The four forces

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Can you match these up?

Strong

holding nucleus together

charge

graviton

∞ m

Weak

∞ m

attractive / repulsive

always attractive

π^0, g

Electromagnetic

10^{-18} m

10^{-15} m

particle decays

mass

Gravity

photon

W^-, W^+, Z^0

all particles

only particles made of quarks

Lesson Objectives

1. To know the four forces.
2. To know some of the key facts about the four forces.
3. To understand how forces arise due to virtual particle exchange.

Textbook pp. 13–15

Specification Requirement

Stable and unstable nuclei

The strong nuclear force; its role in keeping the nucleus stable; short range attraction to about 3 fm, very-short range repulsion below about 0.5 fm.

Particle interactions

Concept of exchange particles to explain forces.

The electromagnetic force; virtual photons as the exchange particle.

The weak interaction . . . ; W^+ *and* W^- *as the exchange particles.*

[AQA GCE AS and A Level Specification Physics A, 2009/10 onwards]