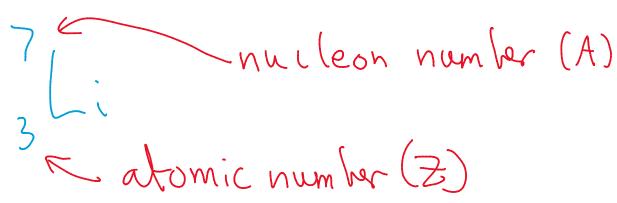
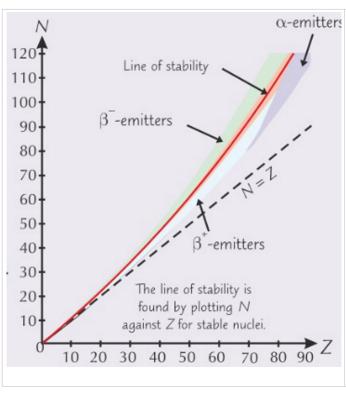
## Radioactivity 004 - Nuclear Decay

10:13

25 February 2020



Remember the strong force - nuclei are held together by this strong, short ranged force. It's quite a balancing act, and plays into nuclear instability. Some nuclei are more stable than others. As in most of physics, there is a graph.



 $\alpha$ -emitter: Nucleon number up the y and number of protons on x

Note the N=Z line. You might expect this to be the most stable line, but it isn't - see the red line - 'line of stability'

Nuclei that decay by alpha tend to be the heavy ones, which isn't really surprising perhaps.

Note the beta- and beta plus decays

## **Decay Formula**

Alpha	Heavy nuclei needing to throw off mass to become more stable
Beta -	Often just called beta decay, we have too many neutrons (called 'neutron rich'), so one turns into a proton emitting an electron and an anti-electron-neutrino
Gamma	After and $\alpha$ or $\beta$ decay the resultant nucleus has too much energy so it releases a Y ray photon. Often therefore gamma decay occurs along with one of the others

Alpha: 
$$238$$
[]  $\rightarrow 70$   $h + 20$   
Beta -:  $188$   $Re \rightarrow 76$   $Os + 0$   $B + 0$   $e$ 

