2. An Experiment on the Discharge Mechanism of the Geiger-Müller Counter

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Attempts were made to verify the various explanations about the action and the discharge mechanism of the G.M. counter.

Measurement

(1) By varying the grid bias of the sharp cut-off tube 6SH7, we selected all pulses with regard to its height; and counted every pulse at its respective state. This was done with every applied voltage. The cases in which the measurements were made were three as follows. The counter was filled with i) 88 mmHg argon and 15 mmHg alcohol mixture; ii) 16.9 mmHg alcohol only; iii) 86.8 mmHg argon only.

(2) The pulse shape and width were observed by the synchroscope, and it was determined whether these were of the "Nach-Entladung" or not.

(3) The efficiency of the counter which was filled with only alcohol to the cosmic rays was measured.

Results

(1) In the Geiger region, the true pulses were almost of the same height under the same applied voltage; and besides these true counts, we found other smaller and larger pulses. The former, we may admit, are the "Nach-Entladung" and the latter are now to be inquired. Exempting both larger and smaller pulses, the plateau curve becomes flat.

(2) When filled with only alcohol we found the pulses which were larger, but not the smaller at all, and the plateau curve had inclination. The efficiency to the cosmic rays was about 70% (when the alcohol pressure was 15 mmHg).

(3) In the case when the counter was full of only argon, there were many smaller pulses and larger ones. As the Geiger region was very short, it was difficult to draw the plateau curve.

Concluding these, we can see that alcohol plays the part of absorbing the photon which is emitted from argon atom when thd electron avalanches occur.

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3. On Some Properties of 2π-type G-M Counter. (III)

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In order to study the relative efficiency at each part of the plane perpendi-

cular to the axis of a counter, we counted β-particles ejected from the same sample of P^{32} which were collimated by the very narrow and long hole (1 mm in diameter).

As the results, the part of the center was found to be rather inefficient. It was considered to be due to the existence of a glass bead and a center wire. While the efficiency of the part near the cathode wall decreased so sharply that it could not be only attributed to ordioary recombination of ions. Moreover, it was found to be not due to diffusion of a beam of the β-rays by some experiments.

4. The Improved Counting Rate Meter

Toshio Yoshida and *Takuji Yanabu*

(K. Kimura Laboratory)

This circuit consists of an uniform pulse generator, an integrator and a vacuum tube voltmeter. The uniform pulse generator consists of two univibrators and a differential circuits, so that the average rate of arrival of the periodic or random pulses can be indicated by the outputmeter and the reading of the meter never depend on the shape of pulses. Also the first univibrator can act the role of the discriminator. The range of the counts can be easily changed by changing only the bias of the integrator tube. In the integrator circuit no condenser is used, except in the tank circuit, and the vacuum tube voltmeter is of the type of the cathode follower, so that the reading of the outputmeter is linear to the average rate of the input pulses. The voltmeter, forming an electrical bridge, is stable to the fluctuation of the supply voltage.

With this meter, we could read the counting rate, from 10 to 300,000 periodic pulses per minute, or from 71 to 23,100 random pulses per minute, within the error of 5%.

5. The Absorption of γ-Rays from Co^{60} in Several Elements

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(K. Kimura Laboratory)

The γ-ray absorption coefficients of twelve elements for Co^{60} γ-rays (1.17 Mev and 1.33 Mev) were measured.

The value of absorption coefficient generally depends to some extent upon the experimental geometry used. In the present experiment, therefore, in order to exclude the effects of scattered or stray radiation as far as possible, we adopted the experimental arrangement essentially the same as that used by Uemura in