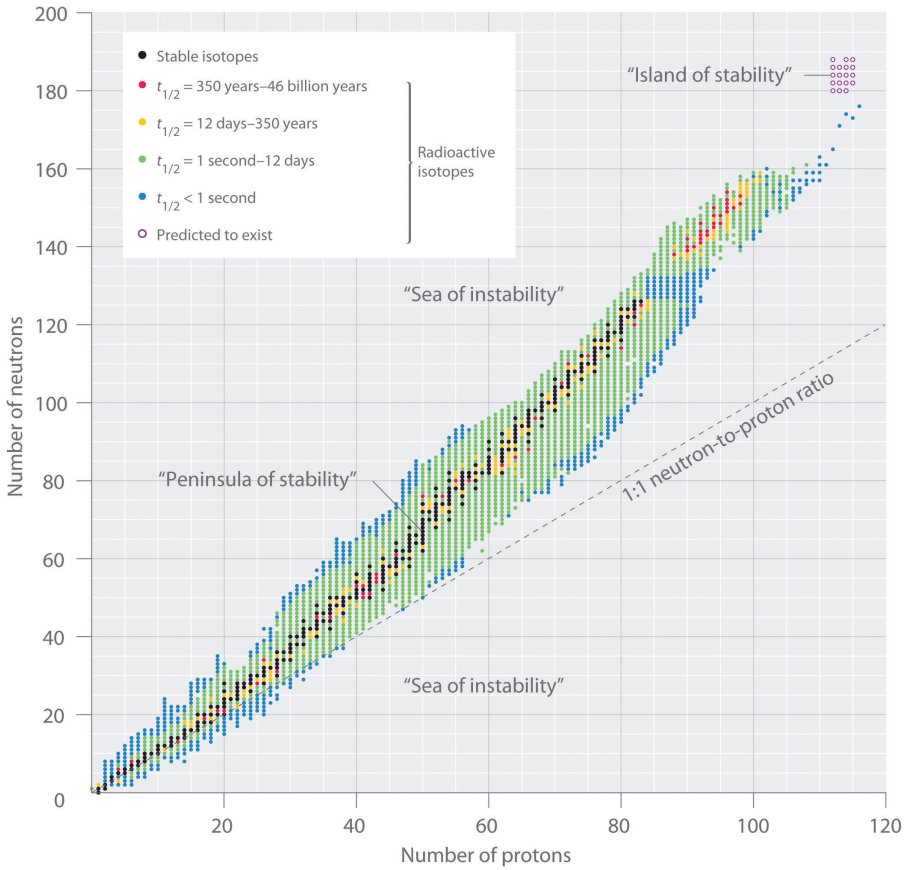
Token: 260 808



Decadimento β^-

$${}^{A}_{Z}X \longrightarrow {}^{A}_{Z+1}X + e^- + \bar{\nu}_e$$

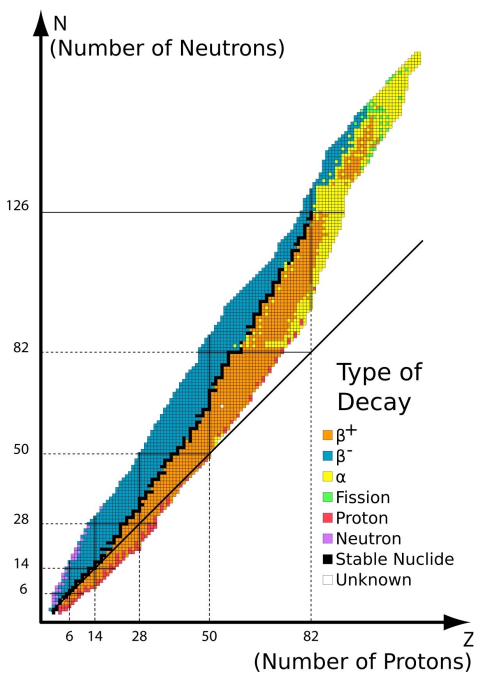
$$n \longrightarrow p + e^- + \bar{\nu}_e$$

$m_n - m_p \simeq 1$ MeV

$m_e = 0.5$ MeV

$$Q = m_n - m_p - m_e - m_\nu$$

$\lesssim 1$ MeV



β^+ : $${}^{A}_{Z}X \longrightarrow {}^{A}_{Z-1}X + e^+ + \nu_e$$

$p \to \cancel{n + e^+ + \nu_e}$ $\quad Q < 0$

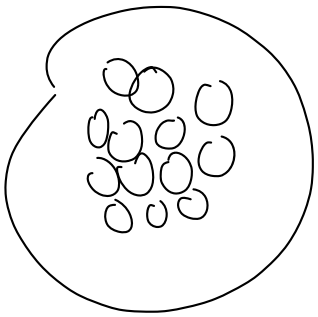
Cattura elettronica

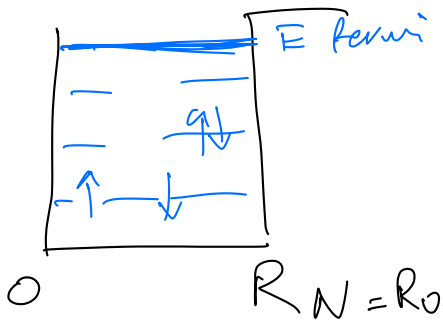
$$ {}^{A}_{Z}X + e^- \longrightarrow {}^{A}_{Z-1}X + \nu_e $$

