$^{2}_{1}H + {}^{2}_{1}H \rightarrow {}^{3}_{2}He + n + \text{energie}$

$^{1}_{1}H + {}^{3}_{1}H \rightarrow {}^{4}_{2}He + \text{energie}$

$n + {}^{14}_{7}N \rightarrow {}^{14}_{6}C + p$

$n + {}^{235}_{92}U \rightarrow$ 2 menší jádra + 2 až 3 neutrony + energie

---

$^{2}H_{1}$ + $^{2}H_{1}$ => $^{3}He_{2}$ + n + energie

p.n . p.n => $p^{2}.n^{1}.e^{-2}$. n . „gama“

1 = e^{-2} . γ^{2}

1 = e^{-2} + 2γ (platí)

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

- -

$D^{+} \rightarrow K^{-}\pi^{+}\pi^{+}$ - - - -

$^{1}H_{1}$ + $^{3}H_{1}$ = $^{4}He_{2}$ + energie

p . pn^{2} = $p^{2}n^{2}e{-}^{2}$. γ^{2}

1 = e^{-2} + 2γ (platí)

znamená to ovšem, že sloučením jader vznikne atom….a do interakce odkudsi vstupují i elektrony

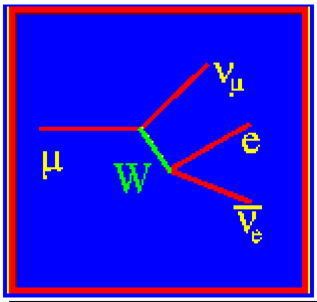
- -

n + $^{14}{}_{7}N$ => $^{14}{}_{6}C$ + p

n + $p^{7}.n^{7}.e^{-7}$ => $p^{6}.n^{8}.e^{-6}$ + p

e^{-} ≠ 1 /to není dobrá rovnováha/

-----…



Sample	N_D	f_{B0}, %	f_{B+}, %	$f_{c\bar{c}}$, %
eD^+	258 ± 22	66.0	20^{+4}_{-7}	14 ± 4
μD^+	202 ± 22	64.0	19^{+4}_{-7}	17 ± 5
eD^{+*}	185 ± 24	71.0	15 ± 7	14 ± 4
μD^{+*}	173 ± 21	68.0	15 ± 7	17 ± 5

$$\frac{x^2 . t^3}{x^2 . t^3} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^1 . t^1}{x^1 . t^1} . \frac{x^1 . t^1}{x^1 . t^1} \qquad (6\ 6)$$

$D^{+(*)} \rightarrow K^{-}\pi^{+}\pi^{+}$

(6 6)

$$D^0 = K^- + \pi^+ \qquad \frac{x^2.t^2}{x^2.t^2} = \frac{x^2.t^1}{x^2.t^1} . \frac{x^1.t^1}{x^1.t^1} \quad \begin{matrix} 5\;4 \\ 5\;4 \end{matrix}$$

;

$$D^{*+} = D^0 + \pi^+ \qquad \frac{x^2.t^3}{x^2.t^3} = \frac{x^2.t^2}{x^2.t^2} . \frac{x^1.t^1}{x^1.t^1} \quad \begin{matrix} 5\;6 \\ 5\;6 \end{matrix}$$

;

$$D^0 = K^- + K^+ \qquad \frac{x^2.t^2}{x^2.t^2} = \frac{x^2.t^2}{x^2.t^2} . \frac{x^2.t^2}{x^2.t^2} \quad \begin{matrix} 6\;6 \\ 6\;6 \end{matrix}$$

zde je vidět, že rozlišovací činitel bude nutno dodat ; ten neznám.

