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

GB/T 39722-2020

**Superconducting electronic devices - Generic specification for
sensors and detectors**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1:1-2009:

This standard uses the translation method equivalent to IEC 61788-22-1:2017

"Superconductivity Part 22-1: Superconducting sub-device sensing

General specification for detectors and detectors:

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows:

---GB/T 2987 Electronic tube parameter symbol (IEC 60027 (alparts), NEQ)

---GB/T 2900:100-2017 Electrical terminology superconductivity (IEC 60050-815:2015, IDT)

---GB 3100-1993 International System of Units and Application (ISO 1000:1992, EQV)

---GB/T 4728 (all parts) Graphical symbols for electrical diagrams [IEC 60617]

---GB/T 5465 (all parts) Graphical symbols for electrical equipment Part 1: Overview and classification (IEC 60417)

---GB/T 16273 (all parts) Graphical symbols for equipment Part 1: General symbols (ISO 7000)

This standard has made the following editorial changes:

--- Modify the standard name to "General Specification for Superconducting Sub-device Sensors and Detectors":

---Add a note under 5:2 to explain the "coherent detection":

Please note that certain contents of this document may involve patents: The issuing agency of this document is not responsible for identifying these patents:

This standard was proposed by the Chinese Academy of Sciences:

This standard is under the jurisdiction of the National Superconducting Standardization

Technical Committee (SAC/TC265):

Drafting organizations of this standard: Zhejiang Futong Technology Co., Ltd., Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Chinese Academy of Sciences

Institute of Physics, Nanjing University, Nankai University:

Introduction

Superconducting characteristics such as superconducting energy gap, narrow superconducting state-normal state transition, nonlinear current-voltage curve, superconducting coherent state, magnetic flux quantumization, etc.;

Will be affected by electromagnetic fields, photons, ions, etc: Various superconducting sensors and detectors have been developed using these different superconducting properties: they

In terms of energy resolution, time response, and noise characteristics, it has extremely high performance that is difficult to achieve with other non-superconducting devices:

The term "sensor" usually refers to a device or device used to measure physical quantities such as static or slowly varying electromagnetic fields, currents, and temperature: While "probing

"Device" usually refers to a device that observes and records single quantum states, such as photons from infrared to gamma rays, single particles, etc: However,

The boundary between "sensor" and "detector" is blurred: Therefore, both words will be used in this document: In addition, the sensor is used to detect

Sensors are also feasible: For example, the superconducting transition edge sensor (TES) is used for X-ray detectors:

The resulting temperature rise can be detected: Therefore, in this standard, the term "superconducting transition edge sensor X-ray detector" is used to indicate the use of TES

A device or device for X-ray detection:

Superconducting sensors and detectors have been used in many fields, including medical diagnosis, communications, mineral exploration, astronomical instruments, and quantum information processing

And analytical instruments, etc: For users, there is currently a lack of unified specifications for related professional terms, legend symbols and test methods, so it is very

It is necessary to establish a unified standardized document:

Superconducting device

General specifications for sensors and detectors

1 Scope

This standard gives general specifications for superconducting sensors and detectors:
These are the various types of sensors in other parts of IEC 61788:

And the basis of the specifications of the detector: The sensors and detectors are mainly composed of superconducting materials and rely on superconductivity or related phenomena: Under test

Standards (physical quantities) include magnetic fields, electromagnetic waves, photons of different energy, electrons, particles, alpha particles and others:

2 Normative references

The following documents are indispensable for the application of this document: For dated reference documents, only the dated version applies to this article

Pieces: For undated references, the latest version (including all amendments) applies to this document:

IEC 60027 (all parts) Electronic tube parameter symbols
(Lettersymbolstobeusedinelectricaltechnology)

IEC 60050-815 International Electrotechnical Vocabulary Part 815: Superconductivity
(InternationalElectrotechnicalVocabula-
ry-Part 815:Superconductivity)

IEC 60417 Graphical symbols for electrical equipment
[Graphicalsymbolsforuseonequipment (see: <http://www:graphicalsymbols>)]

IEC 60617 Graphical symbols for electrical diagrams [Graphicalsymbolsfordiagrams (see: <http://std:iec:ch/iec60617>)]

ISO 1000 International System of Units and Application
(SIunitsandrecommendationsfortheuseoftheirmultiplesandof
certainotherunits)

Graphical symbols for use in ISO 7000 equipment
[Graphicalsymbolsforuseonequipment-Registered
symbols (see: <http://www:graphical-symbols:info>)]