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Multi-Megawatt Operation of a 95 GHz Gyrotron[1] KEVIN FELCH, MONICA BLANK, PHILIPP BORCHARD, PAT CAHALAN, STEVE CAUFFMAN, Communications and Power Industries, GYROTRON TEAM — A 95 GHz gyrotron capable of generating CW power levels in excess of 2 MW is under development at CPI. The gyrotron employs a single-anode electron gun that produces a 90-kV, 75-A electron beam for interaction with the $TE_{22,6,1}$ cavity mode. Output power from the cavity is transformed into a Gaussian beam using an internal converter that consists of a waveguide launcher and three focusing and phase-correcting mirrors. The beam exits the tube through a chemical-vapor-deposition diamond window. The spent electron beam is dissipated in a 40.6-cm diameter collector fabricated from a strengthened copper alloy. The collector nominally operates at a voltage of 61 kV relative to the cathode potential to minimize the amount of power absorbed in the collector and to improve efficiency. In tests on the gyrotron the maximum power achieved thus far is 1.72 MW with 33% efficiency at the nominal beam current of 75 A. At a reduced beam current of 45 A, an output power of 1.4 MW is obtained with over 50% efficiency. We are planning tube modifications to increase the output power level where efficiencies of greater than 50% can still be obtained.

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