Department of Physics,
Faculty of Science,
Kyoto Imperial University,
Kyoto, Japan, April 25.

Dear Prof. W. Heisenberg,

I should like to express my hearty thanks to you and Dr. Euler for the kindness of sending me a reprint of your report appeared in Ergeb. exakt. Naturwiss. I believe that you received already a copy of a short note entitled "On the mass and the life time of the mesotron" from me and S. Sakata. After sending it out, we noticed that the numerical value $4 \cdot 10^{-59}$ cm^3 erg for Fermi's constant g was not adequate for our purpose. So we made a thorough revision of the previous numerical calculation by taking a value

which had been obtained by Bethe and Critchfield from the data of the β-decay of ^{13}N, instead of the previous one $G^2 = 1.2 \cdot 10^{-26}$. Thus the proper life time was found to have following values:

According to these results, the theoretical life time is always a little too short in comparison with $= 2 \cdot 4 \cdot 10^{-6}$ sec, which was estimated by several authors from the cosmic ray data according to your suggestion.

As you know, Nordheim also made a calculation of on the basis of the scalar theory. He was correct in that he used a value for G, which was valid

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for light -active elements. He was also correct in that he concluded that the theoretical life time was too short except for the exaggeration due to the omission of a factor 16 to be multiplied into his expression for . But, in contrast to him, we are inclined to attribute the above discrepancy between theory and experiment to the limitation of the applicability of the present mesotron theory, as discussed by you in detail, rather than to the fault in the assuption for the mechanism of disintegration, though we are not very sure. Detailed account of this and related points will be made in subsequent papers by myself and by my colleague, S. Sakata, M. Kobayasi , etc, where the results of application of the restriction proposed by you to various collision processes relating to the mesotron will be discussed.

I received about two weeks agos a letter from the President P. Langevin of the Solvay Institute of Physics inviting me to attend the eighth "Conseil de Physique". Soon afterwards, I was informed that you ////// were invited to the "Conseil" to deliver a lecture on the applicability of the quantum theory, a problem of central importance at the present stage of the theoretical physics. I hope that I shall perhaps have the honour of seeing you and hearing your lecture this autumn.

Please give my best regard to Dr. H. Euler. I remain

Yours very sincerely,

Hideki Yukawa

P. S. I beg that you will send the letter to the new address (Kyoto Imperial University) written above hereafter.