

OS2-4

宇宙放射線線量計測の現状と将来

Current Status of space dosimetry and the prospects

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The astronauts are exposed to the intense radiation in space. The dose rate is around 1 mSv/day and much higher than that on the ground. The radiation particles in space have high Relative Biological Effectiveness (RBE) and all life on the earth is protected from them by the magnetic field and the atmosphere.

The dose based on measurable quantities is evaluated by dose equivalent, which is given by the product of absorbed dose and quality factor as a function of Linear Energy Transfer (LET)¹⁾. The measurement of LET is essential for dose evaluation in space.

Real-time Radiation Monitoring Device (RRMD)^{2,3)} and Position-Sensitive Tissue-Equivalent Proportional Chamber have been developed^{4,5)} as area monitors. And Passive Dosimeter for Lifescience Experiments in Space (PADLES)^{6,7)} is also developed mainly as a personal monitor. These detectors can measure LET directly from the tracks of incident particles constructed in them onboard the Space Shuttle and the International Space Station (ISS). A photo of the PS-TEPC in the ISS is shown in Fig.1

The current status for domestic dosimeters in space is described and a prospect for space dosimetry will be mentioned.



Fig. 1 Photo of the PS-TEPC in the ISS. The two black boxes of the upper side are Detector Units (DU) and the silver box of the lower side is the Control Unit (CU). Three dimensional tracks of incident particles in the DUs are reconstructed from the signals obtained in the data acquisition system in the CU.

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