$\Sigma^+ \rightarrow$ **p** $+ \ \eta^0$??

$\Sigma_c^+ \rightarrow$ **n** $+ \ \eta^0$

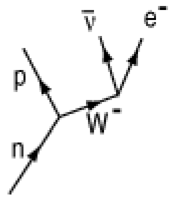
$$\frac{x^4 . t^2}{x^1 . t^4} = \frac{x^3 . t^1}{x^0 . t^3} \cdot \frac{x^1 . t^0}{x^1 . t^0} \qquad \frac{5\ 5}{5\ 5}$$

———————————————

$n^0 \rightarrow p^+ + e^- + \nu^-$

$n^0 \rightarrow p^+ + W^-$

↳ $W^- \rightarrow e^- + \nu^-$



Decay of neutron
$n \rightarrow p + e^- + \bar{\nu}$

---

t → b → c → s → u → ← d

$u \rightarrow d + W^{*+}$

$d \rightarrow u + W^{*-}$

$s \rightarrow u + W^{*-}$

$c \rightarrow s + W^{*+}$

$b \rightarrow c + W^{*-}$

$t \rightarrow b + W^{*+}$

$p + p \rightarrow pn + e^+ + \nu_e$

$n \rightarrow p + e^- + \nu^-_e$

$K^- \rightarrow \pi^0 + e^- + \nu^-_e$

$D^+ \rightarrow K^- + \pi^0 + \pi^+ + e^+ + \nu_e$

$B^0 \rightarrow D^{*-} + e^+ + \nu_e$

– – – –

$\pi^+ (u\ d) \rightarrow \mu^+ + \nu_\mu$; $\pi^+ (u\ d^-)$? $\rightarrow \mu^+ + \nu_\mu$

$u + d \rightarrow W^+ \rightarrow \mu^+ + \nu_\mu$

$\pi^0 \left(\frac{\underline{u^- u + d^- d}}{\sqrt{2}}\right) \rightarrow 2\gamma \qquad \frac{x^0 . t^{+1/3}}{x^1 . t^{-1/3}} \cdot \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} \cdot \frac{x^0 . t^{4/3}}{x^1 . t^{2/3}} \cdot \frac{x^1 . t^{2/3}}{x^0 . t^{4/3}} \qquad \frac{1\,0 \quad 1\,2}{1\,0 \quad 1\,2}$? divné

$\pi^0 \rightarrow e^- + e^+ + \gamma + \gamma$

$\pi^+ + {}_Z{}^A N \rightarrow p + {}_Z{}^{A-1} N$ $\qquad \pi^- + {}_Z{}^A N \rightarrow n + {}_{Z-1}{}^{A-1} N$

D^{+-} (c d) / K^+ ; e^+ /

D^0 (c u) / K ; μ ; e /

D_S^{+-} (c s) / K ; /

Λ^0 (u d s) $\rightarrow p + \pi^-$; $n + \pi^0$ čili převedeno do dvouveličinové řeči :

$$\Lambda^0 = p + \pi^- \qquad \frac{x^4.\,t^1}{x^1.\,t^3} = \frac{x^3.\,t^0}{x^0.\,t^2} \;.\; \frac{x^1.\,t^2}{x^1.\,t^2} \qquad \begin{matrix} 5\ 5 \\ 5\ 5 \end{matrix}$$

$$\Lambda^0 = n + \pi^0 \qquad \frac{x^4.\,t^1}{x^1.\,t^3} = \frac{x^3.\,t^1}{x^0.\,t^3} \;.\; \frac{x^1.\,t^1}{x^1.\,t^1} \qquad \begin{matrix} 5\ 5 \\ 5\ 5 \end{matrix}$$

beta rozpad :

$$\begin{array}{lclcl} \mathbf{{}^{32}P^{/ion/}} & = & \mathbf{{}^{32}S} & & \mathbf{+\ e^- + \nu_e^-} \\ \mathbf{p^{15}.\,n^{17}.\,e^{-15}} & = & \mathbf{p^{16}.\,n^{16}.\,e^{-16}} & & \mathbf{.\ e^-\ .\ \nu_e^-} \\ \mathbf{n} & = & \mathbf{p} & & \mathbf{+\ e^- + \nu_e^-} \\ \mathbf{(d)} & = & \mathbf{(u)} & & \mathbf{+\ e^- + \nu_e^-} \end{array}$$

