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Letter to the Editor of the Physical Review.

## On the Theory of the New Particle in Cosmic Ray.

As already suggested by several authors<sup>1)</sup>, the existence of the new particle in cosmic ray, if confirmed, will be a strong support to the theory which had been proposed by one of the present writers<sup>2)</sup> and recently by Stueckelberg<sup>l</sup>. Thus it will not be useless to give here a brief account of further consequences of the theory and their bearings on cosmic ray and nuclear phenomena.

The aim of the theory was to remove the wellknown difficulty in the so-called " $\beta$ -hypothesis of the nuclear force", in a natural way, by introducing a new field, which was responsible for the short range exchange force between the neutron and the proton, as well as for the  $\beta$ -disintegration. We could arrive at consistent results by assuming the interaction of the new field with the heavy particle to be much larger than that with the light particle. As one of the simplest possible forms, the field was considered to be described by two scalar potentials  $\square$  and  $\tilde{\square}$  conjugate complex to each other, which satisfy the wave equations

$$\left(\Delta - \frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \kappa^2\right) \square = -4\pi g \tilde{\Psi} Q \Psi, \quad (1)$$

$$\left(\Delta - \frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \kappa^2\right) \tilde{\square} = -4\pi g \tilde{\Psi} Q^* \Psi, \quad (2)$$

1) Oppenheimer and Serber, Phys. Rev. 51, 1113, 1937; Yukawa, Proc. Phys.-Math. Soc. Japan 19, 712, 1937; Stueckelberg, Phys. Rev. 52, 41, 1937. It should be noticed that the criticism of Oppenheimer and Serber is not well founded, since many of the difficulties in the current theory do not appear in our theory, as will be shown in the following paragraphs.

2) Yukawa, Proc. Phys.-Math. Soc. 17, 48, 1935.

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