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**International Electrotechnical
Vocabulary—
Part 815 : Superconductivity**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by International Superconductivity Technology Center (ISTEC)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS H 7005:1999** is replaced with this Standard.

This revision has been made based on **IEC 60050-815:2000** *International Electrotechnical Vocabulary—Part 815: Superconductivity* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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International Electrotechnical Vocabulary—Part 815 : Superconductivity

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **IEC 60050-815** *International Electrotechnical Vocabulary—Part 815: Superconductivity* published in 2000 with some modifications of the technical contents.

The terms and definitions given sidelines are not included in the said edition of the International Standard and will be added in the next revision.

All the descriptions in “Information” are not included in the original International Standard. They have been added in this Standard for explanatory purposes.

1 Scope This Standard specifies main terms and definitions related to superconductivity materials.

Remarks 1 The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

IEC 60050-815:2000 *International Electrotechnical Vocabulary—Part 815: Superconductivity* (MOD)

- 2 The numbering of terms is in accordance with **IEV 815**.
- 3 If more than one terms are given for one definition, the priority of use is given in the order of appearance.
- 4 The terms (English equivalents included) may be used with or without the bracketed words.

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS H 7301 *Superconductivity—Test method—Part 1: Critical current—Section 1: DC critical current of Cu/Nb-Ti composite superconductors*

Remarks : **IEC 61788-1**:1998 *Superconductivity—Part 1: Critical current measurement—DC critical current of Cu/Nb-Ti composite superconductors* is identical with the said standard.

JIS H 7302 *Superconductivity—Part 2: Critical current measurement—DC critical current of Nb₃Sn composite superconductors*

Remarks : **IEC 61788-2**:1999 *Superconductivity—Part 2: Critical current measurement—DC critical current of Nb₃Sn composite superconductors* is identical with the said standard.

JIS H 7303 *Superconductivity—Part 6: Mechanical properties measurement—Room temperature tensile test of Cu/Nb-Ti composite superconductors*

Remarks : **IEC 61788-6:2000** *Superconductivity—Part 6: Mechanical properties measurement—Room temperature tensile test of Cu/Nb-Ti composite superconductors* is identical with the said standard.

JIS H 7304 *Superconductivity—Part 5: Matrix to superconductor volume ratio measurement—Copper to superconductor volume ratio of Cu/Nb-Ti composite superconductors*

Remarks : **IEC 61788-5:2000** *Superconductivity—Part 5: Matrix to superconductor volume ratio measurement—Copper to superconductor volume ratio of Cu/Nb-Ti composite superconductors* is identical with the said standard.

JIS H 7305 *Superconductivity—Part 3: Critical current measurement—DC critical current of Ag-sheathed Bi-2212 and Bi-2223 oxide superconductors*

Remarks : **IEC 61788-3:2000** *Superconductivity—Part 3: Critical current measurement—DC critical current of Ag-sheathed Bi-2212 and Bi-2223 oxide superconductors* is identical with the said standard.

3 Terms and definitions The terms and definitions are as follows:

3.1 Superconducting properties

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-01	完全反磁性	KANZEN HANZI SEI	magnetic property in which magnetization exactly opposes the magnetic field strength	perfect diamagnetism
815-01-02	超電導	TYÔDENDÔ	property of materials regarded as having zero direct electric current resistivity and perfect diamagnetism under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information 1 To refer to the characteristic of superconductor, the expression “superconductivity characteristic” may be applied. 2 In Japanese character, “超伝導” may be applied instead of “超電動”. 3 In the case of type II superconductor, H_c means thermodynamic critical field strength.	superconductivity
815-01-03	超電導の	TYÔDENDÔ NO	adjective describing a material or state which exhibits superconductivity	superconducting
815-01-04	超電導性の	TYÔDENDÔ SEI NO	adjective describing a material which exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density.	superconductive
815-01-05	超電導状態	TYÔDENDÔ ZYÔTAI	thermodynamic state in which a material exhibits superconductivity NOTES 1 This state is induced by quantum pairing of electrons. 2 This is a generic term of Meissner state, mixed state and intermediate state of a superconducting substance or material.	superconducting state

