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The DIII-D 3 MW 110 GHz System,* R.W. Callis, J. Lohr, D. Ponce, R.C. O'Neill, R. Prater, T.C. Luce, *General Atomics* — Three 110 GHz gyrotrons with nominal output power of 1 MW each have been installed and are operational on the DIII-D tokamak. One gyrotron is built by Gycom and has a nominal rating of 1 MW and a 2 s pulse length, with the pulse length being determined by the maximum temperature allowed on the edge cooled Boron Nitride window. The second and third gyrotrons were built by Communications and Power Industries (CPI). The first CPI gyrotron uses a double disc FC-75 cooled sapphire window which has a pulse length rating of 0.8 s at 1 MW, 2 s at 0.5 MW and 10 s at 0.35 MW. The second CPI gyrotron, utilizes a single disc CVD (chemical-vapor-deposition) diamond window, that employs water cooling around the edge of the disc. Calculation predict that the CVD diamond window should be capable of full 1 MW cw operation. All gyrotrons are connected to the tokamak by a low-loss-windowless evacuated transmission line using circular corrugated waveguide for propagation in the HE_{11} mode. Each waveguide system incorporates a two mirror launcher which can steer the rf beam poloidally from the center to the outer edge of the plasma. Central current drive experiments with the two gyrotrons with 1.5 MW of injected power drove about 0.17 MA. Results from using the three gyrotron systems will be reported as well as the plans to upgrade the system to 6 MW.

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