

Development of high-power 4K Nb₃Sn superconducting RF electron linac for medical radioisotope production

Thursday 29 August 2024 16:00 (2 hours)

Various types of radioisotopes (RIs) are used in the field of nuclear medicine for diagnosis, such as PET and SPECT. In recent years, RIs are applied to therapy of cancer and the Ac-225 has been confirmed to be effective in the treatment of advanced cancer. One of the promising RI production methods for medical application is the use of high-intensity beam in accelerators. In the case of an electron accelerator, a photonuclear reaction is used in the RI production process. We have started research and development of a 4K niobium-tin (Nb₃Sn) superconducting RF (SRF) electron accelerator system for RI production, which can be operated with a compact conduction cooling system and does not require a large-scale cooling system. As a first step, we plan to develop a single-cell Nb₃Sn superconducting cavity and a cryomodule, and to demonstrate its performance by beam acceleration experiments. In this presentation, we report the basic design of the SRF electron linac and R&D project of the 35 MeV SRF linac for the medical RI production.

Footnotes

Funding Agency

Primary author: KASHIWAGI, Shigeru (Research Center for Accelerator and Radioisotope Science)

Co-authors: KIKUCHI, Akihiro (National Institute for Materials Science); KAVAR, Anjali (Tohoku University); HINODE, Fujio (Tohoku University); ABIKO, H. (Research Center for Accelerator and Radioisotope Science); ITO, Hayato (High Energy Accelerator Research Organization); YAMADA, Hiroki (Tohoku University); SAKAI, Hiroshi (High Energy Accelerator Research Organization); HAMA, Hiroyuki (Tohoku University); NAGASAWA, Ikurou (Tohoku University); KUDO, K. (Research Center for Accelerator and Radioisotope Science); TAKAHASHI, Ken (Tohoku University); NANBU, Ken-ichi (Tohoku University); UMEMORI, Kensei (High Energy Accelerator Research Organization); SHIBATA, Kotaro (Tohoku University); TACHIKI, Minoru (National Institute for Materials Science); SHANAB, Safwan (High Energy Accelerator Research Organization); ARISAWA, Shunichi (National Institute for Materials Science); OOI, Shuuichi (National Institute for Materials Science); YAMADA, Tomohiro (High Energy Accelerator Research Organization); MUTO, Toshiya (Tohoku University)

Presenter: KASHIWAGI, Shigeru (Research Center for Accelerator and Radioisotope Science)

Session Classification: Thursday Poster Session

Track Classification: MC2: Electron Accelerators and Applications: MC2.5 Industrial and medical accelerators