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-06	超電導体	TYÔDENDÔ TAI	substance or material which exhibits superconductivity under appropriate conditions NOTES 1 Often refers to electrical wire or thin films made of superconducting substance or materials. 2 Appropriate conditions apply to temperature, magnetic field strength and current density. Information: It may be used to generically refer to all industrial superconducting materials.	superconductor
815-01-07	常電導状態	ZYÔDENDÔ ZYÔTAI	thermodynamic state in which a superconductor does not exhibit superconductivity	normal (conducting) state
815-01-08	超電導転移	TYÔDENDÔ TENTI	change between the normal and superconducting states Information: It may be used to express the transition from normal conducting state to superconducting state.	superconducting transition
815-01-09	臨界温度 (記号: T_c)	RINKAI ONDO	temperature below which a superconductor exhibits superconductivity at zero magnetic field strength and zero electric current NOTE: Sometimes the term, "critical temperature" refers to the temperature below which a material is in the superconducting state for a given magnetic field strength.	critical temperature (symbol: T_c)
815-01-10	マイスナー状態	MAISUNÂ ZYÔTAI	superconducting state in a bulk superconductor characterized by perfect diamagnetism Information: "Bulk" indicates a size sufficiently larger than the magnetic field penetration depth.	Meissner state
815-01-11	磁束の排除	ZISOKU NO HAIZYO	complete removal of magnetic flux from the interior of a material NOTE: Flux expulsion is a consequence of perfect diamagnetism.	flux expulsion

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-12	マイスナー効果	MAISUNÁ KÓKA	flux expulsion at the transition from the normal, mixed, or intermediate state into the Meissner state Information: See the definitions of “mixed state” (815-01-18) and “intermediate state” (815-01-19).	Meissner effect
815-01-13	永久電流	EIKYŪ DENRYŪ	direct current in a closed circuit considered as constant for an extended duration	persistent current
815-01-14	磁束量子 (記号: Φ_0)	ZISOKU RYŌSI	quantum of magnetic flux, equal to $h/2e$ where h is the Planck constant and e is the elementary electric charge; its value is approximately equal to $2.067\ 830\ 215 \times 10^{-15}$ Wb	flux quantum (symbol: Φ_0)
815-01-15	フラクソイド	HURAKUSOIDO	virtual magnetic flux in an area surrounded by a loop C , defined by: $\Phi = \Phi_c + \mu_0 \lambda^2 \int_C \mathbf{J} \cdot d\mathbf{l},$ where Φ_c is the magnetic flux in the area, λ is the penetration depth, $\mathbf{J}$ is the superconducting current density, μ_0 is the magnetic constant and $d\mathbf{l}$ is a vector line element. NOTES 1 The fluxoid in a superconductor is quantized to a multiple of the flux quantum Φ_0 . 2 Far from the surface of a superconductor, the fluxoid coincides with the flux. Information: This magnetic constant may also be called magnetic inductivity in vacuum. See magnetic field penetration depth (815-01-33).	fluxoid
815-01-16	フラクソン, 渦糸, 磁束線	HURAKUSON, UZUITO, ZISOKU SEN	quantized magnetic flux within a superconductor equal to one flux quantum	fluxon, vortex, flux line
815-01-17	フラクソン格子, 渦糸格子, 磁束線格子	HURAKUSON KŌSI, UZUITO KŌSI, ZISOKU SEN KŌSI	lattice of fluxons in the mixed state NOTE: The triangular fluxon lattice constant a_0 is given by $a_0 = (2\Phi_0/\sqrt{3}B)^{1/2} = 1.075 (\Phi_0/B)^{1/2},$ where Φ_0 is the flux quantum, and B is the magnetic flux density.	fluxon lattice, vortex lattice, flux line lattice

