# PROCEEDINGS OF THE KYOTO INTERNATIONAL SYMPOSIUM *THE JUBILEE OF THE MESON THEORY*

KYOTO, JAPAN
AUGUST 15-17, 1985

Edited by
Masako Bando, Rokuo Kawabe
and Noboru Nakanishi

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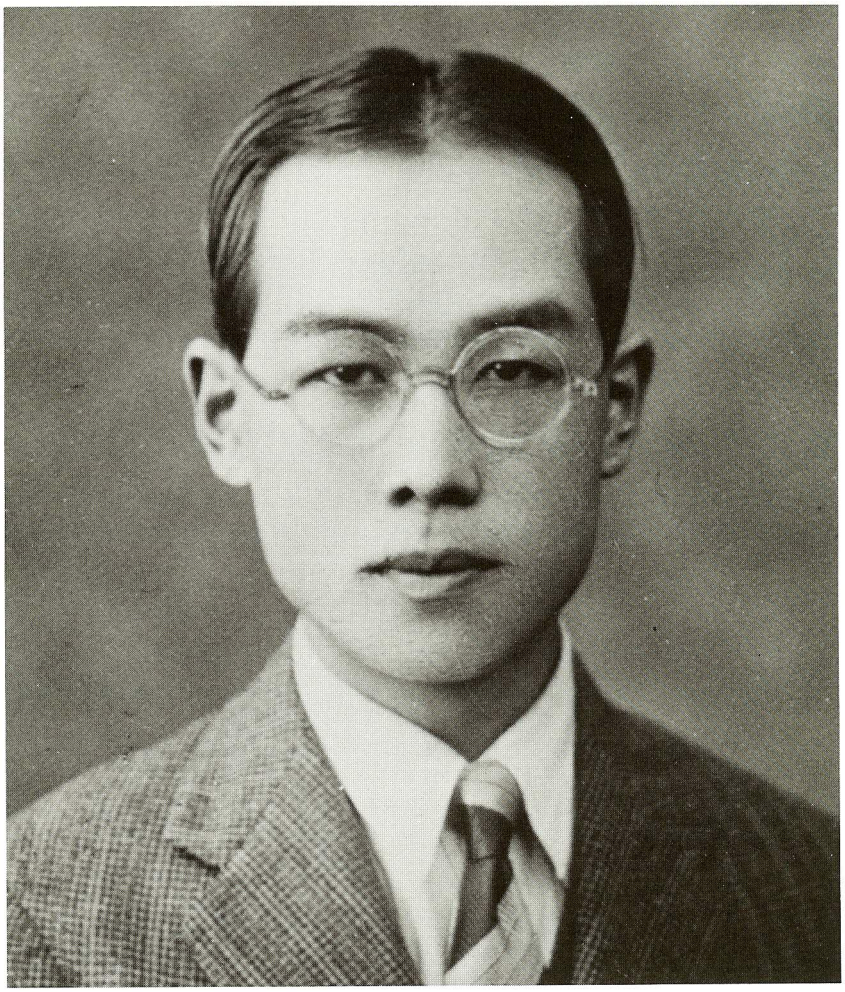

Hideki Yukawa in June 1939.

8×23 = 184
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DEPARTMENT OF PHYSICS
OSAKA IMPERIAL UNIVERSITY.

1

DATE Nov. 1, 1934
NO. 1

# On the Interaction of Elementary Particles. I.

By Hideki Yukawa.

## § 1. Introduction

At the present stage of the quantum theory little is known about the nature of interaction between elementary particles. For example, the ~~force acting between a neutron and a proton~~ interaction whether is an ordinary attraction ~~force~~ or an ~~exchange interaction~~ "Platzwechsel" first proposed by Heisenberg. Recently Fermi[1] has treated the problem of β-ray disintegration on the hypothesis of ~~the existence of~~ "neutrino". According to this theory a neutron and a proton can interact by emitting and absorbing a neutrino and an electron. Unfortunately the energy of interaction calculated on ~~this~~ such assumption[2] is much too small to account for the binding of neutrons and protons in the nucleus. To remove this defect we can (many) have to modify the theory of Heisenberg or Fermi in the following way.

The transition of a heavy particle from a neutron state to a proton state is not always accompanied

(1) E. Fermi, Zeits. f. Phys. **88**, 161, (1934).
(2) Ig. Tamm, Nature, **133**, 981 (1934); D. Iwanenko, ibid., 981 (1934).

Yukawa's handwritten manuscript of his first paper proposing Meson Theory.


A Memorial of Meson Theory place at its birth place, Kurakuen, erected in 1985.

