The corresponding expression of Slater does not contain any explicit effect of the wall construction on the electron motion.

ii) In the case where $\omega = c_{01}/a_0\sqrt{\epsilon\mu}$, this corresponds to Sloan's ion accelerator, and its accelerating electric field is given by the expression containing elliptic integrals.

4. As the means of adjusting the resonance between the progressing electric waves and the electron beam, we can present the way of changing one of a_0, δ and L with z.

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2. On the Dielectric Measurement in the Centimeter Wave Region

Isao TAKAHASHI, Mikio TAKEYAMA, Hideo SENO and Mitsuo ŌTA

(Nozu Laboratory)

In the methods of dielectric measurement in the centimeter wave region, so far the graphical solutions or the approximate expessions have been used. In our method the exact explicit expressions of the complex dielectric constant $\epsilon^*/\epsilon_0 = \epsilon'/\epsilon_0 - j\ \epsilon''/\epsilon_0$ have been derived in the theory of wave guide. These general expressions contain Surber's expression of ϵ^* in the shortcircuit-opencircuit method (1948), as a special case and moreover from these equations many expressions can be derived which are convenient for practical measurements. We can also show one of the causes of the errors which attend the shortcircuit-opencircuit method when the mechanical accuracy of the apparatus is not sufficient. Another advantage of our method is that the deformation, for instance the variation of the sample length, can be made unnecessary.

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3. A High Output Demountable Magnetron Oscillator at 2000 Mc/sec

Sōzaburo YAMASAKI, MIKIO TAKEYAMA and Tanehiro NAKAU

(Nozu Laboratory)

The researches on the multi-segment magnetron of pulse oscillation which has an output powerful in peak but weak in average have in the past been fully performed to generate oscillation in the decimeter and centimeter wave region. On the other hand the researches on the multi-segment magnetron of continuous oscillation and of high output which is very useful for the dielectric heating, and the study of microwave gas discharge, etc. have not been developed. In order to supplement this deficiency, we have made a trial construction of the high output magnetron of continuous oscillation and easy operation. In our magnetron, the anode is 8 segments of "Tachi-

bana type" and the cathode is a simple spiral of pure tungsten wire, and the total input power at 10 KV anode voltage and without magnetic field is 4 KW. We have attained the oscillation at 9 KV anode voltage and 700 Gauß magnetic field, and the continuous output power 500 W at 14.6 cm. length. We have obtained the expectation that the output power higher than 1 KW is possible with the same construction. For the simplification and the inproved efficiency we have constructed a dipole antenna within the magnetron, so that the feeders need not penetrate the wall of the magnetron.

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4. On the Absorption Spectra of $C^{12}H_2O^{16}$ at the 6-mm. and 4-mm. Wave Length

Isao TAKAHASHI, Akira OKAYA and Toru OGAWA

(Nozu Laborstory)

The authors have derived the second and the third harmonic waves from the fundamental wave of the klystron 2K33A whose wave length is 1.2-cm., by usiug the frequency multiplier which we devised and reported at the Anual Meeting of the Physical Society of Japan in 1951.

We have observed the absorption lines of $O^{16}C^{12}S^{32}$ ($J=3 \to 4$, $\nu=48,651.64$ Mc/s, $\alpha=4.4 \times 10^{-4} cm^{-1}$), and several lines of $C^{12}H_2O^{16}$.

Though R.B. Lawrance and M.W.P. Strandberg have made measurements on the spectra of CH_2O, there are yet unobserved lines in milimeter range of this sample. We have detected the line corresponding to $J_{K_{-1}, K_{+1}}$, $11_{2,10} \to 11_{2,9}$ ($\nu=48,600$ Mc/s $\alpha=8 \times 10^{-5} cm^{-1}$), and now are observing the lines $12_{2,11} \to 12_{2,10}$ (6-mm. range) and $19_{3,17} \to 19_{3,16}$ (4-mm range), to compare these with the theoretical values obtained by Heiner *et al.*

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5. X-Ray Studies on Cast Structure of 4% Si-Steel in the Light of Anisotropy of the Velocity of Crystal Growth

Hideo TAKAKI, Masashige KOYAMA and Hidekiyo FUJIHIRA

(H. Takagi Laboratory)

It was found by one of the authors that the growing velocity of [001] was far larger than that of others in the preparation of Si–steel single cystals. On the other hand, it is well known that the growing direction of cast structure of metals which have the cubic structure, is always parallel to [001].