$\Xi = \Omega + K$ pro tuto interakci mi literatura nezadala náboje, takže vyzkouším všechny v úvahu připadající možnosti (je jich pouze 6.mám-li ctít "hladiny"v interakci):

a) $\Xi^0 = \Omega^- + K^+$

$$\frac{x^5 . t^1}{x^2 . t^3} = \frac{x^6 . t^2}{x^3 . t^4} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix} 10\;\;6 \\ 10\;\;6 \end{matrix}$$

b) $\Xi^- = \Omega^- + K^0$

$$\frac{x^5 . t^2}{x^2 . t^4} = \frac{x^6 . t^2}{x^3 . t^4} . \frac{x^2 . t^2}{x^2 . t^2} \qquad \begin{matrix} 10\;\;8 \\ 10\;\;8 \end{matrix}$$

c) $\Xi_c{}^+ = \Omega_c{}^0 + K^+$

$$\frac{x^5 . t^2}{x^2 . t^4} = \frac{x^6 . t^3}{x^3 . t^5} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix} 10\;\;8 \\ 10\;\;8 \end{matrix}$$

d) $\Xi_c{}^0 = \Omega_c{}^0 + K^0$

$$\frac{x^5 . t^3}{x^2 . t^5} = \frac{x^6 . t^3}{x^3 . t^5} . \frac{x^2 . t^2}{x^2 . t^2} \qquad \begin{matrix} 10\;\;10 \\ 10\;\;10 \end{matrix}$$

(rovnováha)

e) $\Xi_{cc}{}^{++} = \Omega_{cc}{}^+ + K^+$

$$\frac{x^5 . t^3}{x^2 . t^5} = \frac{x^6 . t^4}{x^3 . t^6} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix} 10\;\;10 \\ 10\;\;10 \end{matrix}$$

(rovnováha)

f) $\Xi_{cc}{}^+ = \Omega_{cc}{}^+ + K^0$

$$\frac{x^5 . t^4}{x^2 . t^6} = \frac{x^6 . t^4}{x^3 . t^6} . \frac{x^2 . t^2}{x^2 . t^2} \qquad \begin{matrix} 10\;\;12 \\ 10\;\;12 \end{matrix}$$

je vidět, že pro rovnováhu připadají interakce : $\Xi_c{}^0 = \Omega_c{}^0 + K^0$; $\Xi_{cc}{}^{++} = \Omega_{cc}{}^+ + K^+$, ostatní jsou nepravé rovnováhy.

Interakci $\Omega^* = \Xi + K^-$ lze realizovat (má-li se zachovat zák.zachování nábojové rovnováhy)

ve třech možnostech : $\Omega^- = \Xi^0 + K^-$

$$\frac{x^6 . t^2}{x^3 . t^4} = \frac{x^5 . t^1}{x^2 . t^3} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix}10\ \ 6\\ 10\ \ 6\end{matrix}$$

$\Omega_c^{\,0} = \Xi_c^{\,+} + K^-$

$$\frac{x^6 . t^3}{x^3 . t^5} = \frac{x^5 . t^2}{x^2 . t^4} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix}10\ \ 8\\ 10\ \ 8\end{matrix}$$

$\Omega_{cc}^{\,+} = \Xi_{cc}^{\,++} + K^-$

$$\frac{x^6 . t^4}{x^3 . t^6} = \frac{x^5 . t^3}{x^2 . t^5} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix}10\ \ 10\\ 10\ \ 10\end{matrix} \qquad \text{(rovnováha)}$$

…a tak bych podle mých "názorů" navrhoval interakci $\Omega_{cc}^{\,+} = \Xi_{cc}^{\,++} + K^-$

$\bar{b} \to l^+X,\ \bar{B}_d^0 \to D^{+(*)}X$

???????? Ξ Σ Ω ;

$$\frac{x^2 . t^3}{x^2 . t^3} = \frac{x^2 . t^2}{x^2 . t^2} . \frac{x^1 . t^1}{x^1 . t^1} \quad \begin{matrix}(5\ 6)\\ (5\ 6)\end{matrix} \qquad \frac{x^2 . t^2}{x^2 . t^2} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^1 . t^1}{x^1 . t^1} \quad \begin{matrix}(5\ 4)\\ (5\ 4)\end{matrix}$$

