## P4D05

### 94 GHz Heavily Loaded TE01 Gyro-TWT*

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A high power TE01 gyro-TWT is being constructed at UCD that will be driven by a 100 kV, 5 A, MIG electron beam with alpha=vt/vz=1.0 and 5% axial velocity spread. The interaction circuit is heavily loaded [1] for stability and is predicted by our large-signal simulation code to generate 140 kW at 94 GHz with 28% efficiency, 50 dB saturated gain and 5% bandwidth. Linear theory has been used to determine the threshold start-oscillation beam current for absolute instability and the critical section lengths for the potential harmonic gyro-BWO interactions. The MIG was designed with FINELGUN and has been fabricated. The edges of the emitter are coated with molybdenum to suppress edge emission. The input and output couplers transmit the TE01 mode through the intermediary of a TE51 coaxial mode and have been tested. The iteraction circuit with a cutoff of 91 GHz has been coated with graphite and displays a loss of 70 dB at 97 GHz.

References:

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Footnotes:

[1] K.R. Chu, et al., Phys. Rev. Lett. 81, 4760 (1998).

## P4D06

### X-Band Magnicon Amplifier Experiment*

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We will report initial results from a high-power 11.424-GHz magnicon amplifier that is designed to produce ~60 MW at 60% efficiency and 59 dB gain, using a 470-kV, 220-A, 2-mm-diameter beam from an ultrahigh convergence electron gun [1],[2]. The output power is extracted through two WR-90 waveguides which are monitored by directional couplers, and the average power is monitored through calorimetry using the vacuum rf loads. Rf conditioning of this tube began in November, 2000, following the completion of a set of measurements of the gun perveance and electron beam diameter, with high-power operation anticipated early in calendar year 2001. This device was designed as a prototype accelerator-class amplifier tube. Its initial use will be to test rf accelerating structures, and high-power rf pulse compressors.

References:

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Footnotes:

[1] S.H. Gold et al., Phys. Plasmas, vol. 4, pp. 1900-1906, 1997.
[2] O.A. Nezhevenko et al., Proc. 1999 Particle Accelerator Conf., vol. 2, pp. 1049-1051.