MULTI-MEGAWATT 110 GHZ ECH SYSTEM FOR THE DIII–D TOKAMAK*

R.W. Callis, J. Lohr, R.C. O'Neill, D. Ponce, R. Prater

General Atomics, P.O. Box 85608, San Diego California 92186-5608

Two 110 GHz gyrotrons with nominal output power of 1 MW each have been installed on the DIII–D tokamak. The first 110 GHz gyrotron built by Gycom, a Russian company, has a nominal rating of 1 MW and a 2 s pulse lenth, with the pulse length being determined by the maximum temperature allowed on the edge cooled BoronNitride window. This gyrotron was first operated into the DIII–D tokamak in late 1996. The second gyrotron was bulit by Communications and Power Industries (CPI), formerally Varian, was commissioned during the spring of 1997. The CPI gyrotron uses a double disc FC-75 cooled saphire window which has a pulse length rating of 0.8 s at 1 MW, 2 s at 0.5 MW and 10 s at 0.2 MW. Both gyrotrons are connected to the tokamak by a low-loss-windowless evacuated transmission line using circular corrugated waveguide carrying the HE_{11} mode. Using short pulse lengths to avoid breakdown inside the air filled waveguide, the microwave beam has been measured inside the DIII–D vacuum vessel using a paper target and IR camera. The resultant microwave beam was found to be well focused with a spot size of approximately 8 cm from the launcher. The beam can be steered poloidially from the center to the outer edge of the plasma. The initial operation of the Gycom gyrotron with about 0.5 MW delivered to a low density plasma for 0.5 s showed good central electron heating, with peak temperature in excess of 10 keV. A third gyrotron, being built by CPI, will be installed later this year. Progress with the first CPI tube will also be discussed and future plans for the ECH installation and physics experiments will be presented.

*Work supported by U.S. Department of Energy under Contract No. DE-AC03-89ER51114.

R.W. Callis
General Atomics
P.O. Box 85608
San Diego, CA 92186-5608
(619) 455-3554
FAX (619) 455-2838
e-mail: callis@gav.gat.com

Prefer:
Oral
✔ Poster

Category #**7**

If possible, please associate this paper with that of