

**Abstract Submitted for the Fourteenth Topical Conference  
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Category Number and Subject:

Theory     Experiment

**Performance of the 110 GHz System on the DIII-D Tokamak,\*** J. Lohr, R.W. Callis, W.P. Cary, Y. Gorelov, R.A. Legg, R.I. Pinsker, D. Ponce, *General Atomics* — The 110 GHz system on the DIII-D tokamak comprises three Gycom Centaur class gyrotrons producing 750 kW for 2.0 s pulses and one CPI VGT8110 series gyrotron producing 800 kW for 2.0 s pulses. Total injected power is in excess of 2 MW. An additional two CPI gyrotrons are being prepared for operation following failure of their diamond output windows and these failures have resulted in operational limits on power and pulse length for the operating CPI gyrotron. The system has poloidally steerable launchers for four gyrotrons, two with oblique launch for current drive and two with perpendicular launch for heating only. A fully articulating launcher with  $\pm 20^\circ$  poloidal scan and  $\pm 19^\circ$  toroidal scan is also operational. Radiatively cooled mirrors capable of 1 MW for 10 s pulses at 1% duty cycle are being tested on the oblique launcher. New dummy loads based on conversion of the  $HE_{1,1}$  fundamental mode to surface modes and having fast time response and 80% absorption of the incident rf are now in service. A new single mirror coupling scheme for the diamond window gyrotrons has cut losses in the wave coupling process in half to about 6% of the generated power for focused Gaussian beams. The evacuated windowless waveguide lines are up to 100 m in length and are greater than 90% efficient. The performance of the dummy loads, output power modulation, polarization control and the transmission line will be presented. The history and analysis of the failures of the diamond windows will also be discussed.

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Prefer Poster Session  
 Prefer Oral Session

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