$$\mathbf{(d) = (u) + e^- + \nu_e^-} \qquad \frac{x^1.\,t^{2/3}}{x^0.\,t^{4/3}} = \frac{x^1.\,t^{-1/3}}{x^0.\,t^{+1/3}} \;.\; \frac{x^2.\,t^2}{x^2.\,t^1} \;.\; \frac{x^0.\,t^0}{x^0.\,t^1} \qquad \begin{matrix} 3\ 3 \\ 3\ 3 \end{matrix}$$

$$\mathbf{t \rightarrow W^+ + b} \qquad \frac{x^3.\,t^{8/3}}{x^2.\,t^{10/3}} = \frac{x^2.\,t^1}{x^2.\,t^1} \;.\; \frac{x^3.\,t^{5/3}}{x^2.\,t^{7/3}} \qquad \mathbf{?} \qquad \begin{matrix} 7\ 6 \\ 7\ 6 \end{matrix}$$

$$K^+(u\,s) \rightarrow \mu^+ + \nu_\mu \qquad \frac{x^2.\,t^1}{x^2.\,t^1} = \frac{x^1.\,t^1}{x^1.\,t^2} \;.\; \frac{x^1.\,t^1}{x^1.\,t^0} \qquad \begin{matrix} 4\ 3 \\ 4\ 3 \end{matrix}$$

;

$$K^-(u\,s) \rightarrow \pi^- + \pi^0 \qquad \frac{x^2.\,t^1}{x^2.\,t^1} = \frac{x^1.\,t^1}{x^1.\,t^1} \;.\; \frac{x^1.\,t^2}{x^1.\,t^2} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

$$K^+(u\,s) \rightarrow \mu^+ + \nu_\tau \qquad \frac{x^2.\,t^1}{x^2.\,t^1} = \frac{x^1.\,t^1}{x^1.\,t^2} \;.\; \frac{x^1.\,t^2}{x^1.\,t^1} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

;

$$K^-(u\,s) \rightarrow \pi^0 + \mu^- + \nu_\mu^- \qquad \frac{x^2.\,t^1}{x^2.\,t^1} = \frac{x^1.\,t^1}{x^1.\,t^1} \;.\; \frac{x^1.\,t^2}{x^1.\,t^1} \;.\; \frac{x^1.\,t^0}{x^1.\,t^1} \qquad \begin{matrix} 5\ 4 \\ 5\ 4 \end{matrix}$$

$K^+(u\,s) \rightarrow \pi^+ + \pi^0$; $K^-(u\,s) \rightarrow \mu^- + \nu_\mu^-$; $K^-(u\,s) \rightarrow \pi^0 + \mu^- + \nu_\mu^-$

$$K^0_S(d\,s^- + d^-s\ /\sqrt{2}) \rightarrow \pi^+ + \pi^- \qquad \frac{x^2.\,t^2}{x^2.\,t^2} = \frac{x^1.\,t^1}{x^1.\,t^1} \;.\; \frac{x^1.\,t^1}{x^1.\,t^1} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

;

$$K^0_S(d\,s^- + d^-s\ /\sqrt{2}) \rightarrow \pi^0 + \pi^0 = 2\pi^0 \qquad \frac{x^2.\,t^1}{x^2.\,t^1} = \frac{x^1.\,t^2}{x^1.\,t^2} \;.\; \frac{x^1.\,t^2}{x^1.\,t^2} \qquad \begin{matrix} 4\ 5 \\ 4\ 5 \end{matrix}$$

K^0_L (dtto) $\rightarrow \pi^+ + \pi^- + \pi^0$; K^0_L (dtto) $\rightarrow \pi^0 + \pi^0 + \pi^0$

$\eta^0\,(uu^- + dd^- + 2ss^-/\sqrt{6}) \rightarrow 2\gamma$; $\eta^0\,(uu^- + dd^- + 2ss^-/\sqrt{6}) \rightarrow 3\mu$

combination $(u\bar{u} + d\bar{d} - 2s\bar{s})/\sqrt{6}$

$\rho^{+-}\,(u\,d) \rightarrow 2\pi$

ϕ (s s) → $K^+ + K^-$; ϕ (s s) → $K^0 + K^{\sim 0}$

D^{+-} (c d) → K^+ +.....e^+ +....