$D^{*+} \to D^0\pi^+, D^0 \to K^-\pi^+$

a tak se mi tyto interakce moc nelíbí,není zde "pravá" rovnováha

---

$\bar{B}_d^0 \to D^{*+}X,\ D^{*+} \to D^0\pi^+, D^0 \to K^-\pi^+$

$$D^{+*} \to D^0\pi_s^+, D^0 \to K^-\pi^+.$$
$$B \to \bar{D}X \to l^-X.$$

..

$$\bar{b} \to l^+X, \bar{B}^0 \to D^{+(*)}X$$
$$\bar{b} \to l^+X, \bar{B}^0 \to B^0 \to D^{-(*)}X,$$
$$B^- \to D^{+(*)}X.$$
$$c \to D^{+(*)}X, \bar{c} \to l^-X.$$

	$\bar{b} \to l^+X$	$\bar{b} \to B^0 \to \bar{B}^0 \to l^-X$	$\bar{b} \to c \to l^-X$	$\bar{c} \to l^-X$
$\bar{B}^0 \to D^{+(*)}X$	rs	ws	ws	0
$\bar{B}^0 \to B^0 \to D^{-(*)}X$	ws	rs	rs	0
$\bar{B}^- \to D^{+(*)}X$	rs	ws	ws	0
$c \to D^{+(*)}X$	0	0	0	ws
combinatorics	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

$b \to \bar{B}_d^0 \to D^+X,\ D^+ \to K^-\pi^+\pi^+$

$b \to \bar{B}_d^0 \to D^{*+}X,\ D^{*+} \to D^0\pi^+, D^0 \to K^-\pi^+$ $\qquad B_d^0 \to K^{*0}\gamma$??

možná by mělo být v interakci, že odlétají fotony i antifotony čili $B_d^0 = K^{*0} + \gamma + \bar{\gamma}$ a to pak už je dobře

$$\begin{array}{ccccccccc} B_d^0 & = & K^{*0} & + & \gamma & + & \bar{\gamma} & & \\ x^3.t^2 & & x^2.t^2 & & x^2.t^2 & & x^2.t^3 & & (9\ 9) \\ \text{-----} & = & \text{------} & . & \text{------} & . & \text{------} & & \\ x^3.t^2 & & x^2.t^2 & & x^2.t^3 & & x^2.t^2 & & (9\ 9) \end{array}$$

A)

$$\begin{array}{cccccccc} K^{*0} & = & K^+ & + & \pi^- & & & \\ x^2.t^2 & & x^2.t^1 & & x^1.t^1 & & 5\ 4 & \\ \text{------} & = & \text{------} & . & \text{------} & & & ? \\ x^2.t^2 & & x^2.t^1 & & x^1.t^1 & & 5\ 4 & \end{array}$$

B)

$$\begin{array}{cccccccc} D^0 & = & K^- & + & \pi^+ & & & \\ x^2.t^2 & & x^2.t^1 & & x^1.t^1 & & 5\ 4 & \\ \text{------} & = & \text{------} & . & \text{------} & & & ? \\ x^2.t^2 & & x^2.t^1 & & x^1.t^1 & & 5\ 4 & \end{array}$$

což je zajímavé, že interakce typu A) a B) jsou identické (asi s rozdílem v nějakých parametrech) ……..

$B_d^0 \to K^{*0}\gamma, K^{*0} \to K^+\pi^-$

$\mathcal{BR}(B_d^0 \to K^{*0}\gamma, K^{*0} \to K^+\pi^-) < 2.2 \times 10^{-4} \quad (@90\% \ \ C.L)$

	$B_d^0 \to K^{*0}\gamma$	$B_s^0 \to \phi\gamma$
$\int Ldt(\phi\gamma)/\int Ldt(eD^0X)$	$17.05/23.28$	
$N(eD^0X)$ (events)	61 ± 11	
$\mathcal{BR}(B \to e^-D^0X)$	0.0699 ± 0.0142	
$\mathcal{BR}(D^0 \to K^-\pi^+)$	0.0383 ± 0.0012	
$\mathcal{BR}(K^{*0} \to K^+\pi^-)$	$2/3$	$--$
$\mathcal{BR}(\phi \to K^+K^-)$	$--$	0.491 ± 0.006
$f_s/(f_u, f_d)$	$0.34 \pm 0.10 \pm 0.03$	
$\epsilon(eD^0)/\epsilon(K^{*0}\gamma)$	0.500 ± 0.095	$--$
$\epsilon(eD^0)/\epsilon(\phi\gamma)$	$--$	0.342 ± 0.070