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-18	混合状態	KONGÔ ZYÔTAI	superconducting state in which magnetic flux penetrates the type II superconductor in the form of fluxons NOTE: See type II superconductor (815-01-25).	mixed state
815-01-19	中間状態	TYÛKAN ZYÔTAI	superconducting state characterized by the coexistence of domains in the Meissner state and those in either the normal state or the mixed state due to the demagnetization effect of the shape of superconductors	intermediate state
815-01-20	超電導凝縮エネルギー	TYÔDENDÔ GYÔSYUKU ENERUGÎ	free energy density difference between the normal state and the superconducting state NOTE: At zero magnetic field strength and zero direct current, the superconducting condensation energy is given by $1/2 \mu_0 H_c^2$, where μ_0 is the magnetic constant and H_c is the critical magnetic field strength.	superconducting condensation energy
815-01-21	臨界磁界 (記号: H_c)	RINKAI ZIKAI	magnetic field strength corresponding to the superconducting condensation energy at zero magnetic field strength NOTE: H_c is a function of temperature.	critical (magnetic) field strength (symbol: H_c)
815-01-22	第一種超電導体	DAISSYU TYÔDENDÔTAI	superconductor in which superconductivity appears with perfect diamagnetism below the critical magnetic field strength, H_c , but disappears above H_c when demagnetization factor is zero	type I superconductor
815-01-23	下部臨界磁界 (記号: H_{c1})	KABU RINKAI ZIKAI	magnetic field strength at which a fluxon firstly penetrates a bulk type II superconductor deviation from the perfect diamagnetism when demagnetization factor is zero NOTES 1 See type II superconductor (815-01-25). 2 H_{c1} is a function of temperature. Information: "Bulk" indicates a size sufficiently larger than the magnetic field penetration depth (815-01-33).	lower critical (magnetic) field strength (symbol: H_{c1})

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-24	上部臨界磁界 (記号: H_{c2})	ZYÔBU RINKAI ZIKAI	maximum magnetic field strength below which a type II superconductor is in the mixed state NOTES 1 See type II superconductor (815-01-25). 2 H_{c2} is a function of temperature.	upper critical (magnetic) field strength (symbol: H_{c2})
815-01-25	第二種超電導体	DAINISYU TYÔDENDÔTAI	superconductor which exists in the Meissner state when the magnetic field strength is below the lower critical magnetic field strength, H_{c1} , exists in the mixed state for the field between H_{c1} and the upper critical field strength, H_{c2} , and exists in the normal state above H_{c2} , when demagnetization factor is zero	type II superconductor
815-01-26	クーパー対	KÛPÂ TUI	two electrons having opposed wave number vector and spin, bound by an attractive interaction in a superconductor in spite of their electric charges of the same sign	Cooper pair
815-01-27	BCS理論	BÎ SÎ ESU RIRON	microscopic theory of superconductivity developed by Bardeen, Cooper and Schrieffer which postulates that electrons in the vicinity of the Fermi level form Cooper pairs and in this way condense into a superconducting state	BCS theory
815-01-28	超電導エネルギーギャップ (記号: Δ)	TYÔDENDÔ ENERUGÎ GYAPPU	one-half of the minimum energy necessary to excite a superconducting Cooper pair to two normal electrons NOTE: In BCS theory, $\Delta = 1.746 kT_c$ at 0 K, where k is the Boltzmann constant and T_c is the critical temperature.	superconducting energy gap (symbol: Δ)
815-01-29	ギンツブルグ-ランダウ理論	GINTUBURUGU- RANDAU RIRON	macroscopic theory of superconductivity developed by Ginzburg and Landau that combines electrodynamic, quantum mechanical, and thermodynamic properties of superconductors	Ginzburg-Landau theory
815-01-30	(超電導)オーダー・パラメータ (記号: ψ)	(TYÔDENDÔ) ÔDÂ PARAMÊTA	thermodynamic quantity defined in the Ginzburg-Landau theory, the square of the absolute value of which, $ \psi ^2$, is proportional to the number density of Cooper pairs Information: $ \psi $ is almost proportional to energy gap Δ .	(superconducting) order parameter (symbol: ψ)

