1 Introduction

This package consists of several macros that are shorthand for a variety of physical constants, e.g. the speed of light. The package developed out of physics and astronomy classes that I have taught and wanted to ensure that I had correct values for each constant and did not wish to retype them every time I use them. The constants can be used in two forms, the most accurate available values, or versions that are rounded to 3 significant digits for use in typical classroom settings, homework assignments, etc.

Most constants are taken from CODATA 2018, with the exception of the astronomical objects, whose values are taken from International Astronomical Union specified values. Constants that are derived from true constants, e.g. the fine structure constant, have been calculated using the accepted values of the fundamental constants.

1.1 Options

There are three options available: \texttt{shortconst}, \texttt{cgs}, and \texttt{unseparateddecimals}. They can be invoked when the package is declared, e.g. \texttt{\usepackage[shortconst]{physconst}}.

\texttt{shortconst} will reduce the precision to 3 digits for all constants. This is intended when you don’t want to have the details of the constants, just the general value (e.g. $1.60 \times 10^{-19}$ C instead of $1.602176634 \times 10^{-19}$ C).

\texttt{cgs} will provide all constants in cgs, i.e. the units used in astronomy.
unseparated decimals is for situations when you don’t want spaces in the decimal portion of full precision constants. E.g. the elementary charge would appear as $1.602176634 \times 10^{-19}$ C instead of $1.602\ 176\ 634 \times 10^{-19}$ C. (notice the gaps between digits in the latter.)

2 Prerequisites / Dependencies

2.1 General

This package requires the physunits package.

2.2 Generating Documentation

hyperref, xcolor, mdframed, and imakeidx packages are required to generate the documentation (this file) for this package.

3 Acknowledgements

The author would like to thank Dr. Florian Leupold for catching a glaring error in the shortconst option.

4 Bug Reporting


5 Macros

5.1 Normal Macros

The normal macros are the ones that you will typically use, whose values are determined by the choice of options when the package is invoked.
5.1.1 Naming Convention

Each macro starts with a lower case ‘k’ to indicate that it is a constant. If the macro is of special units, e.g. eV, those units will be specified next. If the macro is part of a fundamental unit group, it then gets the name of the group, e.g. Mass, Charge, etc. Finally is the details or name of the constants, e.g. Proton, Planck, etc.

5.1.2 Mass

\kMassElectron \kMassElectron is the mass of an electron.
\keVMassElectron \keVMassElectron is the mass of an electron.
\kMassElectronNumeric \kMassElectronNumeric is the numeric value of the mass of an electron.
\keVMassElectronNumeric \keVMassElectronNumeric is the numeric value of the mass of an electron.
\kMassProton \kMassProton is the mass of a proton.
\keVMassProton \keVMassProton is the mass of a proton.
\kMassProtonNumeric \kMassProtonNumeric is the numeric value of the mass of a proton.
\keVMassProtonNumeric \keVMassProtonNumeric is the numeric value of the mass of a proton.
\kMassHydrogen \kMassHydrogen is the mass of a neutral hydrogen atom.
\keVMassHydrogen \keVMassHydrogen is the mass of a neutral hydrogen atom.
\kMassHydrogenNumeric \kMassHydrogenNumeric is the numeric value of the mass of a neutral hydrogen atom.
\keVMassHydrogenNumeric \keVMassHydrogenNumeric is the numeric value of the mass of a neutral hydrogen atom.
\kMassSun \kMassSun is the mass of the Sun.
\kMassSunNumeric \kMassSunNumeric is the numeric value of the mass of the Sun.
\kMassEarth \kMassEarth is the mass of the Earth.
\kMassEarthNumeric \kMassEarthNumeric is the numeric value of the mass of the Earth.
\kMassJupiter \kMassJupiter is the mass of Jupiter.
\kMassJupiterNumeric \kMassJupiterNumeric is the numeric value of the mass of Jupiter.
\textbf{5.1.3 Charge}

- \texttt{kMassAMU} is the mass of an atomic mass unit.
- \texttt{keVMassAMU} is the mass of an atomic mass unit.
- \texttt{kMassAMUNumeric} is the numeric value of the mass of an atomic mass unit.
- \texttt{keVMassAMUNumeric} is the numeric value of the mass of an atomic mass unit.

