Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

**Self-excitation of a frequency-tunable THz-range gyro-backward-wave oscillator**[1] GREGORY NUSINOVICH, IREAP, University of Maryland, RUIFENG PU, JIAO YU, University of Maryland, OLEKSANDR SINITSYN, VICTOR GRANATSTEIN, IREAP, University of Maryland, GYROTRON TEAM TEAM — Gyro-backward-wave oscillators (gyro-BWOs) are known as high-power sources of millimeter-wave radiation which can be continuously tunable in a wide frequency range by varying either magnetic field or the beam voltage. Our group is planning to start experiments with frequency-tunable gyro-BWOs in the THz frequency range. The required magnetic field will be produced by a pulsed magnet delivering up to 40 T magnetic fields. To increase the tunability we plan to utilize slightly tapered waveguides. In the present paper, the self-excitation conditions in gyro-BWOs with such waveguides are analyzed. First, the analysis is performed assuming that the axial structure of the electromagnetic field in such waveguide, which consists of the region of electromagnetic propagation and the region where the wave frequency is below cutoff, can be approximated by the Airy function. The results of simulations performed with the use of the self-consistent code MAGY will be presented and compared with analytical data. These results will be used for estimating (a) parameters of the required electron gun and (b) tolerances on fabrication of the microwave circuit.

[1]This work is supported by the Office of Naval Research.

Gregory Nusinovich
IREAP, University of Maryland

Date submitted: 20 Jul 2009 Electronic form version 1.4