RECENT RESULTS FROM AN S-BAND HIGH-POWER BROADBAND 18-BEAM KLYSTRON*

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An 18-beam, seven-cavity multiple-beam klystron ("MBK3") has been developed at the Naval Research Laboratory and is designed to produce a peak rf output power of >500 kW over a 400-MHz frequency band centered at 3.1 GHz.[1] The amplifier operates in the TM_{01} fundamental mode, with the 18 beamlets clustered around the axis of the device in two concentric rings of 12 (outer) and six (inner) beamlets.

We will present the results of recent experimental measurements on the MBK. The 18-beam electron gun is designed to operate at a nominal cathode voltage of 42 kV and a total beam current of 41.6 A.[2] The gun operates in the space-charge limited regime and emission from the cathode is controlled by a modulating anode. The electron gun has met its perveance design goal of 4.8×10^{-6} $AV^{-3/2}$ with very good beam transmission (>97% in the absence of rf). Preliminary rf testing has shown amplification across the full design frequency band of 2.9 to 3.3 GHz. The MBK was recently re-gunned to correct a high pressure gas problem in the cathode region. Further results of beam and rf performance will be presented, as available.

1. K.T. Nguyen, *et al*., "Broadband high-power 18-beam S-band klystron amplifier design," *IEEE Trans. Electron Dev*., vol. 56, no. 5, pp. 883-890, May 2009.
2. K.T. Nguyen, *et al*., "Eighteen-beam gun design for high power, high repetition rate," *IEEE Trans. Plasma Sci*., vol. 33, no. 2, pp. 685-695, April 2005.

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