

#### DESIGN OF A HIGH POWER 35GHz GYROTRON

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Electron-cyclotron heating of dense plasmas plays a central role in experimental tokamaks used in thermonuclear fusion research. To provide a considerable enhancement of plasma temperature, a microwave power of typically 1MW at a frequency of 100GHz with pulse duration over 0.1s is required. The gyrotron is the only microwave source capable of generating continuous power of more than 200kW at frequencies above 100GHz. Work is being carried out at the Associated Plasma Laboratory of the Institute for Space Research on the development of a 35GHz gyrotron to be used in plasma heating and noninductive current drive experiments. The device includes a MIG-type electron gun that generates a laminar beam current of 5A with a total transverse velocity spread less than 3%. A weakly irregular waveguide made up of truncated cones constitutes the electrodynamic system which operates in the  $TE_{021}$  nominal mode. Calculations indicate an overall efficiency of 40% and an output power of 100kW. This gyrotron is currently under construction and preliminary tests are planned for the present year.