- \texttt{kChargeFundamental} is the fundamental charge.
- \texttt{kChargeFundamentalNumeric} is the numeric value of the fundamental charge.
- \texttt{kChargeElectron} is the charge of an electron.
- \texttt{kChargeElectronNumeric} is the numeric value of the charge of an electron.
- \texttt{kChargeProton} is the charge of a proton.
- \texttt{kChargeProtonNumeric} is the numeric value of the charge of a proton.

\textbf{5.1.4 Distances and Lengths}

- \texttt{kRadiusBohr} is Bohr radius of an atom.
- \texttt{kRadiusBohrNumeric} is the numeric value of Bohr radius of an atom.
- \texttt{kAstronomicalUnit} is the astronomical unit (the average distance between the Earth and the Sun).
- \texttt{kAstronomicalUnitNumeric} is the numeric value of the astronomical unit (the average distance between the Earth and the Sun).
- \texttt{kParsec} is the length of a parsec \((\frac{648000 \text{ au}}{\pi})\).
- \texttt{kParsecNumeric} is the numeric value of the length of a parsec \((\frac{648000 \text{ au}}{\pi})\).
- \texttt{kRadiusSun} is the mean radius of the Sun.
- \texttt{kRadiusSunNumeric} is the numeric value of the mean radius of the Sun.
- \texttt{kRadiusEarth} is the mean radius of the Earth.
- \texttt{kRadiusEarthNumeric} is the numeric value of the mean radius of the Earth.
\textbf{5.1.5 Energy, Power, and Luminosity}

\texttt{\textbackslash kRydberg} is the Rydberg energy (the binding energy of Hydrogen).
\texttt{\textbackslash keVRydberg} is the Rydberg energy (the binding energy of Hydrogen).
\texttt{\textbackslash kRydbergNumeric} is the numeric value of the Rydberg energy (the binding energy of Hydrogen).
\texttt{\textbackslash keVRydbergNumeric} is the numeric value of the Rydberg energy (the binding energy of Hydrogen).
\texttt{\textbackslash kLuminositySun} is the luminosity of the Sun.
\texttt{\textbackslash kLuminositySunNumeric} is the numeric value of the luminosity of the Sun.

\textbf{5.1.6 Pressure}

\texttt{\textbackslash kPressureAtmosphere} is the standard atmospheric pressure.
\texttt{\textbackslash kPressureAtmosphereNumeric} is the numeric value of the standard atmospheric pressure.
\texttt{\textbackslash kPressureStandard} is the standard atmospheric pressure.
\texttt{\textbackslash kPressureStandardNumeric} is the numeric value of the standard atmospheric pressure.

\textbf{5.1.7 Velocity, Speed and Acceleration}

\texttt{\textbackslash kSpeedLight} is the speed of light.
\texttt{\textbackslash kSpeedLightNumeric} is the numeric value of the speed of light.
\texttt{\textbackslash kAccelGravity} is the acceleration due to gravity at the surface of the Earth.
\texttt{\textbackslash kAccelGravityNumeric} is the numeric value of the acceleration due to gravity at the surface of the Earth.
5.1.8 Other Constants

\texttt{\textbackslash kCoulomb} \texttt{\textbackslash kCoulomb} is the Coulomb constant \((\frac{1}{4\pi\varepsilon_0})\).

\texttt{\textbackslash kCoulomb\textbackslash Numeri}c \texttt{\textbackslash kCoulomb\textbackslash Numeric} is the numeric value of the Coulomb constant \((\frac{1}{4\pi\varepsilon_0})\).

\texttt{\textbackslash kVacuum\textbackslash Permittivity} \texttt{\textbackslash kVacuum\textbackslash Permittivity} is the electric permittivity of the vacuum.

\texttt{\textbackslash kVacuum\textbackslash Permittivity\textbackslash Numeric} \texttt{\textbackslash kVacuum\textbackslash Permittivity\textbackslash Numeric} is the numeric value of the electric permittivity of the vacuum.

\texttt{\textbackslash kVacuum\textbackslash Permeability} \texttt{\textbackslash kVacuum\textbackslash Permeability} is the magnetic permeability of the vacuum.