1. Chau, L.-L.
2. Kobayasi, Minoru
3. Syûkawa, M.
4. Kondo, H.
5. Ting, S.C.C.
6. Salingaros, N.A.
7. Nambu, Y.
8. Dalitz, R.H.
9. Munakata, Y.
10. Ogita, N.
11. Tsai, S.-Y.
12. Nakagawa, M.
13. Hsu, J.-P.
14. Santhanam, T.S.
15. Lee, T.D.
16. Vogt, E.W.
17. Rosen, L.
18. Husimi, K.
19. Ewan, G.T.
20. O'Donnell, P.J.
21. Maki, Z.
22. Tokuoka, Z.
23. Nishijima, K.
24. Nguyen, V.H.
25. Araki, H.
26. Ida, M.
27. Kawarabayashi, K.
28. Zhu, H.Y.
29. Kinoshita, T.
30. Hayakawa, S.
31. Konuma, M.
32. Sakita, B.
33. Kikkawa, K.
34. Sawada, S.
35. Kawabe, R.
36. Nakamura, N.
37. Goto, S.
38. Baba, K.
39. Kugo, T.
40. Hayashi, Masahito
41. Ding, Y.b.
42. Koo, W.K.
43. Hayashi, H.
44. Takahasi, W.
45. Kokado, A.
46. Song, X.
47. Nakamura, S.
48. Oehmke, R.H.
49. Sakamoto, J.
50. Morita, M.
51. Hughes, V.W.
52. Yang, C.N.
53. Okabayashi, T.
54. Yamamoto, H.
55. Hayashi, K.
56. Iwao, S.
57. Depommier, P.H.
58. Matumoto, K.
59. Sato, H.
60. Fujikawa, K.
61. Utiyama, R.
62. Yoneya, T.
63. Yamaguchi, Y.
64. Matsuda, S.
65. Sanda, I.
66. Fujii, A.
67. Shimpuku, T.
68. Yanase, M.
69. Hattori, T.
70. Creutz, M.J.
71. Nojiri, S.
72. Tomozawa, Y.
73. Kuramoto, T.
74. Hata, H.
75. Kato, M.
76. Arisue, H.
77. Hatano, S.
78. Narumi, H.
79. Miyata, H.
80. Enatsu, H.
81. Ono, K.
82. Kita, H.
83. Tamagaki, R.
84. Sogami, I.S.
85. Goto, M.
86. Ito, H.
87. Otsuki, S.
88. Yamada, E.
89. Tabata, K.
90. Nogami, Y.
91. Oda, A.
92. Itō, M.
93. Kunitomo, H.
94. Morozumi, T.
95. Matsuyama, T.
96. Yoshida, C.
97. Yamazaki, T.
98. Ishikawa, T.
99. Tanaka, Y.
100. Ivanenko, D.
101. Brown, L.M.
102. Lichtenberg, D.B.
103. Kaku, M.
104. Kitazoe, T.
105. Yano, T.
106. Hayashi, Mitsuo J.
107. Toyota, N.
108. Koide, Y.
109. Linde, A.D.
110. Rubakov, V.A.
111. Shiozaki, T.
112. Matveev, V.A.
113. Nakai, K.
114. Fujii, K.
115. Kobayashi, S.
116. Sato, Y.
117. Shintani, M.
118. Takabayasi, T.
119. Kabe, S.
120. Kang, J.S.
121. Kremer, M.
122. Yamawaki, K.
123. Igi, K.
124. Freund, P.
125. Yamazaki, K.
126. Bottino, A.
127. Yotsuyanagi, I.
128. Biyajima, M.
129. Wakaizumi, S.
130. Suzuki, T.
131. Nakamura, K.
132. Fujiwara, T.
133. Higuchi, A.
134. Yamawaki, M.T.
135. Machida, S.
136. Hamamoto, S.
137. Takagi, S.
138. Arafune, J.
139. Yukawa, T.
140. Kobayashi, Makoto
141. Itô, D.
142. Murayama, A.
143. Ikeda, K.
144. Iwata, K.
145. Okazaki, T.
146. Kawasaki, K.
147. Bando, M.
148. Itoh, K.
149. Strauch, K.
150. Strauch, M.
151. Ogawa, S.
152. Nilsson, J.S.
153. Marshak, R.E.
154. Blažek, M.
155. Pietschmann, H.V.R.
156. Hisatake, K.
157. Roos, M.
158. Low, M.F.
159. Kobayashi, A.
160. Morinaga, H.
161. Feynman, R.P.
162. Okubo, S.
163. Kobayashi, T.
164. Gervais, J.-L.A.
165. Tanaka, S.
166. Iso, C.
167. Kobayakawa, K.
168. Toyoda, T.
169. Yoshida, K.
170. Hu, N.
171. Di Giacomo, A.
172. Langacker, P.G.
173. Konishi, K.
174. Shimada, T.
175. Watamura, S.
176. Carow-Watamura, U.
177. Yennie, D.R.
178. Fröhlich, H.
179. Hamaguchi, M.
180. Silverman, D.J.
181. Nishioka, M.
182. Fukui, I.
183. Marnelius, R.C.
184. Setô, N.
185. Pac, P.Y.
186. Ohta, T.
187. Kanki, T.
188. Yamada, R.
189. Uematsu, T.
190. Tanaka, K.
191. Fukuda, K.
192. Ishikawa, K.
193. Tabata, T.
194. Yamada, M.
195. Noda, H.
196. Yamashita, Y.
197. Wada, W.W.
198. Umemura, I.
199. Suzuki, M.
200. Mazzanti, P.
201. Kayama, Y.
202. Love, S. T.
203. Kitakaze, K.
204. Peccei, R. D.
205. Ohnuki, Y.
206. Ojima, I.
207. Ohtsubo, N.
208. Kobayashi, Masanori
209. Blaser, J.P.
210. Kawaguchi, M.
211. Ishiwata, T.
212. Crozon, M.J.
213. Ni, G.-j.
214. Komori, H.
215. Wang, P.
216. Preparata, G.
217. Chikashige, Y.
218. Kanamori, J.
219. Li, H.-z.
220. Komatsu, H.
221. Kuang, Y.-P.
222. Zhou, G. Z.
223. Matsuoka, T.
224. Nakanishi, N.
225. Nakkagawa, H.
226. Komamiya, S.
227. Ooguri, H.
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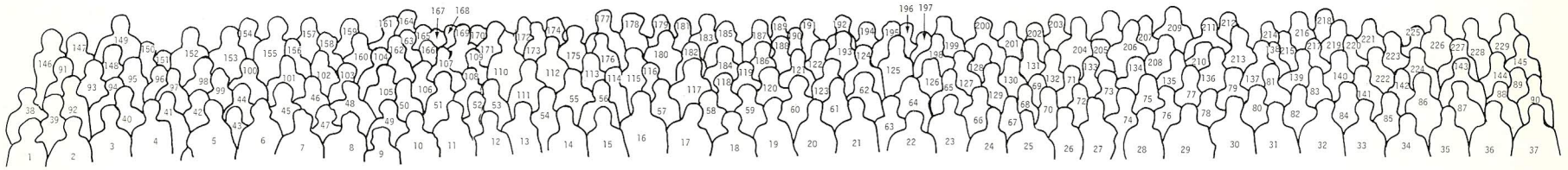

