Operation of a 1.3 GHz, 10 MW Multiple Beam Klystron

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Abstract

Results will be reported for a 1.3 GHz, 10 MW multiple beam klystron that is being developed for the TESLA linear accelerator facility. The design parameters for the device are 10 MW peak RF output power with 150 kW average power, 1.5 ms pulse length, 65% efficiency, 50 dB gain, and 2.0 A/cm^2 maximum cathode loading. Initial testing of the device has validated the basic design approach. Six 120 kV electron beams of measurably identical currents of 22.9 A each have been successfully propagated through the klystron circuit with 99.5% DC beam transmission at full operating video duty and with 98.5% saturated RF transmission. A peak power of 10 MW at 1.3 GHz with 60% efficiency and 49 dB of gain has been measured.

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