

Proton beam irradiation for space use at 3NBT and proton beam irradiation facility plan in J-PARC/宇宙利用のための J-PARC 3NBT および陽子ビーム利用施設における陽子利用

Thursday, 14 November 2024 16:00 (2 hours)

The Japan Aerospace Exploration Agency (JAXA) plans to develop the charged particle spectrum in space to observe the radiation dose for astronauts for Artemis programs. Also, the National Institute of Information and Communications Technology (NICT) plans to develop a spectrum to observe solar flares precisely. Both spectrometers based on Cherenkov radiation are aimed to observe the charged particles up to about 1 GeV. Those institutions want to examine the spectrometers using J-PARC accelerators. To match their requirements and fulfill the safety without disturbing the accelerator operation, a method using beam scattering at the window was developed in J-PARC, which gives us quasi-monoenergetic protons by placing the device at a small angle regarding the incident proton directions. This technique allows us to use the double differential cross sections in several GeV regions, which is explained in this session.

Also, many small space satellites have been planned for future communications. The need for protons for space use has drastically increased, as the need to test the semiconductor devices mounted on the satellites in space environments against failures due to single-event Effects (SEEs). Therefore, the needs are expected to increase drastically worldwide.

For the study of material damage under the beam irradiation circumstance of accelerator-driven systems (ADS), the Japan Atomic Energy Agency (JAEA) had planned to construct a Transmutation Experimental Facility Target Facility (TEF-T) using J-PARC Linac 400 -MeV proton beams and the LBE spallation target. The task force for evaluating partitioning and transmutation technology in the MEXT concluded that the facility should be considered to maximize the advantages of using Linac to meet users' various needs. The proton irradiation facility, a successor of TEF-T, will be constructed to supply the proton beam applications for space use as one of the purposes. In this session, the beam facility, including another purpose, will be explained.

Primary author: MEIGO, Shin-ichiro (J-PARC/JAEA)

Presenter: MEIGO, Shin-ichiro (J-PARC/JAEA)

Session Classification: Poster presentation/ポスターセッション