

PEM035-05

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宇宙放射線被曝管理のための位置有感生体組織等価物質比例計数電離箱 (PS-TEPC) の開発

Development of the Position Sensitive Tissue Equivalent Proportional Chamber (PS-TEPC)

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JAXA published the "JAXA Vision -JAXA2025-" in March, 2005, in which JAXA proposed to prepare for the establishment of a human lunar base. Although astronauts stay in the International Space Station (ISS) for an half of year in maximum, the duration of the stays at the lunar base is expected to be longer. On the other hand, the radiation exposure for an astronaut is limited. So, the space radiation exposure management for astronauts in the lunar mission is expected to be more strict because of less margin against the dose limits.

In the field of dose measurement in space, it is important to measure Linear Energy Transfer (LET) spectrum because many kinds of particles with broad energy spectra contribute to the dose. Tissue Equivalent Proportional Counter (TEPC) developed by NASA has been used as a monitoring instrument in the ISS. It is well known that the instrument cannot measure LET directly because its output depends on direction of an incident particle, although it can measure absorbed dose contributed not only by charged particles but also by neutrons because the medium is a tissue equivalent material. We have started developing Position Sensitive Tissue Equivalent Proportional Chamber (PS-TEPC). The PS-TEPC is expected to measure LET more precisely than TEPC in principle because it can measure both track length and deposited energy of each incident particle. In addition, results of recent performance tests using Bread Board Model (BBM) and heavy ions suggest that the expectation is affirmative. We expect that PS-TEPC will take the place of TEPC for a near future manned space mission.

In this talk, we will introduce the principle of PS-TEPC and show some results of the recent performance tests.

キーワード:宇宙放射線,線量計測

Keywords: space radiation, dose measurement