\texttt{\textbackslash kVacuum\textbackslash Permeability\textbackslash Numeric} \texttt{\textbackslash kVacuum\textbackslash Permeability\textbackslash Numeric} is the numeric value of the magnetic permeability of the vacuum.

\texttt{\textbackslash kVacuum\textbackslash Impedance} \texttt{\textbackslash kVacuum\textbackslash Impedance} is the characteristic impedance of the vacuum.

\texttt{\textbackslash kVacuum\textbackslash Impedance\textbackslash Numeric} \texttt{\textbackslash kVacuum\textbackslash Impedance\textbackslash Numeric} is the numeric value of the characteristic impedance of the vacuum.

\texttt{\textbackslash kBoltzmann} \texttt{\textbackslash kBoltzmann} is the Boltzmann constant.

\texttt{\textbackslash keVBoltzmann} \texttt{\textbackslash keVBoltzmann} is the Boltzmann constant.

\texttt{\textbackslash kBoltzmann\textbackslash Numeric} \texttt{\textbackslash kBoltzmann\textbackslash Numeric} is the numeric value of the Boltzmann constant.

\texttt{\textbackslash keVBoltzmann\textbackslash Numeric} \texttt{\textbackslash keVBoltzmann\textbackslash Numeric} is the numeric value of the Boltzmann constant.

\texttt{\textbackslash kPlanck} \texttt{\textbackslash kPlanck} is the Planck constant.

\texttt{\textbackslash keVPlanck} \texttt{\textbackslash keVPlanck} is the Planck constant.

\texttt{\textbackslash kPlanck\textbackslash Numeric} \texttt{\textbackslash kPlanck\textbackslash Numeric} is the numeric value of the Planck constant.

\texttt{\textbackslash keVPlanck\textbackslash Numeric} \texttt{\textbackslash keVPlanck\textbackslash Numeric} is the numeric value of the Planck constant.

\texttt{\textbackslash kPlanck\textbackslash Reduced} \texttt{\textbackslash kPlanck\textbackslash Reduced} is the Reduced Planck constant \((\frac{\hbar}{2\pi})\).

\texttt{\textbackslash keVPlanck\textbackslash Reduced} \texttt{\textbackslash keVPlanck\textbackslash Reduced} is the Reduced Planck constant \((\frac{\hbar}{2\pi})\).

\texttt{\textbackslash kPlanck\textbackslash Reduced\textbackslash Numeric} \texttt{\textbackslash kPlanck\textbackslash Reduced\textbackslash Numeric} is the numeric value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\).

\texttt{\textbackslash keVPlanck\textbackslash Reduced\textbackslash Numeric} \texttt{\textbackslash keVPlanck\textbackslash Reduced\textbackslash Numeric} is the numeric value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\).

\texttt{\textbackslash kGravity} \texttt{\textbackslash kGravity} is Newton’s gravitational constant.
Gravity Numeric is the numeric value of Newton’s gravitational constant.

Stefan Boltzmann is the Stefan-Boltzmann blackbody constant
\[
\frac{2\pi^2k_B^4}{15\hbar^3c^2}.
\]

Stefan Boltzmann Numeric is the numeric value of the Stefan-Boltzmann blackbody constant
\[
\frac{2\pi^2k_B^4}{15\hbar^3c^2}.
\]

Radiation is the radiation constant, \(a\left(\frac{8\pi^5k_B^4}{15c^3\hbar^3}\right)\).

Radiation Numeric is the numeric value of the radiation constant, \(a\left(\frac{8\pi^5k_B^4}{15c^3\hbar^3}\right)\).

Fine Structure is the fine structure constant.

Fine Structure Numeric is the numeric value of the fine structure constant.

Fine Structure Reciprocal is the reciprocal of the fine structure constant.

洪格多拉 is the numeric value of Avogadro’s Number (the number of particles in a mole).

5.2 Detailed Macros

These macros are used to access the constants with specific units and precision. They require use of \makeatletter and \makeatother in order to be used. They are used internally by physconst to define the macros that are normally used (those described above).

