Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

A Two Frequency 1.5 MW Gyrotron Experiment[1] DAVID TAX, WILLIAM GUSS, MICHAEL SHAPIRO, RICHARD TEMKIN, Massachusetts Institute of Technology, BEN ROCK, RONALD VERNON, University of Wisconsin, JEFFREY NEILSON, Lexam Research — Megawatt gyrotrons are an important microwave source for electron cyclotron heating and current drive (ECH/ECCD) in fusion plasmas due to their ability to produce megawatts of power at millimeter wave frequencies. The MIT gyrotron operates nominally at 96 kV and 40 A with 3 μs pulses and has previously demonstrated 1.5 MW of output power with > 50 % efficiency at 110 GHz with a depressed collector. A new cavity has been designed for 1.5 MW operation at two distinct frequencies: 110 GHz in the $TE_{22,6}$mode and 124.5 GHz in the $TE_{24,7}$mode. A new internal mode converter (IMC) consisting of a dimpled wall launcher and four smooth curved mirrors has also been designed and was optimized for both modes. Simulations of the IMC indicate that > 98 % Gaussian beam content could be achieved for each mode. Cold test results for the components will be presented as well as the current status of the hot test experiment.

[1]Research supported by the DOE Office of Fusion Energy Sciences

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Date submitted: 13 Jul 2012 Electronic form version 1.4