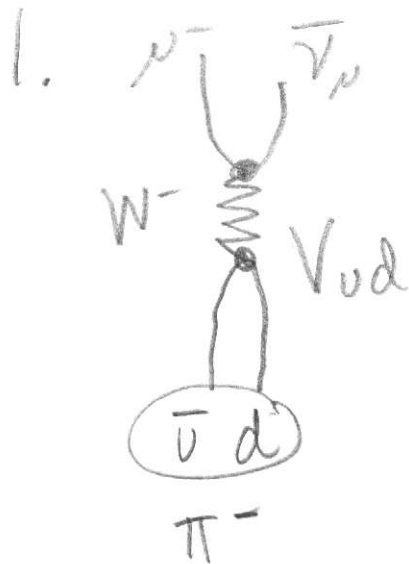


PS#2



$$\frac{\Gamma(K^- \rightarrow \nu^- \bar{\nu}_\mu)}{\Gamma(\pi^- \rightarrow \nu^- \bar{\nu}_\mu)} = \frac{|V_{us}|^2}{|V_{ud}|^2} \approx \left(\frac{0.23}{0.97}\right)^2$$

$$\approx \underline{0.056} \quad \text{estimate}$$

Data:  $\Gamma(\pi^- \rightarrow \nu^- \bar{\nu}_\mu) = \frac{BR}{\tau_{\pi^-}}$

$$= \frac{0.99988}{2.6 \cdot 10^{-8}}$$

$$= 3.8 \cdot 10^7 \text{ /s}$$

$$\Gamma(K^- \rightarrow \nu^- \bar{\nu}_\mu) = \frac{BR}{\tau_{K^-}}$$

$$= \frac{0.635}{1.24 \cdot 10^{-8}} = 5.1 \cdot 10^7$$

$$\frac{\Gamma(K^- \rightarrow \nu^- \bar{\nu}_\mu)}{\Gamma(\pi^- \rightarrow \nu^- \bar{\nu}_\mu)} = \frac{5.1 \cdot 10^7}{3.8 \cdot 10^7} = 1.33 \gg 0.056$$

Actually, including all factors,

$$\frac{\Gamma(K^- \rightarrow \mu^- \bar{\nu}_\mu)}{\Gamma(\pi^- \rightarrow \mu^- \bar{\nu}_\mu)} \approx \frac{|V_{us}|^2}{|V_{ud}|^2} \left(\frac{f_K}{f_\pi}\right)^2 \cdot \frac{m_K}{m_\pi} \left[ \frac{1 - \left(\frac{m_\mu}{m_K}\right)^2}{1 - \left(\frac{m_\mu}{m_\pi}\right)^2} \right]^2$$

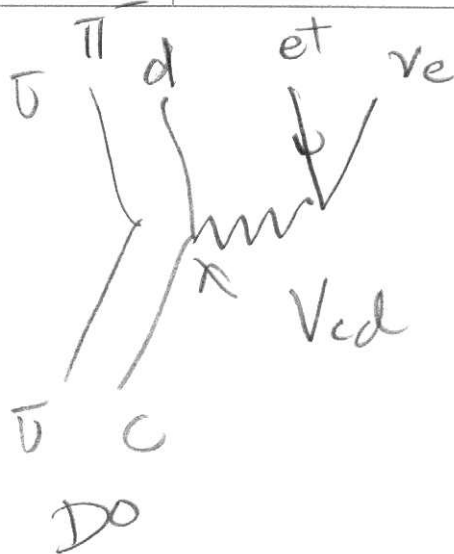
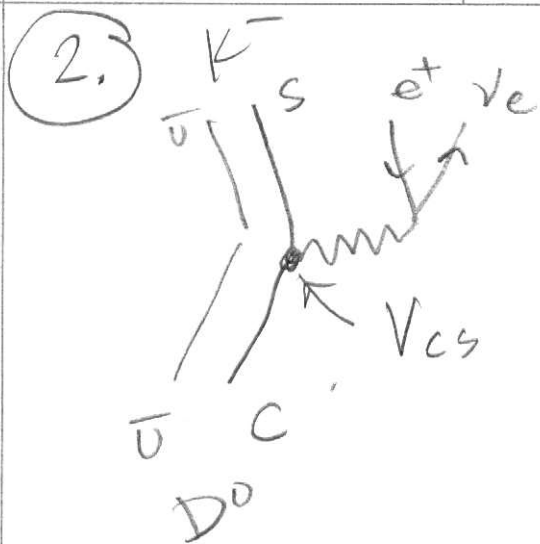
overlap of  
simple quark  
picture with  
real meson

'Phase Space',  
including  
handedness  
of  
interaction

$$\approx 0.056 \cdot (1.16)^2 \cdot 3.54 \cdot \left[ \frac{0.954}{0.427} \right]^2 = 5$$

actually  
deduced,  
not computed!  
FUDGE FACTOR

$$\approx 1.33$$



$$\frac{\Gamma(D^0 \rightarrow K^- e^+ \nu_e)}{\Gamma(D^0 \rightarrow \pi^- e^+ \nu_e)} \approx \left| \frac{V_{cs}}{V_{cd}} \right|^2$$

$$\approx \left| \frac{0.97}{0.23} \right|^2$$

$$\approx 18$$

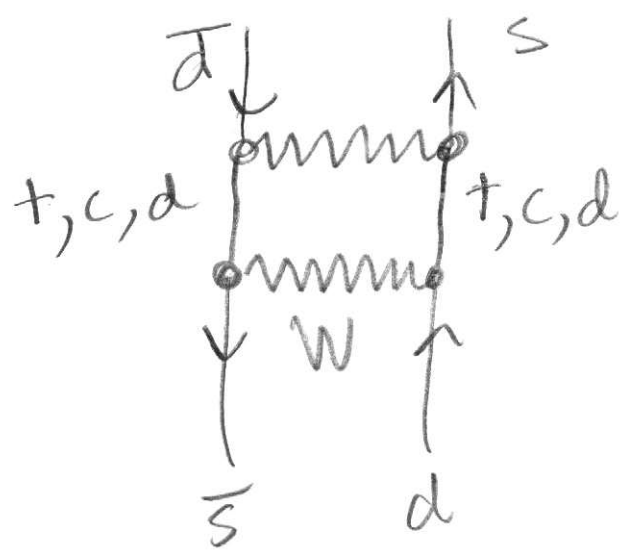
Data

$$\approx \frac{\text{BR}(K^- e^+ \nu_e)}{\text{BR}(\pi^- e^+ \nu_e)} = \frac{3.6 \cdot 10^{-2}}{2.8 \cdot 10^{-3}}$$

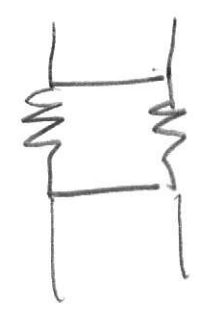
$$\approx 13$$

more phase space for the lighter  
( $\pi^-$ ) final state..

3



can also swap  $t, c, d$  + the  $W$ 's



Also, "long distance"