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-31	BCS コヒーレンス長 (記号: ξ_0)	BĪ SF ESU KOHĪRENSU TYŌ	temperature-independent length correlating the distance between two electrons of a Cooper pair	BCS coherence length (symbol: ξ_0)
815-01-32	コヒーレンス長 (記号: ξ)	KOHĪRENSU TYŌ	length describing the spatial variation of the superconducting order parameter in the Ginzburg-Landau theory NOTES 1 ξ is a function of temperature and nearly equal to the BCS coherence length, ξ_0 , at 0 K in a clean superconductor. 2 $\xi = (\Phi_0/2\pi\mu_0 H_{c2})^{1/2}$, where Φ_0 is the flux quantum, μ_0 is the magnetic constant and H_{c2} is the upper critical magnetic field strength.	coherence length (symbol: ξ)
815-01-33	(ロンドンの)(磁界) 侵入深さ (記号: λ)	(RONDON NO) (ZIKAI) SINNYŪ HUKASA	length describing the spatial variation of the magnetic field strength in a superconductor NOTE: λ is a function of temperature.	(London) penetration depth (symbol: λ)
815-01-34	ギンツブルグ-ランダウ・パラメータ, G-Lパラメータ (記号: κ_{GL})	GINTUBURUGU-RANDAU PARAMĒTA, ZĪ-ERU PARAMĒTA	ratio of (magnetic field) penetration depth, λ , to coherence length, ξ ; $\kappa_{GL} = \lambda/\xi$ NOTES 1 For a type II superconductor, $\kappa_{GL} > 1/\sqrt{2}$; $\kappa_{GL} = H_{c2}/\sqrt{2}H_c$, where H_{c2} is the upper critical magnetic field strength and H_c is the critical magnetic field strength. 2 For a type I superconductor, $\kappa_{GL} < 1/\sqrt{2}$.	Ginzburg-Landau parameter, G-L parameter (symbol: κ_{GL})
815-01-35	きれいな超電導体	KIREINA TYŌDENDŌTAI	superconductor in which the electron mean free path in the normal state is much longer than the BCS coherence length	clean superconductor
815-01-36	汚れた超電導体	YOGORETA TYŌDENDŌTAI	superconductor in which the electron mean free path in the normal state is much shorter than the BCS coherence length	dirty superconductor

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-37	ジョセフソン接合	ZYOSEHUSON SETUGŌ	junction formed from two superconductors separated by an insulator or a normal conductor of very small thickness or by a superconductive bridge of small section, so that they are only weakly coupled Information: In a high temperature superconductor, a peculiar Josephson junction, having an insulated block layer as a barrier, is formed.	Josephson junction
815-01-38	直流ジョセフソン効果	TYOKURYŪ ZYOSEHUSON KŌKA	macroscopic quantum effect in which a direct current of Cooper pairs flow by tunneling through a Josephson junction without power dissipation NOTE: The maximum value of the dissipationless direct current is strongly dependent on the applied magnetic flux density.	DC Josephson effect
815-01-39	交流ジョセフソン効果	KŌRYŪ ZYOSEHUSON KŌKA	macroscopic quantum effect in which, when a voltage U is applied across a Josephson junction, an alternating current of Cooper pairs flows by tunnel effect through the junction, generating the emission of photons having a frequency f proportional to the applied voltage and satisfying the relation: $hf = 2eU$, where h is the Planck constant and e is the elementary electric charge. NOTES 1 The AC Josephson effect also manifests itself conversely so that, when a Josephson junction is irradiated by an electromagnetic radiation of frequency f , the voltage across it can assume quantized values equal to $(h/2e)nf$, where n is a positive integer. 2 $f/U = 483.6 \text{ MHz}/\mu\text{V}$	AC Josephson effect

