De richtingsverdeling van de kosmische stralen en hun aanslagkans in de Geiger-Müller teller

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Summary.

In 1938 measurements carried out by Clay and Jonker (section 14) demonstrated that a fraction of about 20 to 30 per cent of the total number of discharges in a Geiger-Müller counter was produced by soft photons. This means that, on the average over all directions, the number of these photons exceeds that of ionizing corpuscles, whereas the efficiency of particles is nearly 100 per cent and that of photons is less than a few per cent. (sections 11, 12 and 19)
This idea was sustained by our experience that the ratio of the number of threefold coincidences to that of twofold coincidences (between the outer counters ; three counters in the same plane) increases much with the zenith angle ω of the plane of the counter axes. (section 10) Calling the photon efficiency λ, their number P, and that of the corpuscles C , we write : the number of discharges in one counter $N_1 = C + \lambda P$; of twofold coinc. $N_2 = C + \lambda^2 P$ and of threef. coinc. $N_3 = C + \lambda^3 P \cong C$. (a photon produces one or more Compton electrons in the wall of the fitst counter, with a chance λ , goes on and has the same chance of doing this in the second wall , etc.) We were able to demonstrate that $\lambda P/C = f(\delta)$ (in the unit of solid angle) increases much with δ . Therefore we needed accurate data of the zenith angle distribution of the cosmic radiation . (section 14) Some methods of calculating $N(\omega)$ and $N(\alpha)$ (α = zenith angle of the counter axes) have been treated in sections 6, 7 and 8.
We emphasize the determination of the so called " effective

area " ("Empfindlichkeit") of one counter and of a coincidence arrangement. In a separate section 8 we explain the exact counter and coincidence theory of Janossy , which we use for our calculations. (Chapter 3) We also apply Janossy's theory to a special geometrical problem, the solving of which enables us to estimate λ .(sections 11 and 12) We calculate the "plane and sphere intensity" of the C , $C+\lambda^2P$ and $C+\lambda P$ radiation in sections 15 and compare these in section 16 with the results of others. Finally we correct the expressions of Janossy for distances between the extremes :d=2r to 4r and $d \gg l$.(Chapter 5) Using the corrected formulas , we determine the angle distribution of the C radiation a second time but now in an unusual way, viz. from the relation between $N_3=C$ and d.(vertical plane of the axes) (section 28)

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