第10回 素粒子基礎理論討論会
9月14日, 1955 (1)

午前 1. 伊藤・鈴木 : 観測理論について
information theory
A. Gamba : Nuovo Cim. 1 (1955), 358
Takahashi : 日本物理学会誌 7 (1952), 8
Ono : [illegible]

2. 原 : Non-local spinor 場の local 場への分解.

$$R_{\mu\nu}R^{\mu\nu} = S^2 - M^2$$

$$S^2 = (L + \frac{1}{2}\sigma)^2$$

$$M^2 = (M + \frac{1}{2i}\rho_1\sigma)^2$$

$$\varphi_\rho(X, r)$$

$$R_{\mu\nu} = \frac{1}{i}\left(r_\mu \frac{\partial}{\partial x_\nu} - r_\nu \frac{\partial}{\partial x_\mu}\right)$$

$$\varphi(R, r) = \begin{pmatrix} P_j(\theta, \varphi) f_n(r_0) \\ \cdots \\ \cdots \end{pmatrix}$$

Rarita-Schwinger

$$\left(\gamma\frac{\partial}{\partial x} + \varkappa\right)\begin{pmatrix} \vdots \end{pmatrix} = 0$$

$$\psi^{(i)}_{\lambda\mu\nu\ldots}$$
$$(j - \frac{1}{2})$$

$$\gamma_\mu \psi_{\mu\nu\ldots} = 0$$

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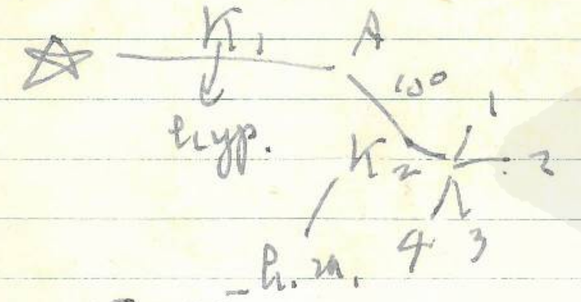
会議：3. 西島：V粒子の理論

heavy meson
θ^0, $\bar{\theta}^0$

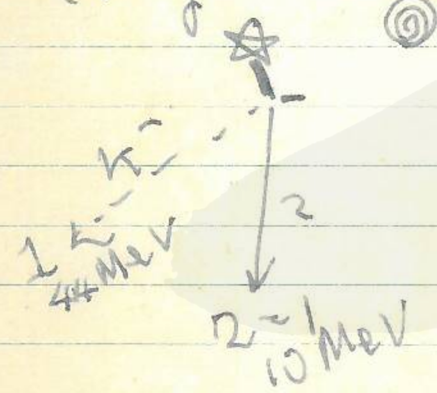
Eisenberg. P.R. 96 ('54), 541
Possible Existence of New Hyperon



$Y^- \to K^- + n$
$\quad + \Lambda^0$　　Q ≈ 5 MeV

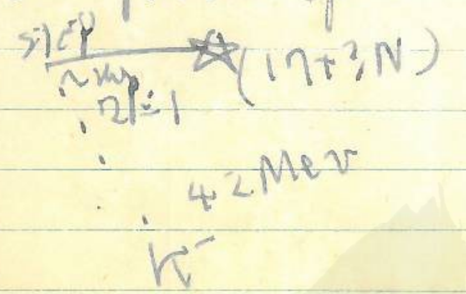
$(Y^- \to \Lambda^0 + \pi^-)$

K-mesonic decay of a slow secondary particle
(Fry, Schneps and Swami, P.R. 97 ('55) 1189.



◎ 1. heavy meson
2. heavy hyperon
3. hyperon hyperfragment
4. meson

Further Evidence for the Existence of a Heavy K-meson or a Heavy Hyperon
(Fry, Schneps and Swami, 　　　　)



1400 me
heavy meson

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Utiyama - Tacabman

~~の~~ ω-parity

$\omega \doteq (-1)^n$

1) $X \to K + n$

$X \to \Lambda^0, \Sigma \cdots$

2) Λ^0 , Σ

$\Sigma + N \to \Lambda + N$

heavy meson

	S.	PS (π)
	+	−
ω'-parity	−	+

hyperon

A $\quad \psi(x) \to \gamma_4 \psi(-x)$ (N)

