

TUESDAY, MAY 16, 1961
SESSION 5: LOW-NOISE
MICROWAVE AMPLIFIERS

2:00 PM - 4:45 PM
CHAIRMAN: G. WADE
RAYTHEON COMPANY
BURLINGTON, MASS.

5.3 SOLID STATE MASERS AS LOW NOISE AMPLIFIERS

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This paper will review the present status of solid state masers as low noise amplifiers. The maser is the most sensitive of existing amplifiers—in fact, its sensitivity is sufficiently close to the theoretical quantum limit that further improvements in sensitivity will be small. Present devices still fall short of the expected performance limit in other respects. In some applications, increased bandwidths are desired. Although fast recovery and freedom from saturation difficulties has been achieved this has still not been obtained simultaneously with large gain bandwidth products. Some remarks will be made with respect to improvements which

may be anticipated in these characteristics.

The maser is well understood theoretically. Further the basic maser is a very simple device. Unfortunately it requires a low temperature environment and this results in costly and complicated auxiliary equipment. At the present time therefore its application would appear to be restricted to sophisticated systems where the ultimate in sensitivity is justified. A satellite communication system is such an example—here the increased complexity of a maser on the ground is a small price to pay for the resulting saving in satellite weight.

