

# High Power Ka Band TWT Amplifier \*

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Two high power 35 GHz TWT amplifiers driven by a relativistic pencil, 850 kV, 200A electron beam have been assembled and tested. The first had a dielectric slow wave structure and was primarily used to develop diagnostics, and to gain experience in working with high power systems in Ka band. The source of the input power for the amplifier was a magnetron producing a 40 kW, 200ns long pulse of which 10 kW was delivered to the experiment. The 30 cm long dielectric (Teflon) amplifier produced output power levels of about 1 MW with a gain of about 23 dB. These results are consistent with expectations from PIC code simulations for this arrangement.

The second amplifier, which is a single stage disk loaded slow wave structure, has been designed. It consists of one hundred uniform cells with two sets of ten tapered cells at the ends to lower the reflection coefficient. The phase advance per cell is  $\pi/2$ . The amplifier passband extends from 28 to 40 GHz. It is designed to increase the output power to about 20 MW. The amplifier is in construction and will be tested in the near future. Details of the design of both systems will be provided and initial results from the new amplifier presented.

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