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Notice to Authors

AUSTRALIAN JOURNAL OF PHYSICS

Papers will be considered for publication if they make an original contribution to any branch of physics. In addition to Papers, articles which are complete but of limited scope are published as Short Communications. Compilations of astrophysical data are published in Astrophysical Supplements. All papers are refereed.

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Accessory Publication. Supplementary material of a detailed nature which is not essential in the printed paper but may be useful to other workers may be lodged with the Editor-in-Chief if submitted with the manuscript for inspection by the referees. Such material will be made available on request and a note to this effect should be included in the paper.

General Presentation. The work should be presented concisely and clearly in English. Introductory material, including a review of the literature, should not exceed what is necessary to indicate the reason for the work and the essential background.

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Abstract. This should state concisely the scope of the work and the principal findings, and should be suitable for direct use by abstracting journals; this will seldom require more than 200 words.

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References are cited in the text by the author and date and are not numbered. Authors are referred to recent issues for the style used in the Journal for citing references to books, periodicals and other literature. Titles of published papers are not included, but the reference to any paper accepted for publication but not yet published must include the title. No editorial responsibility can be taken for the accuracy of the references; authors are requested to check these with special care. All references in the text must be listed, with the names of authors arranged alphabetically; all entries in this list must correspond to references in the text. Abbreviations of titles of periodicals should conform to those used by *Chemical Abstracts*.

Units. Authors will be encouraged to assist in the general adoption of the International System of Units (Système International d'Unités). SI units should be used for exact measurements of physical quantities and as far as practical elsewhere.

Mathematical formulae should be carefully *typed* with symbols in correct alignment and adequately spaced. At least two clear lines should be left above and below all displayed equations. If special symbols must be hand-written, they should be inserted with care and identified by pencilled notes in the margins. Judicious use should be made of the solidus to avoid two-line mathematical expressions wherever possible and especially in the running text. All long formulae should be displayed. Vectors should be indicated by single underlinings (not overhead arrows).

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Each table must be referred to in the text and its approximate position should be indicated in the margin of the manuscript. Only in exceptional circumstances will presentation of essentially the same data in tabular and graphical form be permitted; where adequate, the latter form should be used.

Illustrations. The originals and two copies are required. The originals must not be lettered; copies should be lettered with ink. Half-tone illustrations and line drawings are to be numbered in a common sequence and their approximate position should be indicated in the margin of the text. A typed list of captions is required.

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INTERNATIONAL SYSTEM OF UNITS

The Système International d'Unités (SI) was adopted by the eleventh General Conference on Weights and Measures and endorsed by the International Organization for Standardization in 1960. The system is an extension and refinement of the traditional metric system and is superior to any other in being completely coherent, rational and comprehensive. In the system there is one, and only one, unit for each physical quantity and the product or quotient of any two SI units yields the unit of the resulting quantity; no numerical factors are involved.

The seven base and two supplementary units on which the SI is based are listed in Table 1.

Table 1. Base and supplementary SI units

Quantity	Name of unit	Unit symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol
Plane angle	radian	rad
Solid angle	steradian	sr

The base units are defined as follows:

Metre: The metre is the length equal to 1 650 763·73 (exactly) wavelengths in a vacuum of the radiation corresponding to the transition between the energy levels $2p_{10}$ and $5d_5$ of the pure nuclide ^{86}Kr.

Kilogram: The kilogram is the mass of the International Prototype Kilogram which is in the custody of the Bureau International des Poids et Mesures at Sèvres, France.

Second: The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels ($F = 4$, $M_F = 0$ and $F = 3$, $M_F = 0$) of the ground state of the atom of pure ^{133}Cs.

Ampere: The ampere is that constant current which, if maintained in two parallel rectilinear conductors, of infinite length and of negligible circular cross-section, at a distance apart of 1 metre in a vacuum, would produce a force between the conductors equal to 2×10^{-7} newton per metre of length.

Kelvin: The kelvin is completely defined by the decision of the 1954 Conférence Générale to assign the value 273·16 kelvin (exactly) to the thermodynamic temperature at the triple point of water. It is 1/273·16 of the thermodynamic temperature of the triple point of water.

Candela: The candela is the luminous intensity, in the perpendicular direction, of a surface of 1/600 000 square metre of a black body at the temperature of freezing platinum under a pressure of 101 325 pascals.

Mole: The mole is an amount of substance of a system which contains as many elementary units as there are carbon atoms in 0·012 kg (exactly) of the pure nuclide ^{12}C. The elementary unit must be specified and may be an atom, a molecule, an ion, an electron, a proton, etc., or a specified group of such entities.

All the other necessary units can be derived from these base units. Tables 2 and 3 list some of the derived units.