Fenomenologia dei decadimenti $\Rightarrow$ $B(Z, A)$

nucleo: agglomerato di $A = N + Z$ fermioni:

neutroni, protoni: $S = 1/2$





potenziale nucleone generato da $A-1$ nucleoni:

sperimentalmente: $R = R_0 A^{1/3}$ $\quad R_0 \simeq 1.1$ fm

$$ v(r) = g \frac{e^{-\mu r}}{r} $$

r distanza [L]

$$ \int_0^{E_F} dn_n = 2 \int_0^{E_F} dn = A - Z \quad \text{neutroni} $$

(2: spin)

$$ \int_0^{E_F} dn_p = 2 \int dn = Z \quad \text{protoni} $$

impulso di Fermi

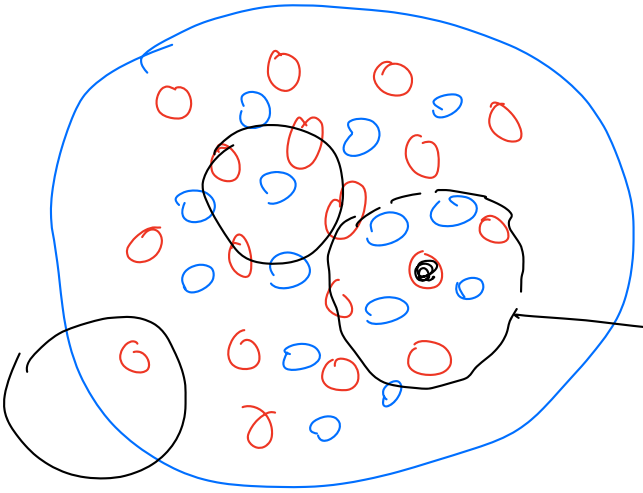
$$p_F = (240\ \text{MeV}) \begin{cases} \left(\frac{Z}{A}\right)^{1/3} & \text{protoni} \\ \left(\frac{2(A-Z)}{A}\right)^{1/3} & \text{neutroni} \end{cases}$$

regime non relativistico

$$\langle E_c \rangle = \frac{\int \frac{p^2}{2m}\, dn}{\int dn}$$

Energia Cinetica.

$$= (9\ \text{MeV}) \left[\left(\frac{Z}{A}\right)^{5/3} + \left(\frac{2(A-Z)}{A}\right)^{5/3} \right]$$



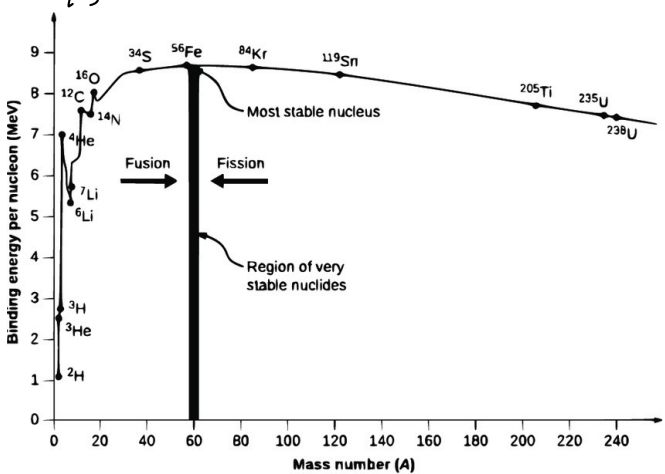
1) Forte nucleare attrattiva
2) Forte di Coulomb
3) Correzioni dovute a E_c cinetica

$\rightarrow V_{int}$

Int. nucleare agisce entro un volume finito V_{int}

A nucleoni $\rightarrow$ termini di interazione $\frac{A(A-1)}{2}$

$B \propto A^2 \Rightarrow \frac{B}{A} \propto A$ non è così sperim.



$R = R_0 A^{1/3}$ $\quad V_N = \frac{4\pi}{3} R_N^3 = \frac{4\pi}{3} R_0^3 A$

$B_V = a_V V \propto a_V A$

↳ energia di legame termine di volume