Overview of units defined by `cernunits.sty`

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Global commands

A general unit can be defined with `\Unit`, which has two arguments, the first a number and the second a unit name, e.g., `\Unit{2.4}{cm}` would result in 2.4 cm.

The separation between the units and its value is controlled by the command `\USP`, which by default is a full non-breaking space '~'.

Unit commands start with an uppercase `U`. All commands described in the following have a variant with the same name with an uppercase `Z` appended, where there is no `\USP` space inserted in front of the command. For instance, compare the following `10\UkeV` (giving 10 keV), and `10\UkeVZ` (giving 10keV).

HEP energy and momenta

The global command `\UeV` with one optional argument can be used to construct units in the 'eV' family, e.g., `100\UeV` yields 100 eV, while `100\UeV[G]` yields 100 GeV. Similarly, for a momentum, `100\UeVc` yields 100 eV/c, while `100\UeVc[G]` yields 100 GeV/c, and for an energy, where `100\UeVcc` yields 100 eV/c^2, and `100\UeVcc[G]` yields 100 GeV/c^2.

Explicit multiples of eV, etc. are available as follows:

`\UkeV`	keV	`\UMeV`	MeV	`\UGeV`	GeV	`\UTeV`	TeV	`\UPeV`	PeV
`\UkeVc`	keV/c	`\UMeVc`	MeV/c	`\UGeVc`	GeV/c	`\UTeVc`	TeV/c	`\UPeVc`	PeV/c
`\UkeVcc`	keV/c^2	`\UMeVcc`	MeV/c^2	`\UGeVcc`	GeV/c^2	`\UTeVcc`	TeV/c^2	`\UPeVcc`	PeV/c^2

Lengths and distances

The generic commands is `\Um` (for metre), which has one optional argument for contructing any multiple or sub-division, e.g., `2.54\Um` gives 2.54 m, and `2.54\Um[f]` yields 2.54 fm.

The following explicitly defined sub-divisions and multiples of a metre are available.

`\Ufm`	fm	`\Upm`	pm	`\Unm`	nm	`\Uum`	µm	`\Umm`	mm
`\Ucm`	cm	`\Udm`	dm	`\Ukm`	km				

On top of that, for cosmology and astronomy, the parsec, and some multiples are available.

`\Upc`	pc	`\Ukpc`	kpc	`\UMpc`	Mpc

Mass

The global command `\Ug` with one optional argument can be used to construct units expressing weight, e.g., `5.6\Ug` yields 5.6 g, while `2.5\Ug[k]` yields 2.5 kg. Explicit weight units are `100\Ung` yielding 100 ng, etc.

`\Ug`	g	`\Ung`	ng	`\Uug`	µg	`\Umg`	mg	`\Ukg`	kg

Force, energy, power, pressure

The following generic commands (each with an optional argument) allow you to specify units for force, energy, power, and pressure.

\UN	N	\UJ	J	\UW	W	\UPa	Pa

The force was 1000 N (10000\UN) or 1 kN (1\UN[k]). The energy dissipated was 0.03 J (0.03\UJ) or 30 mJ (30\UJ[m]). The nuclear power station has a power rating of about 1 billion W (\UW) or 1 GW (1\UW[G]). The 'standard' atmospheric pressure is defined as 101 325 Pa (\UPa), or about 1013 hPa (1013\UPa[h]).

Cross-sections

In high-energy physics the practical unit for cross-sections is the 'barn', that can be noted with the generic command \Ub which has an optional argument, for example, 0.03 b (0.03\Ub) is equal to 30 mb (30\Ub[m]).

\Ub	b	\Ufb	fb	\Upb	pb
\Unb	nb	\Uub	µb	\Umb	mb

Examples of the use of these smaller units are 30 mb (30\Umb), 20 pb (20\Upb), 15 µb (15\Uub), etc.

Time and frequencies

Time is expressed in seconds, annotated with the generic command \Us, which can be used with an optional argument, e.g., 10 s (10\Us) or 15 ms (15\Us[m]). For convenience a series of subunits is available.