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-01-40	同位元素効果	DÔI GENSO KÔKA	relation between the mean mass number of the isotopes of the superconductor and the critical temperature NOTE: In the BCS theory, the critical temperature is inversely proportional to the square root of the mean mass number of the isotopes. Information: The elements which does not show an isotope effect exist.	isotope effect
815-01-41	表面超電導	HYÔMEN TYÔDENDÔ	phenomenon in which a superconducting state appears within about one coherence length from the surface of a material even under a magnetic field strength above the upper critical magnetic field strength, H_{c2} NOTE: If the magnetic field is parallel to the surface of the sample, surface superconductivity appears within a range of a magnetic field strength from H_{c2} to $H_{c3} = 1.695 H_{c2}$ for type II superconductors and from H_c to $H_{c3} = 2.40 H_c$ for type I superconductors.	surface superconductivity
815-01-42	(超電導)近接効果	(TYÔDENDÔ) KINSETU KÔKA	phenomenon where superconducting electrons are observed within a normal conductor when a superconducting material contacts it NOTES 1 This effect is accompanied by a decrease in critical temperature and critical magnetic field strength of the superconductor. 2 The “proximity effect” is defined with a different meaning in IEV 121-13-19 .	(superconducting) proximity effect

3.2 Superconducting substance or materials

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-02-01	超電導元素	TYÔDENDÔ GENSO	chemical element that exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information: The elements such as Hg, Al, Sn, Pb and Nb are typically known, and Nb, especially, is used for a coating material for Josephson junction.	superconducting element
815-02-02	合金超電導体	GÔKIN TYÔDENDÔTAI	metallic alloy that exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information: Nb-Ti alloy is a typically known alloy material.	alloy superconductor
815-02-03	化合物超電導体	KAGÔBUTU TYÔDENDÔTAI	chemical or intermetallic compound that exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information 1 The term is classified into the following: binary system (A-15 compound, B-1 compound, Laves phase compound and so on), and multi system (Chevrel phase compound, Perovskite compound, copper-oxide, boron carbide and so on), from the view point of crystalline structure. 2 There are many materials which have high critical temperature and very high critical magnetic field.	compound superconductor

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-02-04	有機物超電導体	YŪKIBUTU TYŌDENDŌTAI	organic compound that exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information: BEDT-TTF salt, (TMTSF) ₂ PF ₆ and so on are known commonly.	organic superconductor
815-02-05	酸化物超電導体	SANKABUTU TYŌDENDŌTAI	compound superconductor, which contains oxygen as one of its elemental constituents and exhibits superconductivity under appropriate conditions NOTE: Appropriate conditions apply to temperature, magnetic field strength and electric current density. Information 1 This is represented by Perovskite compound and copper-oxide, and is a compound each site of which is substituted by various metallic ion. 2 Many materials having critical temperature no less than the liquid nitrogen temperature have been discovered.	oxide superconductor
815-02-06	ペロブスカイト(化合物)超電導体	PEROBUSUKAITO (KAGŌBUTU) TYŌDENDŌTAI	superconductor with Perovskite-type structure NOTES 1 Perovskite-type structure has typical compositional and structural blocks of ABO ₃ , where A and B refer to metallic elements and O is oxygen. 2 Ba (Pb _{1-x} Bi _x) O ₃ and (Ba _{1-x} M _x) BiO ₃ (where M = K, Rb) are included.	Perovskite (compound) superconductor
815-02-07	CuO ₂ 面(CuO ₂ シート)	SŌ YŪ Ō TŪ MEN (SŌ YŪ Ō TŪ SĪTO)	atomic plane composed of a corner sharing network of the square planar CuO ₄ group	CuO ₂ sheet, CuO ₂ plane, CuO ₂ layer