$D^{\sim 0}D^0$ (c u) → K^+, μ , e^- ???

D_S^{+-} (c s) → K^+ + ... ???

J/Ψ (c c⁻) → $\mu^+ + \mu^-$; J/Ψ (c c⁻) → $e^+ + e^-$

B^{+-} (b u) → D^0 + ...???

$B^{\sim 0}B^0$ (b d) → D^0 + ...???

Y (b b) → $\mu^+ + \mu^-$; Y (b b) → $e^+ + e^-$

B = e^- + D^0

D^0 = K^- + π^+

B_s^0 = ϕ + γ ...... ϕ = K^+ + K^-

B_d^0 = K^{*0} + γ ..... K^{*0} = K^+ + π^-

$$ {}^1_1\mathrm{H} + {}^1_1\mathrm{H} \rightarrow {}^2_1\mathrm{D} + e^+ + \nu_e + \gamma $$
$$ {}^2_1\mathrm{D} + {}^1_1\mathrm{H} \rightarrow {}^3_2\mathrm{He} + \gamma $$
$$ {}^3_2\mathrm{He} + {}^1_1\mathrm{H} \rightarrow {}^4_3\mathrm{Li} + \gamma $$
$$ {}^4_3\mathrm{Li} \rightarrow {}^4_2\mathrm{He} + e^+ + \nu_e $$

=====================================-

srážka nebo slučování ?

$^1H_1$ + $^1H_1$ = $^2H_1$ + e^+ + ν_e proton-proton cyklus

p + p = pn + e^+ + ν_e

$^2H_1$ + $^1H_1$ = $^3He_2$ + γ proton-proton cyklus

pn + p = p^2ne^{-2} + 2γ ?

$^1H_1$ + $^3He_2$ = $^4He_2$ + e^+ + ν_e nebo $^1H_1$ + $^3He_2$ = $^4Li_3$ + γ

p + p^2ne^{-2} = $p^2n^2e^{-2}$ + e^+ + ν_e p + p^2ne^{-2} = p^3ne^{-2} + 2γ ?

$^4Li_3$ = $^4He_2$ + e^+ + ν_e

p^3ne^{-2} = $p^2n^2e^{-2}$ + e^+ + ν_e

$^3He_2$ + $^3He_2$ = $^4He_2$ + $^1H_1$ + $^1H_1$ (+ γ ??)

p^2ne^{-2} + p^2ne^{-2} = $p^2n^2e^{-2}$ + p + p + e^{-2}

4 $^1H_1$ = $^4He_2$ + $2e^+$ + $2\nu_e$

p^4 + = $p^2n^2e^{-2}$ + e^{+2} + ν_e^2

$^2H_1$ + $^2H_1$ = $^3He_2$ + $^1n_0$ (+γ) $^2H_1$ – deuterium ?

$pn + pn = p^2ne^{-2} + n + e^+$?

$^2H_1 + {}^2H_1 = {}^3H_1 + {}^1H_1$ $(+\gamma)$

$pn + pn = pn^2 + p$

$^2H_1 + {}^3H_1 = {}^4He_2 + {}^1n_0$ $(+\gamma)$ $^3H_1$ – tritium

$pn + pn^2 = p^2n^2e^{-2} + n + e^+$?