B $\quad \to -\gamma_4 \psi(-x)$

C $\quad \to i\,\psi(-x)$

D $\quad \to -i\,\psi(-x)$

ω'-parity $\;$ A: +, B: −

$$L^{s}_{int} = \sum_m \sum_b \sum_{b'} g_{mbb'} \chi^{\alpha}_m \bar{\Psi}_b \gamma_5 T^{(bb')}_{\alpha} \Psi_{b'}$$

	π	θ	$\bar{\theta}$	τ	$\bar{\tau}$	N	Λ^0	Σ	Ξ	X
U.T.	−	+	+	−	−	A	B	A	A (B)	B (A)
ω'	+	−	−	+	+	+	−	+	+ (−)	− (+)

$X \to K + n$ $\qquad \Sigma + N \to \Lambda + N$

∓ $\quad$ ± $\quad$ + $\qquad$ + $\quad$ −

$\pi^- + p \to \Sigma^0 + \theta^0$ $\qquad$ U.T. forbidden

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

K-mesonic decay の研究

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Lee　$\overset{s}{K} + \overset{q}{d} \rightleftarrows \overset{S}{\Sigma} + \overset{p}{p}$　によるspinの決定.

K　$m_\tau \sim m_\theta$

$$\frac{d\sigma(\to)}{d\Omega} \Big/ \frac{d\sigma(\leftarrow)}{d\Omega} = \frac{2p^2}{3q^2} \frac{(2S+1)}{(2s+1)}$$

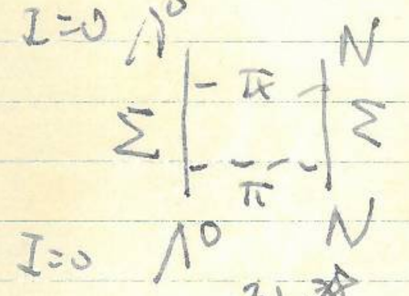
$$\sigma(\to)_{obs} = w_a \sigma_a(\to) + w_b \sigma_b(\to)$$

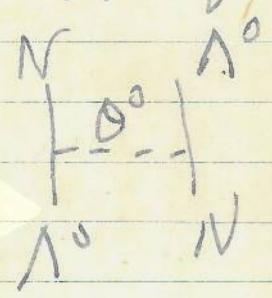
$$\sigma(\leftarrow)_{obs} = \sigma_a(\leftarrow) + \sigma_b(\leftarrow)$$

Hyperon　Λ^0

A. $\Lambda^0 - N$　　$^3H^*$

1. C. I.　　$\Lambda^0 - N$ force range $\leq \frac{1}{2}(NN)$





2. $^3H^*$

$$H_f = T_n + T_p + T_\Lambda + V_{np} + V_{n\Lambda} + V_{p\Lambda}$$

$$H_f \Psi = -(B_d + B_\Lambda)\Psi$$

$$-(B_d + B_\Lambda) \geq -B_d + 2\left\langle \frac{T_\Lambda}{2} + V_{n\Lambda} \right\rangle_{min} \quad (C.I)$$

$$0 > -B_{\Lambda/2} > \left\langle \frac{T_r}{2} + V_{n\Lambda} \right\rangle_{r\,min}$$

$$0 > \left\langle \frac{p_\Lambda^2}{4M} + V_{n\Lambda} \right\rangle_{min}$$

$$0.85 > g_{\Lambda\theta}^2/4\pi \gg 0.19$$

$g^2/4\pi \sim 1.1$　(variation　Λ 1.5MeV)

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hyper-dinucleon $\quad I_3 = \frac{3}{2} \quad \frac{1}{2} \quad -\frac{1}{2} \quad -\frac{3}{2}$

$I = \frac{3}{2}$ $(\Sigma^+ p)$ $(\Sigma^+ n)$ ~~$(\Lambda^0 p)$~~ ~~$(\Lambda^0 n)$~~ $(\Sigma^- n)$

$I = \frac{1}{2}$ $(\Lambda^0 p)$ $(\Lambda^0 n)$

Λ^0 a spin

$^3H^* \to {}^3He + \pi^-$

$^4He^* \to {}^3He + p + \pi^- \qquad 2$

$\to p + p + n + n \qquad 2$
or d

$\frac{1}{2}$ or $\frac{3}{2}$

4、中野；B・S方程式の境界條件

5. 民谷、荒野；核子励起状態、

6. 宮川・妻林；四次元量子化 II.

$\left\{ \frac{\partial^2}{\partial \tau^2} - (\Box - m^2)^2 \right\} \phi(x, \tau) = 0$

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