
The nature of the penetrating component of cosmic rays

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I. INTRODUCTION AND SUMMARY OF CONCLUSIONS

The measurements by Neddermeyer and Anderson (1937) of the absorption of cosmic-ray particles of low energy by metal plates differ in certain respects from those by Blackett and Wilson (1937). The former results showed that, in the energy range 1.2×10^8 to 5×10^8 e-volts, two types of particles exist, an absorbable group assumed to behave as theory predicts of electrons and a much more penetrating group, attributed provisionally to heavier particles.

On the other hand, we found that all the rays with energy under 2×10^8 e-volts were absorbed like electrons, while for rays of greater energy the average energy loss was very much less. Though a very few energetic particles were found to have a high energy loss, insufficient evidence was then available to justify classifying them as of a nature distinct from the less absorbable rays. Thus we obtained definite experimental evidence that the energy loss of the great majority of the rays varies rapidly with their energy. We concluded, therefore, that the energy loss of a normal electron varies with its energy. We now believe this to be probably false, since the success of the cascade theory of showers, in explaining the transition curve in the atmosphere, and a large part, at any rate, of the phenomena of the