$B \to e^-D^0X$

$\mathcal{BR}(B_s^0 \to \phi\gamma) < 3.9 \times 10^{-4} \quad (@90\% \ \ C.L)$

$b \to s\gamma$

$$b \dashrightarrow s.\tilde{\gamma}.\bar{\gamma} \qquad \begin{array}{cccccccc} x^3.t^{5/3} & & x^2.t^{2/3} & & x^2.t^2 & & x^2.t^3 & (8\ \ 8) \\ \text{--------} & = & \text{--------} & . & \text{-------} & . & \text{------} & \\ x^2.t^{7/3} & & x^1.t^{4/3} & & x^2.t^3 & & x^2.t^2 & (8\ \ 8) \end{array}$$

opět by zde mělo platit, že z reakce odlétají fotony i antifotony

$K^{*0} \to K^+\pi^-$
$B_s^0 \to \phi\gamma$

$\phi \to K^+K^-$

$B_s^0 \to \phi\gamma, \phi \to K^+K^-$

$\mathcal{BR}(B_s^0 \to \phi\gamma, \phi \to K^+K^-) < 3.9 \times 10^{-4}$ (@90% C.L)

$\phi = K^+ + K^-$

$$\frac{x^3 . t^2}{x^3 . t^2} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix} 7\ 4 \\ 7\ 4 \end{matrix} \qquad ?$$

$B_s^0 = \phi + \gamma$

$$\frac{x^3 . t^4}{x^3 . t^4} = \frac{x^3 . t^2}{x^3 . t^2} . \frac{x^2 . t^2}{x^2 . t^3} \qquad \begin{matrix} 8\ 8 \\ 8\ 9 \end{matrix} \qquad ?$$

lépe je interakci doplnit na foton plus antifoton :

$B_s^0 = \phi + \gamma + \bar{\gamma}$

$$\frac{x^3 . t^4}{x^3 . t^4} = \frac{x^3 . t^2}{x^3 . t^2} . \frac{x^2 . t^2}{x^2 . t^3} . \frac{x^2 . t^3}{x^2 . t^2} \qquad \begin{matrix} 10\ 11 \\ 10\ 11 \end{matrix}$$

……i když i to není pravá rovnováha

$\bar{B}_s^0 \to J/\psi\phi$

$$\frac{x^3 . t^4}{x^3 . t^4} = \frac{x^3 . t^4}{x^3 . t^4} . \frac{x^3 . t^2}{x^3 . t^2} \qquad \begin{matrix} 9\ 10 \\ 9\ 10 \end{matrix} \qquad ?$$

$\Lambda_c^+ \to K^- p \pi^+$

$$\frac{x^4 . t^2}{x^1 . t^4} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^1}{x^1 . t^1} \qquad \begin{matrix} 7\ 6 \\ 7\ 6 \end{matrix} \qquad ?$$

$\Lambda_c^+ = K^+ + p + \pi^-$

$$\frac{x^4 . t^2}{x^1 . t^4} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^3 . t^0}{x^0 . t^2} . \frac{x^1 . t^1}{x^1 . t^1} \qquad \begin{matrix} 7\ 6 \\ 7\ 6 \end{matrix} \qquad ?$$

$\Lambda_c^+ = K^+ + n + \pi^0$

$$\frac{x^4 . t^2}{x^1 . t^4} = \frac{x^2 . t^1}{x^2 . t^1} . \frac{x^3 . t^1}{x^0 . t^3} . \frac{x^1 . t^2}{x^1 . t^2} \qquad \begin{matrix} 7\ 8 \\ 7\ 8 \end{matrix} \qquad ?$$

zde je něco záhadného….že zde "se " rovnováha přeskočí :??