$^2H_1 + {}^3He_2 = {}^4He_2 + {}^1H_1$ $(+\gamma)$ deuterium cyklus

$pn + p^2ne^{-2} = p^2n^2e^{-2} + p$

$p^3n^2e^{-2} = p^3n^2e^{-2} + 2\gamma + 2\gamma^{-}$

$$\frac{x^{22}.t^7}{x^4.t^{17}} = \frac{x^{22}.t^7}{x^4.t^{17}} . \frac{x^4.t^4}{x^4.t^6} . \frac{x^4.t^6}{x^4.t^4} \qquad \frac{34 \quad 34}{34 \quad 34}$$

$6\,{}^2H_1 + {}^3H_1 + {}^3He_2 = 2{}^4He_2 + {}^3He_2 + {}^3H_1 + 2{}^1H_1 + 2{}^1n_0$ $(+\gamma)$

$(pn)^6 + pn^2 + p^2ne^{-2} = (p^2n^2e^{-2})^2 + p^2ne^{-2} + pn^2 + p^2 + n^2$

$p^9\,n^9\,e^{-2} = p^9\,n^9\,e^{-2} + e^{-4}$

$1 = e^{-4} . \gamma^4$

$6\,{}^2H_1 = 2{}^4He_2 + 2\,{}^1H_1 + 2\,{}^1n_0$ $(+\gamma)$

$(pn)^6 = (p^2n^2e^{-2})^2 + p^2 + n^2 + 4\gamma$

$1 = e^{-4} . \gamma^4$

$$1 = \frac{x^8.t^8}{x^8.t^4} . \frac{x^8.t^8}{x^8.t^{12}} \qquad \frac{16 \quad 16}{16 \quad 16}$$

$^1H_1 + {}^3H_1 = {}^4He_2 + \gamma$

$p + pn^2 = p^2n^2e^{-2} + 2\gamma$

$1 = e^{-2} . \gamma^2$

$$1 = \frac{x^4.t^4}{x^4.t^2} . \frac{x^4.t^4}{x^4.t^6} \qquad \frac{8 \quad 8}{8 \quad 8}$$

$6Li_3 + {}^1n_0 = {}^4He_2 + {}^3H_1$ $(+\gamma)$

$p^3n^3e^{-3} + n = p^2n^2e^{-2} + pn^2 + e^-$

$1 = e^- . \gamma$

$^1n_0$ (fast) $+ {}^7Li_3 = {}^3H_1 + {}^4He_2 + {}^1n_0$ (slow)

$n + p^3n^4e^{-3} = pn^2 + p^2n^2e^{-2} + n + e^-$?

$x^1.t^2$ $x^2.t^2$ $x^2.t^3$ 5 7

$\pi^0 \rightarrow \gamma + \gamma^-$ $\dfrac{}{x^1 . t^2} = \dfrac{}{x^2 . t^3} . \dfrac{}{x^2 . t^2}$?? 5 7

$\pi^0 = \gamma + \gamma + \gamma$?

$^{64}Cu_{29} = {}^{64}Ni_{28} + e^+ + v$

$p^{29}n^{35}e^{-29} = p^{28}n^{36}e^{-28} + e^+ + v$ beta rozpad

$(p \; . \; e^-) = (\; n \;) \; . \; e^+ \; . \; v_e$?

$^{89}Kr_{36} + e^- = {}^{89}Br_{35} + \nu_e^-$

$p^{36}n^{53}e^{-36} \; . \; e^- = p^{35}n^{54}e^{-35} \; . \; \nu_e^-$

$(p \; e^-) \; . \; e^- = (\; n \;) \; . \; \nu_e^-$

proč tatáž a tatáž stejná chyba ??, kam se vždy poděje elektron z obalu atomu a proč není zapsán v rovnici?? (lokální nerovnováha)

$\Sigma^+ \rightarrow p + \pi^0$ and $\Sigma^+ \rightarrow n + \pi^+$

$\Omega^- = \Xi^0 + \pi^-$

$\dfrac{x^6 . t^2}{x^3 . t^4} = \dfrac{x^5 . t^1}{x^2 . t^3} . \dfrac{x^1 . t^1}{x^1 . t^1}$ 9 6 / 9 6

$\Omega^- = \Lambda^0 + K^-$

$\dfrac{x^6 . t^2}{x^3 . t^4} = \dfrac{x^4 . t^1}{x^1 . t^3} . \dfrac{x^2 . t^1}{x^2 . t^1}$ 9 6 / 9 6