KYOTO INTERNATIONAL SYMPOSIUM:THE JUBILEE OF THE MESON THEORY 15-17 AUGUST 1985

## Preface

Kyoto International Symposium: The Jubilee of the Meson Theory (MESON50) was held at Kyoto International Conference Hall on August 15-17, 1985, under the auspices of the Research Institute for Fundamental Physics (RIFP), the Faculty of Science, and the College of Liberal Arts of Kyoto University, in cooperation with the Physical Society of Japan, the Faculty of Science of Osaka University, the Institute for Nuclear Study and the Institute for Cosmic Ray Research of the University of Tokyo, the National Laboratory for High Energy Physics (KEK), and the Yukawa Foundation.

Meson Theory was proposed by Hideki Yukawa (1907-1981) in 1935, namely, only a decade after the birth of quantum mechanics. At that time, much confusion prevailed about the applicability of quantum theory. Yukawa's Meson Theory indicated the right direction for developing particle physics: It established that quantum field theory is the correct theory even inside a nucleus, it explained how to describe nuclear force at the fundamental level, and it clarified the necessity of distinguishing strong and weak interactions. Thus one may say that particle physics began with Yukawa's Meson Theory.

The purpose of this Symposium were firstly, of course, to celebrate the 50th Anniversary of Yukawa's Meson Theory, secondly to review the development of particle physics during these fifty years and the application of meson physics to various fields, and thirdly to discuss current topics in particle physics in order to obtain some insight into its future progress in the fundamental theory of space-time and matter.

The participants of this Symposium were 88 foreign physicists from 18 countries and 172 Japanese scientists, and 32 interesting talks were given as shown in the Programme. All participants enjoyed fruitful discussions and conversations. The Symposium was quite successful; this success was due to the cooperation of the participants, the members of the Advisory and the Organizing Committees, and the scientific secretaries and assistants.

Finally, the Editors would like to thank the invited speakers of this Symposium for the prompt submission of their manuscripts.

Masako Bando
Rokuo Kawabe
Noboru Nakanishi
Editors of the Proceedings of MESON50

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## CONTENTS