Table 2. Derived SI units with special names

Physical quantity	Name of unit	Symbol for unit	Definition of unit
Energy	joule	J	$kg\ m^2\ s^{-2}$
Force	newton	N	$kg\ m\ s^{-2} = J\ m^{-1}$
Pressure	pascal	Pa	$kg\ m^{-1}\ s^{-2} = N\ m^{-2}$
Power	watt	W	$kg\ m^2\ s^{-3} = J\ s^{-1}$
Electric charge	coulomb	C	A s
Electric potential difference	volt	V	$kg\ m^2\ s^{-3}\ A^{-1} = J\ A^{-1}\ s^{-1}$
Electric resistance	ohm	Ω	$kg\ m^2\ s^{-3}\ A^{-2} = V\ A^{-1}$
Electric conductance	siemens	S	$kg^{-1}\ m^{-2}\ s^3\ A^2 = \Omega^{-1}$
Electric capacitance	farad	F	$A^2\ s^4\ kg^{-1}\ m^{-2} = A\ s\ V^{-1}$
Magnetic flux	weber	Wb	$kg\ m^2\ s^{-2}\ A^{-1} = V\ s$
Inductance	henry	H	$kg\ m^2\ s^{-2}\ A^{-2} = V\ s\ A^{-1}$
Magnetic flux density	tesla	T	$kg\ s^{-2}\ A^{-1} = V\ s\ m^{-2}$
Luminous flux	lumen	lm	cd sr
Illumination	lux	lx	$cd\ sr\ m^{-2}$
Frequency	hertz	Hz	s^{-1}
Activity	becquerel	Bq	s^{-1}
Absorbed dose	gray	Gy	$J\ kg^{-1}$

Table 3. Other derived SI units

Physical quantity	SI unit	Symbol
Area	square metre	m^2
Volume	cubic metre	m^3
Density	kilogram per cubic metre	$kg\ m^{-3}$
Velocity	metre per second	$m\ s^{-1}$
Angular velocity	radian per second	$rad\ s^{-1}$
Acceleration	metre per second squared	$m\ s^{-2}$
Kinematic viscosity	square metre per second	$m^2\ s^{-1}$
Dynamic viscosity	pascal second	Pa s
Electric field strength	volt per metre	$V\ m^{-1}$
Magnetic field strength	ampere per metre	$A\ m^{-1}$
Luminance	candela per square metre	$cd\ m^{-2}$
Heat capacity	joule per kelvin	$J\ K^{-1}$
Thermal conductivity	watt per metre kelvin	$W\ m^{-1}\ K^{-1}$
Surface tension	newton per metre	$N\ m^{-1}$
Thermal coefficient of expansion	reciprocal kelvin	K^{-1}

Some of the SI units are of inconvenient size, but the prefixes listed in Table 4 may be used to indicate fractions or multiples of the base or derived units.

Table 4. Prefixes for SI units

Fraction	Prefix	Symbol	Multiple	Prefix	Symbol
10^{-1}	deci	d	10	deca	da
10^{-2}	centi	c	10^{2}	hecto	h
10^{-3}	milli	m	10^{3}	kilo	k
10^{-6}	micro	μ	10^{6}	mega	M
10^{-9}	nano	n	10^{9}	giga	G
10^{-12}	pico	p	10^{12}	tera	T
10^{-15}	femto	f	10^{15}	peta	P
10^{-18}	atto	a	10^{18}	exa	E

Also, there are a number of familiar units which differ from the corresponding SI units only by powers of ten. They are not part of SI but will probably continue in use for some time. The list of such units in Table 5 is not exhaustive.

Table 5. Named units which are decimal fractions or multiples of SI units

Physical quantity	Name	Symbol	Definition
Length	ångstrom	Å	10^{-10} m
Length	micron	μm	10^{-6} m
Area	hectare	ha	10^{4} m^{2}
Volume	litre	l	10^{-3} m^{3}
Mass	tonne	t	10^{3} kg
Force	dyne	dyn	10^{-5} N
Pressure	bar	bar	10^{5} Pa
Energy	erg	erg	10^{-7} J
Kinematic viscosity	stokes	St	10^{-4} m^{2} s^{-1}
Dynamic viscosity	poise	P	10^{-1} Pa s
Magnetic flux	maxwell	Mx	10^{-8} Wb
Magnetic flux density (magnetic induction)	gauss	G	10^{-4} T
Absorbed dose	rad	rad	10^{-2} Gy

Table 6 lists a number of other units which are not part of SI and defines them exactly in terms of the base SI units. *Their use is to be discouraged.*

Table 6. Some common units defined exactly in terms of SI units

Physical quantity	Name	Symbol	Definition
Length	inch	in	$2 \cdot 54 \times 10^{-2}$ m
Area	acre	ac	$4\,046 \cdot 856\,422\,4$ m^2
Mass	pound (avoirdupois)	lb	$0 \cdot 453\,592\,37$ kg
Force	kilogram-force	kgf	$9 \cdot 806\,65$ N
Pressure	atmosphere	atm	101 325 Pa
Pressure	torr	Torr	(101 325/760) Pa
Pressure	conventional millimetre of mercury	mmHg	$13 \cdot 595\,1 \times 980 \cdot 665 \times 10^{-2}$ Pa
Energy	kilowatt-hour	kW h	$3 \cdot 6 \times 10^{6}$ J
Energy	thermochemical calorie	cal (thermochem.)	$4 \cdot 184$ J
Energy	international table calorie	cal_{IT}	$4 \cdot 186\,8$ J
Activity	curie	Ci	$3 \cdot 7 \times 10^{10}$ Bq