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-02-08	銅酸化物超電導体	DÔSANKABUTU TYÔDENDÔTAI	oxide superconductor with layered structure containing CuO_2 sheets NOTE: Typical oxide superconductors such as $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$, $\text{Bi}_2\text{Sr}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+4}$ ($n = 1, 2, 3$), $\text{Tl}_m\text{Ba}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2(m+n)}$ ($m = 1, 2, n = 1, 2, 3$) and $\text{HgBa}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+2}$ ($n = 1, 2, 3$) are included.	copper-oxide (cuprate) superconductor
815-02-09	p 型銅酸化物超電導体	PÎGATA DÔSANKABUTU TYÔDENDÔTAI	oxide superconductor containing CuO_2 sheets with hole-like carriers NOTE: $(\text{La}, \text{Sr})_2\text{CuO}_4$, $\text{YBa}_2\text{Cu}_3\text{O}_7$, $(\text{Bi}, \text{Pb})_2\text{Sr}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+4}$ ($n = 1, 2, 3$), $\text{Tl}_m\text{Ba}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2(m+n)}$ ($m = 1, 2, n = 1, 2, 3$) and $\text{HgBa}_2\text{Ca}_{n-1}\text{Cu}_n\text{O}_{2n+2}$ ($n = 1, 2, 3$) system are typically included.	p-type copper-oxide (cuprate) superconductor
815-02-10	n 型銅酸化物超電導体	ENUGATA DÔSANKABUTU TYÔDENDÔTAI	oxide superconductor containing CuO_2 sheets with electron-like carriers NOTE: $(\text{Nd}, \text{Ce})_2\text{CuO}_4$, $(\text{Sr}, \text{Nd})\text{CuO}_2$ system are typically included.	n-type copper-oxide (cuprate) superconductor
815-02-11	高温超電導体	KÔON TYÔDENDÔTAI	one class of superconductors with a critical temperature generally higher than about 25 K	high temperature superconductor, high- T_c superconductor
815-02-12	低温超電導体	TEION TYÔDENDÔTAI	one class of superconductors with a critical temperature generally lower than about 25 K	low temperature superconductor, low- T_c superconductor
815-02-13	A-15 (化合物)超電導体	Ê-HIHUTÎN (KAGÔBUTU) TYÔDENDÔTAI	compound superconductor with A-15 crystal structure and an A ₃ B composition NOTE: Nb_3Sn , V_3Ga and Nb_3Al are included.	A-15 (compound) superconductor

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-02-14	B-1 (化合物)超電導体	BĪ-WAN (KAGÔBUTU) TYÔDENDÔTAI	compound superconductor with rocksalt (NaCl) structure and AB composition, where A is a metallic element and B is carbon, nitrogen, or oxygen NOTE: NbN, NbC, MoN are included. Information: NbN, especially, is used for a coating material for Josephson junction.	B-1 (compound) superconductor
815-02-15	ラーベス相(化合物)超電導体	RÂBESUSÔ (KAGÔBUTU) TYÔDENDÔTAI	intermetallic compound superconductor with AB ₂ composition and atomic radius ratio $r_A/r_B = 1.1$ to 1.4 NOTE: HfV ₃ , ZrV ₃ and (Hf,Zr)V ₃ are included.	Laves phase (compound) superconductor
815-02-16	シェブレル相(化合物)超電導体	SYEBURERUSÔ (KAGÔBUTU) TYÔDENDÔTAI	compound superconductor composed of a Mo _x X ₈ cluster ion and a metal ion, N, with chemical composition NM ₁₀ X ₈ NOTE: PbMo ₆ S ₈ , SnMo ₆ S ₈ and CuMo ₆ S ₈ are included. Information: N means metals of from quadrivalent to monovalent such as Pb, Sn, Cu and La, and X means chalcogen elements such as S, Se and Te.	Chevrel phase (compound) superconductor
815-02-17	フラーレン(化合物)超電導体	HURÂREN (KAGÔBUTU) TYÔDENDÔTAI	superconductive material expressed as M _x C ₆₀ , where x is typically 3 when M is an alkali metal, and x is typically 5 or 6 when M is an alkaline-earth metal	fullerene (compound) superconductor
815-02-18	ほう(硼)炭化物超電導体	HÔTANKABUTU TYÔDENDÔTAI	compound superconductor expressed as RM ₂ B ₂ C, where R is the yttrium (Y), a lanthanide, or an actinide element, and M is the nickel (Ni), the palladium (Pd) or the platinum (Pt)	boron carbide superconductor
815-02-19 (New)	マグネシウムほう(硼)化物超電導体 [ニほう(硼)化マグネシウム超電導体]	MAGUNESIUMU HÔKABUTU TYÔDENDÔTAI [NIHÔKA MAGUNESIUMU TYÔDENDÔTAI]	high temperature superconductor, whose crystalline structure belongs to hexagonal system, and has composition of MgB ₂	magnesium boride superconductor (magnesium diboride superconductor) (New)