$B_c^- \to J/\psi \ell^- X$ $\qquad$ $\bar{B}_s^0 \to \ell^- D_s^+ X$

$\ell = e, \mu$ $\qquad$ $J/\psi \to \mu^+\mu^-$ $\qquad$ $B \to J/\psi K$ $\qquad$ $B \to J/\psi X$

$B \to \psi(2S) K$

$^3H = {}^3He + e^- + \nu_e^-$ (? ? ? ? co to je)

$p.\,n^2.e^- = p^2.n \;.\; e^- \;.\; \nu_e$

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

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

$\pi = \mu^+ + \nu_\mu$

$$\frac{x^1 . t^1}{x^1 . t^1} = \frac{x^1 . t^1}{x^1 . t^2} \cdot \frac{x^1 . t^1}{x^1 . t^0} \qquad \begin{matrix}(3\;\;3)\\(3\;\;3)\end{matrix}$$

$\hookrightarrow \mu^+ = e^+ + \nu_e + \nu_\mu^-$

$$\frac{x^1 . t^1}{x^1 . t^2} = \frac{x^2 . t^1}{x^2 . t^2} \cdot \frac{x^0 . t^1}{x^0 . t^0} \cdot \frac{x^1 . t^0}{x^1 . t^1} \qquad \begin{matrix}(4\;\;4)\\(4\;\;4)\end{matrix}$$

$\tau = /n/ . (\pi + \nu_\tau)$

$$\frac{x^2 . t^1}{x^2 . t^0} = n \frac{x^1 . t^1}{x^1 . t^1} \cdot \frac{x^0 . t^2}{x^0 . t^1} \qquad \begin{matrix}(\,3\;\;3)\\(\,3\;\;3)\end{matrix}$$

$H^0 = b\,b^-$; $e^+ + e^- = H^+ + H^-$; $H^+ = \tau^+ + \nu_\tau$; $H^+ = t^*\, b^- = W^+\, b\, b^-$

$D^0 = K^+ + K^- = K^- + \pi^+ = K^+ + \pi^-$

$D^+ = \mu^+ + \nu_\mu$

$D_s^+ = \phi + \ell + \nu_\ell$

.–.

$H^0 = b + b^-$ >>>>>>>

$$\frac{x^0 . t^1}{x^0 . t^1} = \frac{x^3 . t^{5/3}}{x^2 . t^{7/3}} \cdot \frac{x^2 . t^{7/3}}{x^3 . t^{5/3}} \qquad \begin{matrix}5\;\;5\\5\;\;5\end{matrix}$$

$e^+ + e^- = H^+ + H^-$ >>>>

$$\frac{x^2 . t^1}{x^2 . t^2} \cdot \frac{x^2 . t^2}{x^2 . t^1} = \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^0 . t^2}{x^0 . t^2} \qquad \begin{matrix}6\;\;6\\6\;\;6\end{matrix}$$

$H^+ = \tau^+ + \nu_\tau$???????

$H^+ = \mu^+ + \nu_e$ >>>>>>

$$\frac{x^2 . t^1}{x^2 . t^1} = \frac{x^1 . t^1}{x^1 . t^2} \cdot \frac{x^0 . t^1}{x^0 . t^0} \qquad \begin{matrix}3\;\;3\\3\;\;3\end{matrix}$$

$H^+ = \tau^+ + \nu_\tau$???????

$H^+ = e^+ + \nu_\tau$ >>>>>>

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

$H^+ = t^*\, b^- = W^+\, b\, b^-$

$$\frac{x^2 . t^1}{x^2 . t^1} = \frac{x^3 . t^{8/3}}{x^2 . t^{10/3}} \cdot \frac{x^2 . t^{7/3}}{x^3 . t^{5/3}} \quad \begin{matrix}(7\,6)\\(7\,6)\end{matrix} \quad \frac{x^2 . t^1}{x^2 . t^1} = \frac{x^2 . t^2}{x^2 . t^2} \cdot \frac{X^5 . T^4}{X^5 . T^4}$$

