

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Experimental study of a high efficiency 1.5 MW, 110 GHz gyrotron with a depressed collector EUNMI CHOI, ANTOINE CERFON, YOSHITERU HIDAKA, MICHAEL SHAPIRO, JAGADISHWAR SIRIGIRI, RICHARD TEMKIN, MIT, MIT-PSFC WAVES AND BEAMS TEAM — A 1.5 MW, 110 GHz gyrotron is being developed mainly for plasma heating in the DIII-D tokamak. Research at MIT with a short pulse prototype gyrotron is dedicated to understand the physics and engineering challenges facing megawatt class gyrotrons with high efficiency ($>50\%$). We have successfully tested a low ohmic loss cavity (named V-2005) providing 1.67 MW of output power with a corresponding efficiency of 42 % in an axial configuration (without an internal mode converter and without a depressed collector). This paper will report the most recent experimental study with an internal mode converter and a single-stage depressed collector. The operating mode was the TE_{22,6} mode and an existing MIG gun was used at 96 kV of beam voltage and 40 A of beam current with 3 microsecond pulses. We have successfully achieved 50 % of gyrotron overall efficiency at 1.5 MW of output power with 25 kV of beam depression using the new cavity, V-2005. Analysis of the experimental results will be discussed.

Eunmi Choi
MIT

Date submitted: 19 Jul 2006

Electronic form version 1.4