

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 146 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 improved efficiency we have constructed a dipole antenna within the magnetron, so that the feeders need not penetrate the wall of the magnetron.

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 Laboratory)

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 using the frequency multiplier which we devised and reported at the Annual Meeting of the Physical Society of Japan in 1951.

We have observed the absorption lines of $O^{16}C^{12}S^{32}$ ($J=3 \rightarrow 4$, $\nu=48,651.64$ Mc/s, $\alpha=4.4 \times 10^{-4} \text{cm}^{-1}$), 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 millimeter range of this sample. We have detected the line corresponding to $J_{K-1}, K=11_{2,10} \rightarrow 11_{2,9}$ ($\nu=48,600$ Mc/s $\alpha=8 \times 10^{-5} \text{cm}^{-1}$), and now are observing the lines $12_{2,11} \rightarrow 12_{2,10}$ (6-mm. range) and $19_{3,17} \rightarrow 19_{3,16}$ (4-mm range), to compare these with the theoretical values obtained by Heiner *et al.*

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 crystals. 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].