Session 18. Components

April 30 (Tuesday) / 16:30 ~ 17:50 / Room 3

Session Chair: Seong-Tae Han (Korea Electrotechnology Research Institute, Korea)

16:30 ~ 16:50

18.1 / Output coupler for a THz gyro-amplifier

Craig R. Donaldson (University of Strathclyde, UK), Liang Zhang (University of Strathclyde, UK), Wenlong He (Shenzhen University, China)

This paper presents the design and simulation results of an output coupler for a gyro-amplifier operating at THz frequencies. The combination of a smoothly profiled horn and multilayer microwave window allow for the almost total conversion of the TE_{11} mode to the Gaussian-like HE_{11} mode while forming a vacuum tight seal with very low reflections. This assembly operates over the 360-384 GHz frequency range.

16:50 ~ 17:10

18.2 / Rectangular- versus Sine-Corrugated Waveguide Polarizers for Ka-band Gyro-TWT

Alexey Kosogor (Rostov-on-Don Research Institute of Radio Communication, Russia), Yuri Tikhov (Rostov-on-Don Research Institute of Radio Communication, Russia)

This paper presents a comparison of two kinds of waveguide polarizers for use in Ka-band Gyro-TWT. It is shown that in competition versus conventional polarizer having rectangular corrugation, a sine-corrugation is not necessarily a prerequisite for superior high-power handling or enhanced circular polarization purity over broadband frequency range.

17:10 ~ 17:30

18.3 / Design and Multipactor Analysis of a High Power RF Window

Mohit Kumar Joshi (IIT, India), Tapeshwar Tiwari (IIT, India), Ratnajit Bhattacharjee (IIT, India)

This paper presents the design of a high power RF window for X-band megawatt class pulsed coaxial magnetron. In this proposed design, overmoded cavity, with TE_{012} like mode (mixed with TE_{312}) is considered instead of conventional pillbox cavity. Frequency domain simulation is carried out in CST and return loss, insertion loss, VSWR are obtained as 51.52 dB, 0.07 dB, and 1.005, respectively at 9.3 GHz. Mixed mode operation makes the bandwidth broad, and 40.8 MHz bandwidth is achieved for VSWR less than 1.05. Multipactor and RF breakdown limit the power handling capacity of high power microwave devices and components. Knowledge of multipactor threshold is required for the proper operation of devices. The multipactor analysis of the proposed RF window is carried out in SPARK3D to determine multipactor threshold. Vaughan

model is used for the Secondary Electron Yield (SEY) characterization of materials. Multipactor threshold of the proposed RF window is determined as 16 MW. This makes the RF window suitable for the operation up to 16 MW peak power at 9.3 GHz.

17:30 ~ 17:50

18.4 / A Novel terahertz Wave Microstructure Phase Shifter Loaded in Rectangular Waveguide

Zongjun Shi (University of Electronic Science and Technology of China, China), Yujie Guo (University of Electronic Science and Technology of China, China), Yihong Zhou (University of Electronic Science and Technology of China, China), Xinjin Shi (University of Electronic Science and Technology of China, China), Ziqiang Yang (University of Electronic Science and Technology of China, China), Feng Lan (University of Electronic Science and Technology of China, China)

This paper proposes a novel, compact and wide phase shift range tunable phase shifter operating in 0.3THz-0.325THz, which is loaded in WR-3 band rectangular waveguide and controlled by electricity. The phase shifter comprises of three phase shift units that are mounted in the H plane cuts of the rectangular waveguide. The phase shifter units based on quartz substrate are designed to be a symmetrical structure for both increasing volume of phase shift and reducing the insertion loss. Each unit is adopted microstripe line as secondary transmission line coupling with primary transmission line inside rectangular waveguide via gold probe to introduce extra parallel impedance into main transmission line. Furthermore, diodes are loaded with secondary transmission line for electric steering so that the phase shifter with total three phase shift units is capable to realize four discrete phase shifts. Simulation results show the phase shift ranges from 0 to 180 degrees with the step of 60 degrees. Its insertion loss is better than -1.5dB, and the return loss is below -10dB. A prototype has been fabricated and measured by using the terahertz vector network analyzer. In static test, the maximum phase shift is up to 260 degrees. For the dynamic test of the three shifting units, the maximum phase shift is about 90 degrees at 0.31THz.