3.3 Electromagnetic phenomena and properties

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-03-01	臨界電流 (記号: I_c)	RINKAI DENRYŪ	maximum direct current that can be regarded as flowing without resistance NOTE: I_c is a function of magnetic field strength and temperature. Information: This is also a function of stress.	critical current (symbol: I_c)
815-03-02	臨界電流基準, I_c 基準	RINKAI DENRYŪ KIZYUN, AISŌ KIZYUN	criterion to determine the critical current, I_c , based on the electric field strength, E or the resistivity, ρ NOTE: $E = 10 \mu\text{V/m}$ or $E = 100 \mu\text{V/m}$ is often used as electric field criterion, and $\rho = 10^{-13} \Omega \cdot \text{m}$ or $\rho = 10^{-14} \Omega \cdot \text{m}$ is often used as resistivity criterion.	critical current criterion, I_c criterion
815-03-03	臨界電流密度 (記号: J_c)	RINKAI DENRYŪ MITUDO	the electric current density at the critical current using either the cross-section of the whole conductor (overall) or of the non-stabilizer part of the conductor if there is a stabilizer NOTE: The overall current density is called in English, engineering current density (symbol: J_c).	critical current density (symbol: J_c)
815-03-04	輸送臨界電流密度 (記号: J_{cl}), 通電臨界電流密度	YUSŌ RINKAI DENRYŪ MITUDO, TŪDEN RINKAI DENRYŪ MITUDO	critical current density obtained by a resistivity or a voltage measurement	transport critical current density (symbol: J_{cl})
815-03-05	臨界面	RINKAI MEN	surface in the three dimensional space of temperature, current density and magnetic field strength exhibiting the temperature and the magnetic field dependences of the critical current density	critical surface
815-03-06	臨界状態モデル	RINKAI ZYŌTAI MODERU	model describing the magnetic flux distribution in a type II superconductor in which the flux density gradient is assumed to be equal to $\mu_0 J_c$, where μ_0 is the magnetic constant of vacuum and J_c is the critical current density, whenever the magnetic flux density is not zero	critical state model

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-03-07	ビーンモデル, ビーン-ロンドンモデル	BĪN MODERU, BĪN-RONDON MODERU	critical state model which assumes that the critical current density, J_c , is constant independent of the magnetic flux density, B	Bean model, Bean-London model
815-03-08	ギムモデル	KIMU MODERU	critical state model which assumes that the critical current density inside the superconductor is given by $J_c = a/(B+B_0)$, where B is the magnetic flux density, and a and B_0 are constants	Kim model
815-03-09	磁化臨界電流密度 (記号: J_{cm})	ZIKA RINKAI DENRYŪ MITUDO	critical current density obtained by a magnetization measurement using a theoretical model (critical state model) NOTE: If a material is non-uniform or anisotropic, J_{cm} differs from the transport critical current density, J_{ct} .	magnetization critical current density (symbol: J_{cm})
815-03-10	n -値(超電導体の 値) (記号: n)	ENU-TI (TYŌDENDŌTAI NO ENU-TI)	exponent obtained in a specific range of electric field strength or resistivity when the voltage/current $U(I)$ curve is approximated by the equation $U \propto I^n$ Information: Generally, materials having larger n value show good characteristics.	n -value (of a superconductor) (symbol: n)
815-03-11	クエンチ	KUENTI	uncontrollable and irreversible transition of a superconductor or a superconducting device from the superconducting state to the normal conducting state NOTE: A term usually applied to superconducting magnets.	quench
815-03-12	安定化材	ANTEIKA ZAI	material, typically a metal, in electrical and/or thermal contact with a superconductor, which establishes thermal contact to the coolant and/or acts as an electrical shunt NOTE: Materials with high specific heat at also used. Information: Copper, aluminum, silver and so on, having low electric resistance and high heat conduction, are applied.	stabilizer
815-03-13	回復電流	KAIHUKU DENRYŪ	maximum current which allows the superconducting state to recover under given cooling conditions	recovery current

