

**Abstract Submitted for the 54th Annual Meeting
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Category Number and Subject: 5.6.2. DIII-D Tokamak

Theory Experiment

Operational Performance of the ECH System on DIII-D,*

M. Cengher, J. Lohr, Y.A. Gorelov, D. Ponce, C.P. Moeller, *General Atomics* – The measurement of the rf power in the ECH system on DIII-D is showing the history of the performance for the six 110 GHz, 1 MW class gyrotrons. Four of the six systems show a general trend to higher values for the power injected in the tokamak after improvement of the transmission line, while for the other two systems the lower injected power is explained by operation at lower input power for reliability. The power calibration is based on the measured linearity of the injected power with the gyrotron cavity loading for all 6 systems. Total collector loading was measured versus the beam voltage. The measured transmission loss for 4 of the transmission lines is less than 1.1 dB, close to the theoretical value. The HE_{11} mode content is over 85% for all the lines. An average gain of 0.035 in the total transmission coefficient in the lines is due to a reduced number of miter bends in the system, reduced waveguide run, and improved angular alignment of the rf beam at the waveguide input. Measurements using a 4-port monitor and a dummy load have shown that the maximum power transmitted to a load corresponds to a maximum in the HE_{11} mode.

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