\Us	s	\Ufs	fs	\Ups	ps
\Uns	ns	\Uus	µs	\Ums	ms

Hours and years also have their generic commands (with optional argument), \Uh and \Uy. Examples are 1000 y (1000\Uy) which can also be written as 1 ky (1\Uy[k]), and 10 h (10\Uh).

The unit for frequencies is the hertz. Its generic command (with optional argument) is \UHz. Earthquakes have a frequency spectrum going into the sub-Hz (\UHzZ) region, and extending down to a few mHz (\UHzZ[m]). For convenience the following series of multiples is available.

\UHz	Hz	\UkHz	kHz	\UMHz	MHz	\UGHz	GHz

Magnetic and electric units

For magnetic and electric SI base and derived units a list of generic commands (with optional argument) follows.

ampere	electric current	\UA	A
coulomb	electric charge	\UC	C
farad	capacitance	\UF	F
ohm	electric resistance	\UO	Ω
siemens	electric conductance	\US	S
volt	electric potential	\UV	V
weber	magnetic flux	\UWb	Wb
tesla	magnetic flux density	\UT	T
henry	inductance	\UH	H

The following relations between units hold.

$\mathrm{C} \rightarrow \mathrm{s} \cdot \mathrm{A}$	`$\UC\rightarrow\Us\cdot\UA$`
$\mathrm{V} \rightarrow \mathrm{W}/\mathrm{A}$	`$\UV\rightarrow\UW/\UA$`
$\mathrm{F} \rightarrow \mathrm{C}/\mathrm{V}$	`$\UF\rightarrow\UC/\UV$`
$\Omega \rightarrow \mathrm{V}/\mathrm{A}$	`$\UO\rightarrow\UV/\UA$`
$\mathrm{S} \rightarrow \mathrm{A}/\mathrm{V}$	`$\US\rightarrow\UA/\UV$`
$\mathrm{Wb} \rightarrow \mathrm{V} \cdot \mathrm{s}$	`$\UWb\rightarrow\UV\cdot\Us$`
$\mathrm{T} \rightarrow \mathrm{Wb}/\mathrm{m}^2$	`$\UT\rightarrow\UWb/\Um^2$`
$\mathrm{H} \rightarrow \mathrm{Wb}/\mathrm{A}$	`$\UH\rightarrow\UWb/\UA$`

For convenience a command for kilovolt (`\UkV`) is available.

On top of that the CGS unit for magnetic flux density, the gauss, has its own generic symbol (`\UG`) and its multiple (`\UkG`). One has the relation $1\ \mathrm{G} = 10^{-4}\ \mathrm{T}$ (`$1\UG=10\sp{-4}\UT$`) or $1\ \mathrm{T} = 10\ \mathrm{kG}$ (`$1\UT=10\UkG$` or `$1\UT=10\UG[k]$`).

Temperature

The SI unit for thermodynamic temperature is the kelvin and a derived unit is the degree Celsius. They both have their generic command `\UK`, and `\UDC`, respectively. By definition $0^{\circ}\mathrm{C} = 273.15\ \mathrm{K}$ (`$0\UDC=273.15\UK$`).

Human health-related units

There are a few derived units approved by the International Commission on Radiation Units and Measurements, as follows.

becquerel	radionuclide activity	`\UBq`	Bq
gray	absorbed dose	`\UGy`	Gy
sievert	equivalent dose	`\USv`	Sv

Moreover, the following relations between units hold:

$\mathrm{Bq} \rightarrow \mathrm{s}^{-1}$	`$\UBq\rightarrow\Us^{-1}$`
$\mathrm{Gy} \rightarrow \mathrm{J}/\mathrm{kg}$	`$\UGy\rightarrow\UJ/\Ukg$`
$\mathrm{Sv} \rightarrow \mathrm{J}/\mathrm{kg}$	`$\USv\rightarrow\UJ/\Ukg$`

Dimensionless units

A generic unit for plane angles is the rad (generic command `\Urad`) and its convenient subdivision the millirad (`\mrad`). One has $0.05\ \mathrm{rad} = 50\ \mathrm{mrad}$ (`$0.05\Urad=50\Urad[m]$`), which can also be written $0.05\ \mathrm{rad} = 50\ \mathrm{mrad}$ (`$0.05\Urad=50\Umrad$`).