Poster 1

April 29 (Monday) / 15:10 ~ 16:30 / Capri room

Klystrons / MBKs

P1-3.1 / Design of a 4kW CW X-Band Broadband Klystron

Yuan Liang (Chinese Academy of Sciences, China), Honghong Gu (Chinese Academy of Sciences, China), Yaogen Ding (Chinese Academy of Sciences, China), Haibing Ding (Chinese Academy of Sciences, China), Bin Shen (Chinese Academy of Sciences, China), Caiying Wang (Chinese Academy of Sciences, China), Yueqing Liu (Chinese Academy of Sciences, China), Xiangjun Wang (Chinese Academy of Sciences, China), Wei Li (Chinese Academy of Sciences, China)

A continuous wave X-band klystron producing output power of 4 kW and bandwidth of over150MHz has been designed in Institute of Electronics, Chinese Academy of Sciences (IECAS). The design, manufacture, and test results have been reported in this paper. The results indicate that the performance of the tube satisfies the design requirement. The improved tube has a beam transmission rate over 97%, and operates very stably.

P1-3.2 / A 600kW C-Band Broadband Klystron with Wide Pulse-length

Xiu Liu (Beijing Vacuum Electronic Research Institute, China), Dongfengen Li (Beijing Vacuum Electronic Research Institute, China), Jun Zhou (Beijing Vacuum Electronic Research Institute, China), Kun Wang (Beijing Vacuum Electronic Research Institute, China), Jiajia Ouyang (Beijing Vacuum Electronic Research Institute, China), Haizhi Zhang (Beijing Vacuum Electronic Research Institute, China), Yongmeig Liu (Beijing Vacuum Electronic Research Institute, China) , Yueshuai Zhao (Beijing Vacuum Electronic Research Institute, China), Jitao Yang (Beijing Vacuum Electronic Research Institute, China), Sian Zhang (Beijing Vacuum Electronic Research Institute, China)

The putput section of the tube applied a 2-gap couple-output cavity techniques. The tube has a peak output power of 600kW, pulse-length of 200us, a instantaneous bandwith above of 220MHz, efficiency of 32%, gain of 43dB. The paper described the design issues, techniques features,computing simulation and test results.

P1-3.3 / Development of an X-band 650-kW Peak Output Power Klystron with a 100-MHz Instantaneous Bandwidth

Zhu Fang (Chinese Academy of Sciences, China), Liu Yueqing (Chinese Academy of Sciences, China), Li Yakun (Chinese Academy of Sciences, China), Zhang Zhenxia (Chinese Academy of Sciences, China), Li Xiuxia (Chinese Academy of Sciences, China), Zhou Guanli (Chinese Academy of Sciences, China), Wang Weilong (Chinese Academy of Sciences, China), Zhang Zhaochuan (Chinese Academy of Sciences, China), Luo Jirun (Chinese Academy of Sciences, China)

This paper presents the design considerations, the simulation, and the test results for an X-band klystron design with a 600-kW peak output power level, which was developed in 2018. Five klystrons were built and tested. Over 650-kW-peak-output power with a 100-MHz instantaneous bandwidth was measured at a 0.5% RF duty cycle (50-μs RF pulse-width and a 100-Hz repetition rate). The measured electron beam-to-RF conversion efficiency is 30%.

P1-3.4 / Simulation of high injection eficency of multi- beam diode for Ka-band relativstic klystron amplifier

Zhiwei Dang (University of Electronic Science and Technology of China / China Academy of Engineering Physics, China), Zhanliang Wang (University of Electronic Science and Technology of China, China), Hua Huang (China Academy of Engineering Physics, China), Shifeng Li (University of Electronic Science and Technology of China / China Academy of Engineering Physics, China), Yu Bai (China Academy of Engineering Physics, China), Jinjing Luo (University of Electronic Science and Technology of China, China), Yubin Gong (University of Electronic Science and Technology of China, China)

To generate annular multi-beam intense relativistic electron beams, a multi-beam diode of an Ka-band relativistic klystron amplifier is designed. The introduction efficiency and the quality of the electron beam are investigated by three-dimension particle in cell simulation. The simulation results show that the diode can generate 26 beams electron beams with high quality and introduction efficiency of about 99% by optimizing the key parameters of the multi-beam diode. The diode can be applied to multi-beam coaxial relativistic klystron amplifier with gigawatt-level output at Ka band.

P1-3.5 / Development of a C-Band High Effiency Klystron

Dmitriy A. Komarov (JSC “RPE “Toriy”, Russia), Evgeny P. Yakushkin (JSC “RPE “Toriy”, Russia), Yury N. Paramonov (JSC “RPE “Toriy”, Russia), Alexander N. Darmaev (JSC “RPE “Toriy”, Russia)

JSC Research and Production Corporation “Toriy” has designed and manufactured the KIU-273, a high peak power, high gain, C-band klystron. The klystron operates at 5712 MHz, with 3.4 MW peak output power, 25kW average output power, and gain of 55 dB. Experimental date is presented.

P1-3.6 / DESIGN OF CEPC HIGH EFFICIENCY MULTIBEAM KLYSTRON

Shengchang Wang (Chines academy of science, China), Shigeki Fukuda (High Energy Accelerator Research Organization, Japan), Zusheng Zhou (Chines academy of science, China), Un-Nisa Zaib (Chines academy of science, China), Zhijun Lu (Chines academy of science, China), Shilun Pei (Chines academy of science, China), Dong Dong (Chines academy of science, China), Ouzheng Xiao (Chines academy of science, China), Guoxi Pei (Chines academy of science, China)

This paper presents the design and simulation of CEPC 650MHz/800kW CW multibeam klystron. To get high efficiency, single beam perveance is chosen to be as low as 0.2μP. On the other

hand, beam voltage is 54kV which could be considered as a safe vale in CW operation. Three dimensional PIC simulations of CEPC MBK predict an efficiency of 80%.