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MEŠANJE PRI NEVTRALNIH MEZONIH

POENOSTAVIMO SI RAČUN S PREDPOSTAVKO, DA MEZONI NE RAZPADAJO.

$$\left.\begin{aligned} |K_1\rangle &= \frac{1}{\sqrt{2}}\left(|K^0\rangle + |\bar{K}^0\rangle\right) \\ |K_2\rangle &= \frac{1}{\sqrt{2}}\left(|K^0\rangle - |\bar{K}^0\rangle\right) \end{aligned}\right\} \text{ LASTNI STANJI } \hat{H}$$

$$\Rightarrow |\bar{K}^0\rangle = \frac{1}{\sqrt{2}}\left(|K_1\rangle - |K_2\rangle\right)$$

$$|K_1(t)\rangle = |K_1\rangle e^{-iE_1 t} \underset{\uparrow \text{ ZA MIRUJOČ KAON}}{=} |K_1\rangle e^{-im_1 t}$$

$$|K_2(t)\rangle = |K_1\rangle e^{-im_2 t}$$

$\bar{K}^0$ USTVARIMO PRI MOČNI INTERAKCIJI $pp \to pm \bar{K}^0 K^+$

OB $t=0$ $\quad |\bar{K}^0\rangle = \frac{1}{\sqrt{2}}\left(|K_1\rangle - |K_2\rangle\right)$

OB $t>0$ $\quad |\bar{K}^0(t)\rangle = \frac{1}{\sqrt{2}}\left(|K_1(t)\rangle - |K_2(t)\rangle\right) = \frac{1}{\sqrt{2}}\left(|K_1\rangle e^{-im_1 t} - |K_2\rangle e^{-im_2 t}\right)$

VERJETNOST, DA SE JE OB $t>0$ $\bar{K}^0$ SPREMENIL V K^0:

$$P(\bar{K}^0 \to K^0; t) = \left|\langle K^0 | \bar{K}^0(t)\rangle\right|^2$$

$$\langle K^0 | \bar{K}^0(t)\rangle = \frac{1}{2}\left(\langle K_1| + \langle K_2|\right)\left(|K_1\rangle e^{-im_1 t} - |K_2\rangle e^{-im_2 t}\right) =$$

$$= \frac{1}{2}\left[\underbrace{\langle K_1|K_1\rangle}_{=1} e^{-im_1 t} - \underbrace{\langle K_1|K_2\rangle}_{=0} e^{-im_2 t} + \underbrace{\langle K_2|K_1\rangle}_{=0} e^{-im_1 t} - \underbrace{\langle K_2|K_2\rangle}_{=1} e^{-im_2 t}\right]$$

KER $|K_1\rangle, |K_2\rangle$ LASTNI STANJI H, ORTOGONALNI IN NORMIRANI

$$= \frac{1}{2}\left(e^{-im_1 t} - e^{-im_2 t}\right) = \frac{1}{2} e^{-i(m_1+m_2)t\cdot\frac{1}{2}}\left(e^{-i(m_1-m_2)\frac{1}{2}t} - e^{+i(m_1-m_2)\frac{1}{2}t}\right)$$

$$= \frac{1}{2} e^{-i(m_1+m_2)\frac{1}{2}t} \cdot (-1) \cdot 2i \sin\left(\frac{(m_1-m_2)}{2} t\right)$$

$$P(\bar{K}^0 \to K^0; t) = \frac{1}{4}\underbrace{\left| e^{-i(m_1+m_2)\cdot\frac{t}{2}}\right|^2}_{=1} \cdot 2^2 \cdot \sin^2\left(\frac{(m_1-m_2)}{2} t\right) =$$

$$= \sin^2\left(\frac{m_1-m_2}{2} \cdot t\right)$$

$$P(\bar{K}^0 \to K^0; t) = \sin^2\left(\frac{(m_1-m_2)}{2} t\right)$$

$$P(\bar{K}^0 \to \bar{K}^0; t) = \cos^2\left(\frac{(m_1-m_2)}{2} \cdot t\right)$$