232.Title: MEMS-plunger Platform for Tunable Terahertz wire Laser at ~5 K

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Abstract: T Particle-in-cell simulations of a staggered double grating array traveling wave tube intended as a wideband amplifier for terahertz communications, sensing, and imaging applications showed that, for an electron beam power of 5 kW, it produces 150-275 W, corresponding to 3%-5.5% electronic efficiency, at 0.22 THz with over ~30% bandwidth and with greater than 12 dB/cm growth rate. The circuit has been fabricated by both UV lithography and high precision computer-numerical-control machining with ~2-3 m dimensional tolerance and ~50 nm surface roughness. A scandate nanocomposite (Sc2O3-W) cathode for the electron beam Source: has successfully emitted 120 A/cm2 (space charge limited) at 1150degreeC and 50 /cm2 at 1050degreeC for 8000 has required to produce the requisite high current density electron beam.