

**Abstract Submitted for the 53rd Annual Meeting
Division of Plasma Physics
November 14–18, 2011, Salt Lake City, Utah**

Category Number and Subject:

Theory Experiment

Performance Measurements for the ECH Transmission Lines on DIII-D,* M. Cengher, J. Lohr, Y.A. Gorelov, D. Ponce, C.P. Moeller, *GA* – The power measurements in the waveguide transmission lines of the ECH system in DIII-D for the six 110 GHz gyrotrons showed higher transmission coefficient after eliminating 14 miter bends, rerouting the lines, and improving the angular alignment of the rf beam at the waveguide input. The transmission in the waveguide lines increased by between 2% and 7% per line, translating into more than 120 kW power gain when the gyrotrons are tuned up for high power. The linearity of the power injected in the tokamak with the gyrotron cavity loading was verified for all 6 systems. After the realignment of the rf beam at the waveguide input, the measured HE_{11} mode content was between 85% and 94%, contributing to the increase in the transmission coefficient. A higher HE_{11} mode content is expected to improve transmission in future conversion miter bends. A 4-port rf monitor was used with a directional coupler to measure the HE_{11} , HE_{21} , and TE_{01} mode amplitudes. The 4-port monitor and dummy load measurements for one gyrotron show that a maximum in the HE_{11} mode corresponds to the best angular alignment.

*Work supported by the US DOE under DE-FC02-04ER54698 and GA IR&D funding.