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☐ Theory ☒ Experiment

Operation of a Six Gyrotron System on the DIII-D Tokamak,* J. Lohr, M. Cengher, I.A. Gorelov, D. Ponce, *General Atomics* – The gyrotron installation on the DIII-D tokamak has been completed. The system comprises six 110 GHz 1 MW gyrotrons limited administratively to generating pulses up to 5 s in length. Measured transmission line efficiencies are about 75% for 100 m line length, and injected power ≤ 3.5 MW has been achieved. The rf beams can be directed anywhere in the tokamak upper half plane for co- and counter current drive with complete control of the elliptical polarization. The gyrotrons are modulated by tetrodes either with pre-programmed time dependence of output power or under control of the DIII-D Plasma Control System (PCS) responding in real time to changing experimental requirements. System reliability has consistently exceeded 80%. Upgrade plans include installation of two more waveguide lines, bringing the total to eight, gradual replacement of the 1.0 MW diode gyrotrons by 1.5 MW depressed collector tubes, construction of additional high voltage power supplies, and modification of the launchers to accommodate real time steering of the rf beams under PCS control.

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