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OSAKA IMPERIAL UNIVERSITY.

DATE Feb. 26, 1939

NO. 1

Short Note

~~The Mass and the Mean Life Time of the Mesotron~~

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According to the present theory of the nuclear forces and the β-decay[1], the mesotron with the charge $-e$ (or $+e$) can transform into a negative (or positive) electron and an antineutrino (or a neutrino) even in vacuum, the mean life time due to this process being proportional to the energy.[1] In the previous papers,[2] ~~the proper life time~~, i.e. the mean life time ~~of the mesotron at rest,~~ the proper life time, i.e. of the mesotron at rest ~~was calculated~~ by assuming the interaction of it with the light particles ~~between the mesotron~~ ~~on the basis of the theory of the mesotron satisfying the Dirac-Proca equations and was found to be of the order of~~

$$\tau_0 = 1.5\times10^{-7}\,\text{sec}$$

~~for the mass of the mesotron m_0~~ if we assume the proper mass m_0 to ~~be equal to $200\,m$.~~[2] equivalent ~~corresponding~~ to ~~the~~ that in Fermi's theory of β-decay and was found to ~~have~~ ~~be of the order of~~ the form

$$T_0 = \frac{\hbar c}{g'^2}\cdot\frac{\hbar}{m_0c^2}\left\{\frac{2}{3}\lambda_1+\frac{1}{3}\mu_1^2\right\},\qquad(1)$$

which has a numerical value about ~~$T_0 = 1.3\times10^{-7}$ sec~~

$$T_0 \cong 1.3\times10^{-7}\,\text{sec}\qquad(2)$$

for $\lambda_1=\mu_1=1$, $g'=\ldots$ ~~the proper mass~~ $m_0 = 200\,m$, whereas ~~the life~~ it T_0 became far smaller ~~very much too short~~, if we assumed the interaction equivalent to that in Konopinski-Uhlenbeck's theory. On the other hand, the proper life time ~~value~~ determined ~~experi~~ ~~determined from the experiments~~ by ~~many~~ various authors[3] ~~do~~ from the experiments on the cosmic ray according to the suggestion of Euler and Heisenberg[4] (Ferretti) all pointed to a value of the order of

$$T_0 = 2\times10^{-6}\,\text{sec},\qquad(3)$$

~~Thus, the agreement of the theory and the experiment is not very satisfactory~~, so that which is in qualitative agreement with