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Initial Operation of a Wideband 140 GHz, 1kW Confocal Gyro-Traveling Wave Amplifier¹ COLIN JOYE, MICHAEL SHAPIRO, RICHARD TEMKIN, JAGADISHWAR SIRIGIRI, ANTONIO TORREZAN, Massachusetts Institute of Technology — The present experimental results of a zero-drive stable, short pulse 140 GHz gyro-traveling wave tube amplifier are reported. The amplifier consists of three amplifying sections employing a novel high order HE(0,6) operating mode of a quasi-optical confocal waveguide in order to reduce mode density and achieve circuit loss through diffraction rather than absorption in localized dielectric materials. The confocal waveguide preferentially provides higher loss to the lower order competing modes thus allowing operating in a higher order mode. Two quasi-optical severs are used to suppress backward wave oscillations. At present, the amplifier has achieved a linear gain of 34 dB in experiment, and peak output powers up to 400W have been observed at a beam voltage of 39.5kV, beam current of 1.65A, and beam pitch factor of 0.9. Bandwidths over 1 GHz have been observed.

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