



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 41457-2022

**Space environment - Solar proton fluences at GEO and
guideline for selection of confidence level in statistical model of
solar proton fluencies**

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents"

drafted.

This document is modified and adopted ISO 12208.2015 "Space system space environment (artificial and natural) long-term observation quality in geosynchronous orbit

Guidelines for choosing confidence levels for statistical models of sub-fluence and solar proton fluence.

Compared with ISO 12208.2015, this document has the following structural adjustments.

--- Added "2 Normative Reference Documents";

--- Added "3.6 relative damage coefficient" in "Terms and Definitions".

Compared with ISO 12208.2015, this document has many technical differences. In the outer margins of the clauses involved, vertical

A single line (?) is marked. See Appendix A for a list of these technical differences and their reasons.

The following editorial changes have been made to this document.

--- Modify the title of the document to adapt to the Chinese, and change it to "Space Environment Geosynchronous Orbit Solar Proton Flux and Its Statistics

Model Confidence Selection Guide;

--- Reorganization and identification of references;

--- The title of Appendix B has been rewritten;

--- Modify "AE-8" in B.3.1 to "AE-9".

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

1 Scope

This document presents the method and options for estimating the long-term (solar activity cycle greater than 11 years) fluence of solar protons in geosynchronous orbit (GEO).

Guidelines for choosing confidence levels for solar proton fluence models.

This document applies to performance degradation estimates of solar cells. Charge coupled device (CCD), image sensor (APS) and other optoelectronic devices

The performance degradation estimation is used for reference.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations

documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to this document.

GB/T 32452 Spacecraft Space Environment Terminology

3 Terms and Definitions

The terms and definitions defined in GB/T 32452 and the following apply to this document.

3.1

confidence level

Confidence level

The confidence level used for cumulative fluence estimates.

3.2

extremely rare event extremelyrareevent

The solar energy proton (SEP) event occurs only once in a solar cycle, and the mass in a complete solar cycle

The sub-fluence is mainly derived from this SEP event.

Note. SEP events that occurred in August 1972, October 1989 or July.2000 are extremely rare events.

3.3

flux

The number of particles passing through a specific area per unit time.

3.4

fluence

Time integral of flux.

3.5

n-year fluence

The fluence for the n-year mission period.

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