

**Abstract Submitted for the 54th Annual Meeting
Division of Plasma Physics
October 29 through November 2, 2012
Providence, Rhode Island**

Category Number and Subject: 5.6.2. DIII-D Tokamak

[] Theory [X] Experiment

Upgraded Waveguide Components for New 1.2 and 1.5 MW Gyrotrons on the DIII-D Tokamak,* Y.A. Gorelov, J. Doane, M. Cengher, J. Lohr, D. Ponce, *GA* – The present gyrotron system on the DIII-D tokamak comprises 110 GHz gyrotrons in the 1 MW class with designed pulse lengths of 10 s. The system is being upgraded with two types of depressed collector gyrotrons producing 1.2 MW at 110 GHz and 1.5 MW at 117.5 GHz, for which waveguide components having higher power ratings will be required. New power monitors and polarizers have been designed and fabricated, which are capable of operating for 10 s pulses at the higher power levels. This presentation reports an analysis of the component heat loading to obtain a thermal equilibrium. Using this equilibrium, a stress strain analysis was performed to calculate life expectancies. The calculations take into account the temperature dependence of the heat transfer coefficient in the component coolant channels. Although the high heat load components required upgrading, the waveguide lines themselves have adequate margins for the expected power and pulse length. A summary of the thermal capabilities of other components will also be presented..

*Work by the US Department of Energy under DE-FC02-04ER54698.