$D^0 = K^+ + K^- = K^- + \pi^+ = K^+ + \pi^-$

$$\frac{x^2 . t^2}{x^2 . t^2} = \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^2 . t^1}{x^2 . t^1} \quad \begin{matrix}(6\,4)\\=\\(6\,4)\end{matrix} \quad \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^1 . t^1}{x^1 . t^1} \quad \begin{matrix}(5\;\;4)\\=\\(5\;\;4)\end{matrix} \quad \text{dtto} \qquad ????$$

$$D^+ = \mu^+ + \nu_\mu \;??? \qquad \frac{x^2 . t^3}{x^2 . t^3} = \frac{x^2 . t^0}{x^2 . t^1} . \frac{x^0 . t^1}{x^0 . t^0} \quad \frac{(4\ \ 4)}{(4\ \ 4)} \; ; \; \frac{x^2 . t^3}{x^2 . t^3} = \frac{x^1 . t^1}{x^1 . t^2} . \frac{x^1 . t^1}{x^1 . t^0} \quad \frac{(4\ \ 5)}{(4\ \ 5)}\ ????$$

$$D^+ = \tau^+ + \nu_e$$

$$\mu^+ = e^+ + \nu_e + \nu_\mu^- \;>>>> \qquad \frac{x^1 . t^1}{x^1 . t^2} = \frac{x^2 . t^1}{x^2 . t^2} . \frac{x^0 . t^1}{x^0 . t^0} . \frac{x^1 . t^0}{x^1 . t^1} \qquad \frac{4\ \ 4}{4\ \ 4}$$

$K^+ = \mu^+ + \nu_\mu$

$\pi^+ = \mu^+ + \nu_\mu$

$D^+ = \mu^+ + \nu_\mu$ toto vše uvádí literatura…ač je to podivné, plyne to z toho, že fyikové postavili mezony "takatak" z kvarků…já kvarkovou tezi přijal beze změny.

$$\mu^+ + \nu_\mu = \frac{x^1 . t^1}{x^1 . t^2} . \frac{x^1 . t^1}{x^1 . t^0} \quad \frac{(2\ \ 2)}{(2\ \ 2)}$$

$$K^+ = \frac{x^2 . t^1}{x^2 . t^1}$$

mezony K^+; π^+ ; D^+ podle určení kvarků , nejsou částicemi totožnými, a tak nemohou se rovnat $\mu^+ + \nu_\mu$

$$\pi^+ = \frac{x^1 . t^1}{x^1 . t^1}$$

$$D^+ = \frac{x^2 . t^3}{x^2 . t^3}$$

32.Nakřáplá jádra od Milana Rojka, Jiřího Dolejšího, Jana Kuchaře.(11/98)

Uvádí se zde,že *: rozpad není jedinou cestou,jak se jádra navzájem přeměňují.Může také docházet ke slučování jader a různým reakcím,například* :

$${}_1H^2 \quad + \quad {}_1H^2 \quad => \quad {}^3{}_2He \quad + \quad n \quad + \; \text{energie}$$

$$p.n \quad . \quad p.n \quad => \quad p^2.n^1.e^{-2} \quad . \quad n \quad . \; \text{„gama“}$$

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

- -

$$n \quad + \quad {}^{14}{}_7N \quad => \quad {}^{14}{}_6C \quad + \quad p$$

$$n \quad . \quad p^7.n^7.e^{-7} \quad => \quad p^6.n^8.e^{-6} \quad . \quad p$$

$$e^- \quad \neq \quad 1$$

/to není rovnováha/

- -

Buď zde není správně dodržena zápisová konvence, nebo já chybně čtu zápis, anebo (se domnívám) , že takto je reakce nesprávně.

