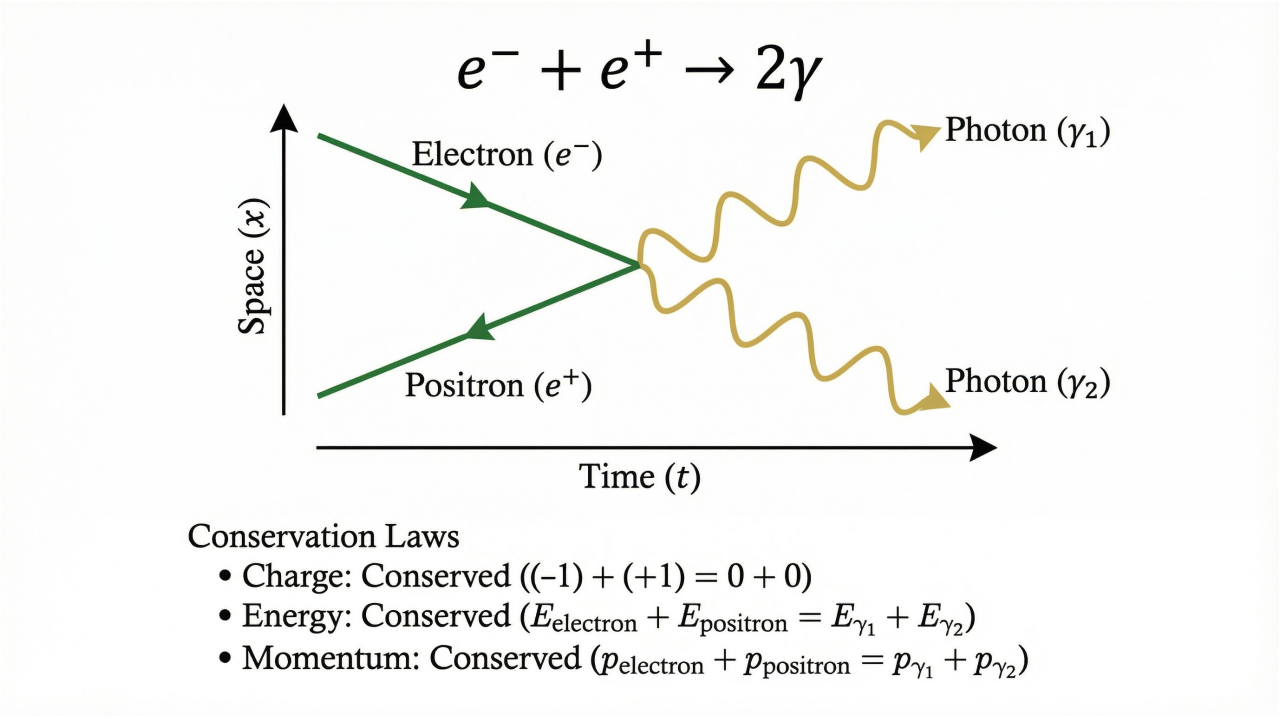
This diagram illustrates the concept of **fundamental forces** acting between two particles through the exchange of **force carrier particles** or **bosons**. It shows two interacting particles exchanging a boson, highlighting how forces like the electromagnetic force are mediated by photon exchange. Understanding this mechanism is crucial because it explains how particles exert forces on each other without direct contact, a foundational idea in quantum field theory and particle physics.

Figure 2: Beta Minus Decay Particle Interaction



This diagram depicts the particle interaction process in **beta minus decay**, where a neutron inside an unstable nucleus transforms into a proton by emitting a **W^- boson**, which quickly decays into an **electron** and an **electron antineutrino**. The illustration is important because it visualizes how weak interactions change particle identity and produce radiation, explaining the origin of beta radiation and demonstrating the role of exchange particles in particle transformations.

Figure 3: Particle-Antiparticle Annihilation and Photon Production



This diagram shows the process of **particle-antiparticle annihilation**, where an electron and a positron collide and annihilate each other, producing two gamma photons that travel in opposite directions. The diagram is vital for understanding how matter and antimatter interact, converting their mass into energy as described by Einstein's equation $E=mc^2$, and it visually demonstrates the conservation of energy and momentum in particle physics.

Study Notes

Use this space to annotate the diagrams above, add your own labels, or note down exam-style questions that relate to each figure. Try covering the labels and testing yourself from memory.