Session 24. Applications

May 1 (Wednesday) / 13:30 ~ 15:10 / Room 3

Session Chair: Heung-Sik Kang (Pohang Accelerator Laboratory, Korea)

13:30 ~ 13:50

24.1 / [Keynote] Injection-Locked CW Magnetron for a wirelessly-powered TV

Bo Yang (Kyoto University, Japan), Tomohiko Mitani (Kyoto University, Japan), Naoki Shinohara (Kyoto University, Japan)

It is shown a wireless power transfer system that transmitted microwave drove the power and video signal of a TV which worked as a wirelessly-powered TV. At the transmitter, we modulated a video signal on a 2.45 GHz sine wave via frequency modulation, a 2.45 GHz injection-locked magnetron could amplify the frequency modulation signal. Utilizing injection locking method, we injected the modulated signal to a 2.45 GHz magnetron and the magnetron amplified this modulation signal. At the receiver, we rectified the microwave energy to the power source and demodulated this microwave to the video signal of the TV. The wireless power transfer distance was 3.5 meters. At the aid of the transmitted microwave, we successfully rectified 48 W DC power and demodulated the video signal.

13:50 ~ 14:10

24.2 / Active Electronically Scanned Array Based on TWT

Suiming Zhou (Beijing Vacuum Electronic Research Institute, China), Baoliang Hao (Beijing Vacuum Electronic Research Institute, China), Jianyong Kou (Beijing Vacuum Electronic Research Institute, China)

Active electronically scanned array (AESA) radar is one of the future radar tendencies. Travelling wave tubes (TWTs) were applied as key parts in lots of AESA radars in last century. At the end of last century lots of solid-state power-amplifier AESA radars were developed, but these AESA radars were limited in actual combats. In the last decade with the TWT technical breakthroughs, such as miniaturization, high efficiency, high consistency and high reliability, TWT could be undertaken as the power amplifier in AESA radar, which makes the radar's maneuverability higher and its cost lower. Maybe TWT would be the optimal choice of power device in the development of AESA radar.

14:10 ~ 14:30

24.3 / X-band Linear Accelerator for Radiotherapy

Y. S. Lee (Korea Electrotechnology Research Institute, Korea), G. J. Kim (Korea Electrotechnology Research Institute, Korea), S. H. Kim (Korea Electrotechnology Research Institute, Korea), J. H.

Lee (Korea Electrotechnology Research Institute, Korea), I. S. Kim (Korea Electrotechnology Research Institute, Korea), Y. W. Choi (Korea Electrotechnology Research Institute, Korea), J. I. Kim (Korea Electrotechnology Research Institute, Korea), J. H. Hwang (The Catholic University of Korea, Korea), A. R. Kim (The Catholic University of Korea, Korea), Y. J. Seol (The Catholic University of Korea, Korea), T. G. Oh (The Catholic University of Korea, Korea), N. Y. An (The Catholic University of Korea, Korea), Y. A. Oh (The Catholic University of Korea, Korea), Y. N. Kang (The Catholic University of Korea, Korea)

In the field of radiotherapy, as the treatment method which is combined with imaging devices becomes important, there is an increasing demand for miniaturization and weight reduction of linear accelerator (LINAC), which is a core part of the radiotherapy equipment. To meet these requirements, LINAC has been developed by applying X-band RF technology and side-coupled structure. The developed LINAC is operated by an RF signal with a frequency of 9.3 GHz. The length of the RF cavity is 37 cm and the shunt impedance is 116 MΩ/m. The electron beam can be accelerated up to 6.3 MeV with having about beam current of 80 mA by electric field strength of 16.8 MeV/m. Based on the design parameters, the dose rate is calculated to be more than 1000 cGy/min when the source to surface distance (SSD) is 80 cm.

14:30 ~ 14:50

24.4 / Cathodoluminescent UV-Sources Using Carbon Fiber Field Emission Cathodes

Dmitry I. Ozol (Moscow Institute of Physics and Technology, Russia), Evgenii P. Sheshin (Moscow Institute of Physics and Technology, Russia), Natalia Yu. Vereschagina (Lebedev Physics Institute of RAS, Russia), Maksim V. Garkusha (Moscow Institute of Physics and Technology, Russia) Mikhail I. Danilkin (Lebedev Physics Institute of RAS, Russia), Htet Win Aung (Moscow Institute of Physics and Technology, Russia)

The prototypes of cathodoluminescent UV radiation sources with field emission cathodes on the basis of carbon fiber are manufactured. These sources exhibit various UV spectra depending on the phosphors used.

14:50 ~ 15:10

24.5 / Carbon nanotube based cold cathode emitter employed x-ray tube fabrication for medical imaging applications

Yi Yin Yu (KyungHee University, Korea), Kyu Chang Park (KyungHee University, Korea)

A x-ray module with triode configuration was fabricated using vertically aligned carbon nanotubes (VACNTs) emitters. The I-V characteristics of the module inside a vacuum chamber with angle anode were evaluated and x-ray images were derived as well. Furthermore, taking advantages of the module compactness, we made a conventional type of glass sealed x-ray tube. We assessed the I-V characteristics and image resolution for medical imaging applications such as early diagnosis for osteoporosis.