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-03-14	応力効果, ひずみ効果	ÔRYOKU KÔKA, HIZUMI KÔKA	change in superconducting properties upon application of mechanical, thermal or electromagnetic stress to the superconductor Information: Compound system and oxide system superconductor, generally, are more sensitive compared to simple substance and alloy system.	stress effect, strain effect
815-03-15	照射効果	SYÔSYA KÔKA	change in superconducting properties of a material exposed to high energy particles or to electromagnetic waves Information 1 Cascade, tubular defect and so on generated in superconductor work as a pinning centre of flux. 2 Many irradiation defects may cause deterioration of superconductor characteristic and mechanical characteristics.	irradiation effect
815-03-16	ローレンツカ(フラクソンに作用する)	RÔRENTURYOKU (HURAKUSON NI SAYÔ SURU)	force applied to fluxons by a current NOTE: The force per unit volume is given by $J \times B$, where J is the current density, and B is the magnetic flux density. Information: It is defined as Coulomb-Lorentz force in IEV 121-01-19 .	Lorentz force (on fluxons)
815-03-17	表面バリア	HYÔMEN BARIYA	energy barrier for moving a fluxon into or out of the superconductor interior	surface barrier
815-03-18	ピンニング・センタ, ピン止め点, ピン	PINNINGU SENTA, PINDOME TEN, PIN	region of a superconductor which exerts a force on a fluxon NOTE: Pinning centres include various crystal lattice defects, precipitates, grain boundaries, etc.	pinning centre, pinning site, pin
815-03-19	磁束ピンニング	ZISOKU PINNINGU	trapping of fluxons by pinning centres against the Lorentz force	flux pinning

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
815-03-20	磁束クリープ 磁束フロー	ZISOKU KURĪPU	thermally activated flux motion in which fluxons move from one pinning centre to another NOTE: Persistent current decreases with time due to flux creep.	flux creep
815-03-21	磁束フロー	ZISOKU HURŌ	stable overall motion of fluxons or the fluxon lattice due to the Lorentz force which generates a resistance	flux flow
815-03-22	フラックス・ジャンプ	HURAKKUSU ZYANPU	cooperative and transitional movements of pinned fluxons as a result of a magnetic instability initiated by a mechanical, thermal, magnetic, or electrical disturbance Information: Also referred to as “磁束跳躍 (ZISOKU TYŌYAKU)” = flux jump”.	flux jump
815-03-23	ピン力	PINRYOKU	net force exerted on a fluxon or the fluxon lattice by pinning centres Information: Also referred to as “ピン止め力 (PINDOME RYOKU)” = pinning force”.	pinning force
815-03-24	要素的ピン力	YŌSOTEKI PINRYOKU	maximum pinning force by a single pinning centre exerted on one or a bundle of fluxons NOTE: For planar defects parallel to fluxons, the maximum pinning force per unit length of the fluxon is usually defined.	elementary pinning force
815-03-25	ピン力密度, バルク・ピン力 (記号: F_p)	PINRYOKU MITUDO, BARUKU PINRYOKU	quotient of the sum of the individual pinning forces in a superconductor by the volume of the superconductor NOTE: The pinning force is given by $F_p = -J_c \times B$, where J_c is the critical current density and B is the magnetic flux density.	pinning force density, bulk pinning force (symbol: F_p)