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## Experimental Performance Evaluation of a 272 GHz Energy-Recirculating Folded Waveguide Traveling-Wave Tube Oscillator

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We present recent experimental results of a 272 GHz energy-recirculating folded waveguide traveling-wave tube oscillator (FWTWTO), developed in Ulsan National Institute of Science and Technology (UNIST) in South Korea.

The developed device is driven by a backward wave oscillator with an initial electron beam and the generated radio frequency (RF) signal is amplified in the traveling-wave tube amplifier by the spent electron beam as an energy-recirculating method. An expected maximum average output power from this device is 43.55 W at a frequency of 272.2 GHz under consideration of ohmic loss and 11 keV beam conditions. In experiment, the generated RF signal from the device is measured by a developed plasmonic THz detector and a heterodyne system. Measured output power and generated frequency from the FWTWTO will be presented in detail and each component fabrication and evaluation results will be discussed. Especially, we present obtained excellent surface roughness results from fabrication of the folded waveguide (FWG) circuit.

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