$$\mu^- = e^- + \nu_e + \nu_\mu^-$$

$$\frac{x^1 . t^2}{x^1 . t^1} = \frac{x^2 . t^2}{x^2 . t^1} \cdot \frac{x^0 . t^1}{x^0 . t^0} \cdot \frac{x^1 . t^0}{x^1 . t^1} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

$$\tau^- = e^- + \nu_\tau + \nu_e^-$$

$$\frac{x^2 . t^1}{x^2 . t^0} = \frac{x^2 . t^2}{x^2 . t^1} \cdot \frac{x^0 . t^2}{x^0 . t^1} \cdot \frac{x^0 . t^0}{x^0 . t^1} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

$$K^0 = \mu^- + e^+$$

$$\frac{x^2 . t^2}{x^2 . t^2} = \frac{x^1 . t^2}{x^1 . t^1} \cdot \frac{x^2 . t^1}{x^2 . t^2} \qquad \begin{matrix} 5\ 5 \\ 5\ 5 \end{matrix}$$

$$B = (C \quad C^- \quad S)$$

$$\frac{x^3 . t^{5/3}}{x^2 . t^{7/3}} = \frac{x^2 . t^{5/3}}{x^1 . t^{7/3}} \cdot \frac{x^1 . t^{7/3}}{x^2 . t^{5/3}} \cdot \frac{x^2 . t^{2/3}}{x^1 . t^{4/3}} \qquad \begin{matrix} 7\ 7 \\ 7\ 7 \end{matrix}$$

$$\rho^{-+} = W^{-+} + \pi^0$$

$$\frac{x^1 . t^1}{x^1 . t^1} = \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^1 . t^2}{x^1 . t^2} \qquad \begin{matrix} 4\ 4 \\ 4\ 4 \end{matrix}$$

$$\tau^- = K^- + \pi^- + \pi^+ + \pi^0 + \nu_\tau$$

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

$$D^+ = \mu^+ + \nu_\mu$$

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

$$D^0 = K^- + K^+$$

$$\frac{x^2 . t^2}{x^2 . t^2} = \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^2 . t^1}{x^2 . t^1} \qquad \begin{matrix} 6\ 4 \\ 6\ 4 \end{matrix}$$

$$D^0 = K^- + \pi^+$$

$$\frac{x^2 . t^2}{x^2 . t^2} = \frac{x^2 . t^1}{x^2 . t^1} \cdot \frac{x^1 . t^1}{x^1 . t^1} \qquad \begin{matrix} 5\ 4 \\ 5\ 4 \end{matrix}$$

$$D^+ = {}^*K^{-0} + \ell^+ + \nu_\ell$$

$$\frac{x^2 . t^3}{x^2 . t^3} = \frac{x^2 . t^2}{x^2 . t^2} \cdot \frac{x^2 . t^1}{x^2 . t^2} \cdot \frac{x^1 . t^1}{x^1 . t^0} \qquad \begin{matrix} 7\ 7 \\ 7\ 7 \end{matrix}$$

$$e^+ + \nu_\mu$$

$$D^+ = {}^*K^{-0} + \tau^+ + \nu_e$$

$$\frac{x^2 . t^3}{x^2 . t^3} = \frac{x^2 . t^2}{x^2 . t^2} \cdot \frac{x^2 . t^0}{x^2 . t^1} \cdot \frac{x^0 . t^1}{x^0 . t^0} \qquad \begin{matrix} 6\ 6 \\ 6\ 6 \end{matrix}$$

$$D_s^+ = \phi^0 + \ell^+ + \nu_\ell$$

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

$$D_s^+ = \phi^0 + \mu^+ + \nu_e$$
$$D_s^+ = \phi^0 + e^+ + \nu_\tau$$

$$\frac{x^3 . t^3}{x^3 . t^3} = \frac{x^3 . t^2}{x^3 . t^2} \cdot \frac{x^2 . t^1}{x^2 . t^2} \cdot \frac{x^0 . t^2}{x^0 . t^1} \qquad \begin{matrix} 8\ 8 \\ 8\ 8 \end{matrix}$$

$$K^+ = \pi^+ + \nu_e + \nu_e^-$$

$$\frac{x^2 . t^1}{x^2 . t^1} = \frac{x^1 . t^1}{x^1 . t^1} \cdot \frac{x^0 . t^1}{x^0 . t^0} \cdot \frac{x^0 . t^0}{x^0 . t^1} \qquad \begin{matrix} 3\ 3 \\ 3\ 3 \end{matrix}$$