

## XV. STABLE-FREQUENCY MICROWAVE OSCILLATOR

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To provide a signal source for the atomic beam clock, which requires an oscillator of good short-term stability, an oscillator has been made, using a  $TE_{011}$  cavity at room temperature and operating at 3000 Mc/sec. Oscillation is maintained by an amplifier with a Western Electric 416 B triode. A circuit of the double-cavity type is used, designed for mechanical rigidity both in the circuit and in the couplings to the main cavity. A pair of such oscillators, when beating together, have given a reasonable sinusoidal output at a difference frequency of 100 cps. This implies a stability of the order of 1 part in  $10^9$  for periods of a second. Frequency variation caused by changes in plate voltage has been observed as low as 2 parts in  $10^7$  per volt. There is no effect from stray magnetic fields. Provided a reasonable form of antivibration mount is used, this oscillator seems to provide a simple source with a short-term stability of 1 part in  $10^9$ .