the hypotheses stated; we compare these results with the experimental data:

Experiment	W_1(theoretical)	W_2(theoretical)
K^+ 2.8 ± 1.2%	3.341%	0.399%
K^- 1.2 ± 0.6%	0.655%	0.741%

Since K^- (or $\tilde{K}^+$) occurs only in the group $K\tilde{K}$, for which there is no essential difference between the hypotheses stated above, we cannot expect any difference between the corresponding values. For K^+, however, which occurs also in the group $K\Sigma$, we get a marked difference, since in this case there is a decided difference between the two hypotheses.

As can be seen from the data given above, the hypothesis of Schwinger and Gell-Mann is in better agreement with experiment.

The writer thanks V. S. Barashenkov for his constant interest in this work.

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REFLECTION OF ELECTRONS FROM A HIGH-FREQUENCY POTENTIAL BARRIER

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In the works of Gaponov and the author[1,2] it was shown that the nonrelativistic motion of a charged particle in a high-frequency electromagnetic field is determined by the time-averaged distribution of the high-frequency potential $\Phi = (\eta/2\omega)^2 |E|^2$, where η is the charge-to-mass ratio, E the field strength, and ω the angular frequency of the field. In particular, the average trajectory of the motion is found directly from the energy integral

$$\tfrac{1}{2}\dot{\mathbf{r}}^2 + \Phi(\mathbf{r}) = \text{const.} \qquad (1)$$

The simplest experimental test of these conclusions involves studying the reflection of particles from high-frequency potential barriers. Let the barrier be given by the function $\Phi(z)$, which has a maximum at the point $z = z_1$. Then a particle flying toward the barrier with a speed $\dot{z}$ ($v = \sqrt{2|\eta|V}$) will, as can be seen from (1), be reflected from it if the condition

$$|E|_{z=z_1} > 2\omega\sqrt{V/|\eta|}. \qquad (2)$$

is fulfilled.

The experiment was conducted with a continuously evacuated electron tube comprising a rectangular resonator (2.9 × 1.3 × 10 cm), excited through a narrow inductive "window" and tuned to resonance by a special vacuum piston (wave mode TE_{105}, resonant frequency $\omega = 5.8 \times 10^{10}$ sec.$^{-1}$). Cylindrical pipes (0.97 cm in diameter) were soldered from the outside into the two wide walls of the resonator in such a way that their axis would go through the antinode of the field E. Since only exponentially decreasing waves were excited inside the cylinders, the distribution of the potential Φ along their axis had the shape of a potential barrier with a maximum in the center of the resonator and zero points deep inside the cylindrical pipes. In one of the pipes we placed a two-electrode electron gun, and in the second a disc-shaped collector. To prevent dispersion of the electrons, a weak-focusing magnetic field (on the order of 40 oersteds) was superimposed. The absence of high frequency fields near the surface of the electrodes eliminated the detected current due to phase sorting of the electrons.

The resonator was excited by high-frequency pulses of 10^{-6} sec duration. The height of the barrier was measured by the value of the positive compensating voltage pulse applied to the electron-gun anode, i.e., by the value of the minimal speed of electrons necessary to overcome the barrier. The results are presented in the figure. The power P (in kilowatts) fed into the resonator is plotted on the abscissa and the height of the barrier V (in volts) is plotted on the ordinate. The dotted line in the same figure is calculated from formula (2), taking into account the configuration of the fields in the resonator and its Q factor. The discrepancies do not exceed the error limits of the measurements.

The experiment was conducted at relatively low power levels, although, in principle, peak powers up to 10^6 w may be fed into such systems,

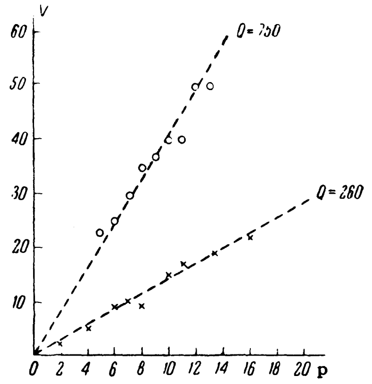

FIG. 1

i.e. barriers up to 10^4 v may be realized. However, in experiments with reflection of fast particles, it should be taken into account that the time of motion of the particles along the slope of the barrier should comprise a sufficiently large number of high-frequency cycles, or else the potential picture itself would lose its sense and the particle could jump the barrier at favorable phases (some kind of "tunnel effect") even though its velocity satisfies condition (2).

Boot and Harvie[3] described an experiment to demonstrate the presence of a potential barrier in a multicavity magnetron. The electrons that appear close to the anode block as a result of ionization (high-frequency discharge) roll down the slope of the barrier to the cold cathode. This effect was detected by the appearance of current in the external circuit and by cathode heating caused by electron bombardment. Experiments with magnetrons conducted by us previously have shown that for unambiguous interpretation of the effect it is necessary to remove the electrodes from the high frequency field, i.e., to avoid a sharp slope of the potential distribution in the whole interaction space.

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NUCLEAR MAGNETIC RESONANCE SHIFT IN MOLYBDENUM

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WE have investigated the shift of the nuclear magnetic resonance, due to the paramagnetism of the conduction electrons (Knight shift)[1] in metallic molybdenum. The spectrometer was similar to the one used before.[2] An electromagnet with a pole diameter of 300 mm and a gap of 42 mm made possible work in fields up to 14,000 gausses, stabilized with deuteron resonance as reference. The frequency was measured with a type 528 wavemeter.

In order to avoid the influence of skin-effect on the resonance line,[3] we worked with a powder prepared by filing a molybdenum sheet and sifting the filings through a sieve of 150 mesh. The molybdenum content in the sheet was not less than 99.9%, and the paramagnetic impurities not more than 0.008%. To relieve the internal stresses, the powder was annealed at 1250°C for two hours in a vacuum of 10^{-4} Hg.

Resonance caused by both odd isotopes of molybdenum was observed in the powder thus obtained. The amplitude ratio of the resonance lines of Mo^{95} and Mo^{97} was 3 : 1, whereas the isotope-content ratio was only 1.5 : 1. An even bigger difference was obtained in the unannealed metal, where the Mo^{97} line was not observed at all, although the Mo^{95} resonance exceeded the noise level by 5 to 6 times. The Mo^{95} signal in the powder immediately after filing was nearly one order lower than in the annealed one. All this points to a strong effect of the interaction between the nuclear quadrupole moments and the gradient of the electrical field, an interaction due to the disturbance of the lattice structure. The quadrupole interaction was noticed to be greater for Mo^{97}. This agrees with the data of W. G. Proctor F. C. Yu on nuclear magnetic resonance of molybdenum in an aqueous solution of K_2MoO_4.[4]

Bloembergen and Rowland[5] showed that a shift of the resonance lines becomes possible at a quadrupole interaction big enough for second-order quadrupole effects to appear. The shifted line should be asymmetrical. For molybdenum,