

# **Microwave Production and Beam Transport in a Multi-MW Large-Orbit, Axis Encircling, Coaxial Gyrotron Oscillator**

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Large orbit, coaxial gyrotrons are currently under investigation with microwave power up to 40 MW. The axis encircling electron beam is generated by a magnetic cusp field. Current Transport through the magnetic cusp and through the microwave cavity are examined. The frequency of the fundamental mode, TE<sub>111</sub>, is observed to be 2.3 GHz. Time-frequency (TF) analysis of heterodyne mixer data shows frequency modulation with e-beam voltage. Mode competition and mode hopping have also been observed by TF analysis. Microwave cold test data is compared to operating modes of the gyrotron. The electron beam is produced by MELBA (Michigan Electron Beam Accelerator) with the following parameters: 0.75-1.0 MV, 1-10 kA diode current, 0.2-1.5 kA tube current, 0.5-1.0 microsecond pulselength.

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