$\Xi^- = \Lambda^0 + \pi^-$

$\dfrac{x^5 . t^2}{x^2 . t^4} = \dfrac{x^4 . t^1}{x^1 . t^3} . \dfrac{x^1 . t^1}{x^1 . t^1}$ 7 6 / 7 6

$\Xi^- \rightarrow n + \pi^-$

$\dfrac{x^5 . t^2}{x^2 . t^4} = \dfrac{x^3 . t^1}{x^0 . t^3} . \dfrac{x^1 . t^1}{x^1 . t^1}$ 6 6 / 6 6

; $\Xi^- \rightarrow \Lambda + \pi^-$

$\dfrac{x^5 . t^2}{x^2 . t^4} = \dfrac{x^4 . t^1}{x^1 . t^3} . \dfrac{x^1 . t^1}{x^1 . t^1}$ 7 6 / 7 6

$\Xi^0 = \Lambda^0 + \pi^0$

$\dfrac{x^5 . t^1}{x^2 . t^3} = \dfrac{x^4 . t^1}{x^1 . t^3} . \dfrac{x^1 . t^2}{x^1 . t^2}$ 7 6 / 7 6

$\Delta^- = n + \pi^-$

$\dfrac{x^3 . t^2}{x^0 . t^4} = \dfrac{x^3 . t^1}{x^0 . t^3} . \dfrac{x^1 . t^1}{x^1 . t^1}$ 4 6 / 4 6

$$\Delta^0 = n + \pi^0$$

$$\frac{x^3 . t^1}{x^0 . t^3} = \frac{x^3 . t^1}{x^0 . t^3} . \frac{x^1 . t^2}{x^1 . t^2}$$

4 6
4 6

$$\Delta^+ = p + \pi^0$$

$$\frac{x^3 . t^0}{x^0 . t^2} = \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^2}{x^1 . t^2}$$

4 4
4 4

$$\Delta^{++} = p + \pi^+$$

$$\frac{x^3 . t^{-1}}{x^0 . t^{+1}} = \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^1}{x^1 . t^1}$$

4 2
4 2

$$\Sigma^- = n + \pi^-$$

$$\frac{x^4 . t^2}{x^1 . t^4} = \frac{x^3 . t^1}{x^0 . t^3} . \frac{x^1 . t^1}{x^1 . t^1}$$

5 6
5 6

$$\Sigma^0 = \Lambda^0 + \gamma$$

$$\frac{x^4 . t^1}{x^1 . t^3} = \frac{x^4 . t^1}{x^1 . t^3} . \frac{x^2 . t^2}{x^2 . t^3}$$

7 6
7 7

? ? neplatí

$$\Sigma^+ = p + \pi^0$$

$$\frac{x^4 . t^0}{x^1 . t^2} = \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^2}{x^1 . t^2}$$

5 4
5 4

$$\Sigma^+ = n + \pi^+$$

$$\frac{x^4 . t^0}{x^1 . t^2} = \frac{x^3 . t^1}{x^0 . t^3} . \frac{x^1 . t^1}{x^1 . t^1}$$

5 4
5 4

$$\Lambda^0 = p + \pi^-$$

$$\frac{x^4 . t^1}{x^1 . t^3} = \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^1}{x^1 . t^1}$$

5 4
5 4

$$\Lambda^0 = n + \pi^0$$

$$\frac{x^4 . t^1}{x^1 . t^3} = \frac{x^3 . t^1}{x^0 . t^3} . \frac{x^1 . t^2}{x^1 . t^2}$$

5 6
5 6

.–.–.–.–

Nejdříve p + n ⟶ D
a pak D + n ⟶ T, D + p ⟶ ^{3}He, D + D ⟶ ^{3}He
a T + p ⟶ ^{4}He nebo ^{3}He + n ⟶ ^{4}He

p + n = D
D + n = T
D + p = $^3He_2$
D + D = $^3He_2$
T + p = $^4He_2$
$^3He_2$ + n = $^4He_2$

p + n = D
p + n = pn ? asi neplatí
D + n = T
pn + n = pn^2
D + p = $^3He_2$
pn + p = p^2ne^{-2} ?
D + D = $^3He_2$
pn + pn = p^2ne^{-2} ?
T + p = $^4He_2$
p^2n + pn = $p^2n^2e^{-2}$?
$^3He_2$ + n = $^4He_2$
p^2ne^{-2}+ n = $p^2n^2e^{-2}$

