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Performance of Diamond Gyrotron Windows at DIII-D[1] I.A. GORELOV, J. LOHR, R.W. CALLIS, D. PONCE, GA, K. KAJIWARA, ORISE — Artificially grown diamond disks prepared by chemical vapor deposition (CVD) are widely used for gyrotron windows and for tokamak rf port windows due to their ability to transmit high frequency (greater than 100 GHz) and high power (greater than 1 MW) rf beams with minimum losses and excellent thermal performance. A large database has been accumulated during the last few years with results of simulations and experiments on thermal and mechanical properties of CVD diamond under different conditions of rf power transmission, cooling and neutron irradiation. We present experimental measurements and computer simulations of the performance at 110 GHz and 1 MW of three CVD diamond gyrotron output windows on production gyrotrons operating for electron cyclotron heating and current drive experiments on the DIII-D tokamak. We also report model calculations for a 110 GHz depressed collector gyrotron with output power in excess of 1 MW. The model calculations are compared with experimental temperature data from infrared monitoring of the windows during 5 s pulses with 1 MW transmitted rf power.

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I.A. Gorelov
General Atomics

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