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## Note on the Theory of Positrons

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Infinite charge density due to the electrons in the negative energy state

The difficulty of the Dirac's theory of positrons can be  
or attempts were made to eliminate

Recently, the ~~problem~~ difficulty of infinite charge density due to electrons in the negative energy states in the Dirac's theory of positrons. The present author wants to ~~treat~~ <sup>discuss</sup> this problem on the assumption of complete symmetry of positive and negative charges.

First At first the electron and the ~~proton~~ positron are considered as if they <sup>to be</sup> were independent particles. If we denote the quantized wave functions for them by  $\psi_k$  and  $\phi_k$  respectively, where  $k$  takes the values 1, 2, <sup>3, 4</sup> and <sup>4</sup>, the charge densities for them can be ~~be~~ are

$$-e \sum_k \psi_k^\dagger \psi_k \quad \text{and} \quad +e \sum_k \phi_k^\dagger \phi_k$$

respectively. Similarly their current densities ~~are~~ can be expressed as by

$$-ec \sum_{k,l} \psi_k^\dagger \alpha_{kl} \psi_l \quad \text{and} \quad +ec \sum_{k,l} \phi_k^\dagger \alpha_{kl} \phi_l,$$

where  $c\alpha$  is the vector velocity vector introduced by