(mezonY)

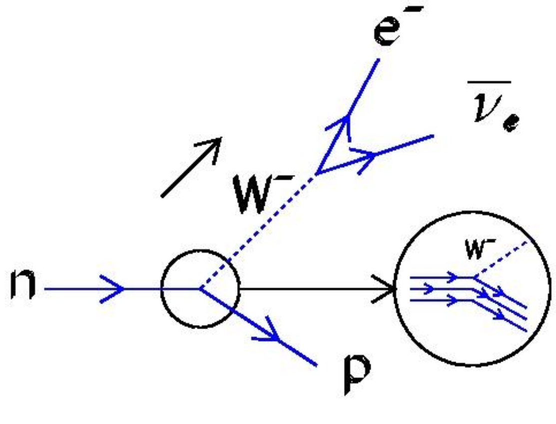
$$\begin{array}{ccccccccccc} & \nu_e^- & & d & = & Y & = & u & & d^- & \\ \frac{4\ \ 1}{4\ \ 1} & \frac{x^0 . t^0}{x^0 . t^1} & \cdot & \frac{x^1 . t^{2/3}}{x^0 . t^{4/3}} & = & \frac{x^4 . t}{x^3 . t^{1/3}} & = & \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} & \cdot & \frac{x^0 . t^{4/3}}{x^1 . t^{2/3}} & \frac{4\ \ 1}{5\ \ 1} \quad ? \end{array}$$

$$\begin{array}{ccccccccccc} & e^+ & & u & = & Y & = & u & & d^- & \\ & \frac{x^2 . t^1}{x^2 . t^2} & \cdot & \frac{x^1 . t^{-1/3}}{x^0 . t^{1/3}} & = & \frac{x^0 . t^{-2/3}}{x^0 . t^{2/3}} & = & \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} & \cdot & \frac{x^0 . t^{4/3}}{x^1 . t^{2/3}} & \frac{2\ \ 1}{2\ \ 1} \quad ? \end{array}$$

$$\begin{array}{ccccccccccc} & \nu_e^- & & d^- & = & Y & = & u & & d & \\ \frac{4\ \ 1}{4\ \ 1} & \frac{x^0 . t^0}{x^0 . t^1} & \cdot & \frac{x^1 . t^{2/3}}{x^0 . t^{4/3}} & = & \frac{x^4 . t^{-4/3}}{x^3 . t^{1/3}} & = & \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} & \cdot & \frac{x^1 . t^{2/3}}{x^0 . t^{4/3}} & \frac{4\ \ 1}{5\ \ 1} \quad ? \end{array}$$

$$\begin{array}{ccccccccccc} & e^+ & & d^- & = & X & = & u & & u & \\ & \frac{x^2 . t^1}{x^2 . t^2} & \cdot & \frac{x^1 . t^{2/3}}{x^0 . t^{4/3}} & = & \frac{x^0 . t^{-2/3}}{x^0 . t^{2/3}} & = & \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} & \cdot & \frac{x^1 . t^{-1/3}}{x^0 . t^{+1/3}} & \frac{2\ \ 1}{2\ \ 1} \quad ? \end{array}$$

.–.–.–.–.–.–.–.–



$W^- \quad = \quad e^- + \nu_e^-$

$$\frac{x^2 . t^2}{x^2 . t^2} = \frac{x^2 . t^1}{x^2 . t^2} . \frac{x^0 . t^1}{x^0 . t^0} \qquad \frac{4 \; 4}{4 \; 4}$$

$n \quad = \quad p \quad + \quad W^-$

$$\frac{x^3 . t^1}{x^0 . t^3} = \frac{x^3 . t^0}{x^0 . t^2} + \frac{x^2 . t^2}{x^2 . t^2} \qquad \frac{5 \; 5}{5 \; 5}$$

$$\pi^+ \rightarrow \mu^+ \nu_\mu$$
$$\hookrightarrow e^+ \nu_e \overline{\nu}_\mu$$