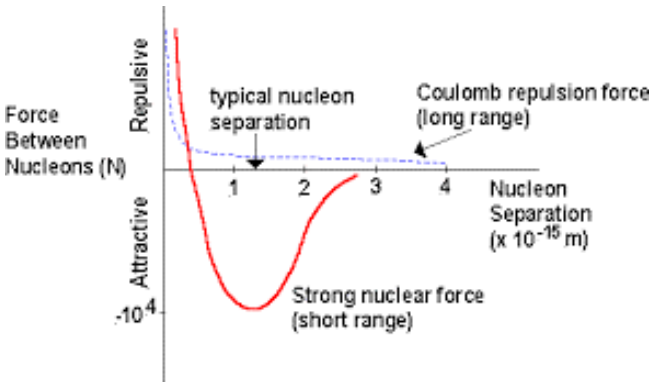
**Stable and unstable nuclei – 3.2.1.2–**

This is strong interaction. The strong nuclear force has a attraction to the other particles in the nucleus of 0.5fm to 3.0fm. Under 0.5fm it has a high repulsion to stop the attraction bonding the protons together. The strong force also keeps the protons together in the nucleus and stops them from shooting out of the nucleus. After 3fm the strong nuclear force drops rapidly to zero.




Alpha emission –

An alpha particle is basically a helium atom. $\alpha^4_2$ – this is an **alpha particle** it contains 2 protons and 2 neutrons. When this gets emitted it reduces the **Mass number by 4 and the proton number by 2.**

**U 238 > 234 Th + α 4**

**92 90 2**

Beta Minus emission –

Beta minus emission occurs in neutron rich isotopes. This is where the neutron in a nucleus turns in to a proton and emits an electron with an anti-electron neutrino. This means the proton number is increased BY ONE, and the mass number STAYS THE SAME. Beta minus decay is when a **NEGATIVE ELECTRON** is emitted. Beta plus emission is when a **POSITIVE ELECTRON** is emitted.



**187Re75 > 187Os76 + 0β-1 + Antielectron Neutrino**

THE NEUTRINO –

How was the neutrino found?

The neutrino was hypothesised by scientists because when a particle releases a beta particle its energy is less than it was before the beta decay and this didn't make sense and didn't follow the law of conservation of energy. Therefore, the neutrino was hypothesised to conserve work amongst the law of conservation of energy. The neutrino was neutral because it had to also satisfy the conservation of charge.