5.2.1 Naming Convention

The detailed macros are named like \@units@precision@name. The units specify which units the constant is in (SI, cgs, or eV). For constants that are independent of the unit system (e.g. Avogadro’s number and the fine structure constant), the units are omitted. The precision is either ‘short’ or ‘full’ to indicate how much precision is included in the number. All short precision constants have 3 significant figures. The precision of full precision constants vary by their definition and/or inputs. Finally, the name or description of the constant appears.
5.2.2 Mass

\texttt{\SIshortMassElectron} is the mass of an electron in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \SIshortMassElectron
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $9.11 \times 10^{-31}$ kg
\end{verbatim}

\texttt{\SIfullMassElectron} is the mass of an electron in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \SIfullMassElectron
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $9.108\,980\,087\,382 \times 10^{-31}$ kg
\end{verbatim}

\texttt{\cgsshortMassElectron} is the mass of an electron in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \cgsshortMassElectron
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $9.11 \times 10^{-28}$ g
\end{verbatim}

\texttt{\cgsfullMassElectron} is the mass of an electron in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is \texttt{\textbackslash{}cgs\textbackslash{}full\textbackslash{}MassElectron} \texttt{\textbackslash{}makeatother}

Resulting in

The value is $9.108\,980\,087\,382 \times 10^{-28}\,\text{g}$

\texttt{\textbackslash{}eV\textbackslash{}short\textbackslash{}MassElectron} is the mass of an electron in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash{}makeatletter}
\texttt{The value is \texttt{\textbackslash{}eV\textbackslash{}short\textbackslash{}MassElectron}}
\texttt{\textbackslash{}makeatother}

Resulting in

The value is $5.11 \times 10^5\,\text{eV}\,c^{-2}$

\texttt{\textbackslash{}eV\textbackslash{}full\textbackslash{}MassElectron} is the mass of an electron in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash{}makeatletter}
\texttt{The value is \texttt{\textbackslash{}eV\textbackslash{}full\textbackslash{}MassElectron}}
\texttt{\textbackslash{}makeatother}

Resulting in

The value is $5.109\,763\,089\,046 \times 10^5\,\text{eV}\,c^{-2}$

\texttt{\textbackslash{}SI\textbackslash{}short\textbackslash{}MassElectronNumeric} is a mathematical value of the mass of an electron in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash{}makeatletter}
\texttt{The value is \texttt{\textbackslash{}SI\textbackslash{}short\textbackslash{}MassElectronNumeric}}
\texttt{\textbackslash{}makeatother}

Resulting in
\texttt{k\text@SI\text@full\text@MassElectronNumeric} is a mathematical value of the mass of an electron in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\texttt{The value is k\text@SI\text@full\text@MassElectronNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 9.11e – 31
\end{verbatim}

\texttt{k\text@cgs\text@short\text@MassElectronNumeric} is a mathematical value of the mass of an electron in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\texttt{The value is k\text@cgs\text@short\text@MassElectronNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 9.11e – 28
\end{verbatim}

\texttt{k\text@cgs\text@full\text@MassElectronNumeric} is a mathematical value of the mass of an electron in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\texttt{The value is k\text@cgs\text@full\text@MassElectronNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 9.108980087382e – 31
\end{verbatim}

\texttt{k\text@eV\text@short\text@MassElectronNumeric} is a mathematical value of the mass of an electron in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}\mbox{}
The value is \texttt{\textbackslash eV\short@MassElectronNumeric}\mbox{}
\texttt{\textbackslash makeatother}

Resulting in
\begin{quote}
The value is 5.11e + 05
\end{quote}

\texttt{\textbackslash eV\full@MassElectronNumeric}\texttt{\textbackslash eV\full@MassElectronNumeric} is a mathematical value of the mass of an electron in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}\mbox{}
The value is \texttt{\textbackslash eV\full@MassElectronNumeric}\mbox{}
\texttt{\textbackslash makeatother}

Resulting in
\begin{quote}
The value is 5.109763089046e + 05
\end{quote}

\texttt{\textbackslash SI\short@MassProton} \texttt{\textbackslash SI\short@MassProton} is the mass of a proton in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}\mbox{}
The value is \texttt{\textbackslash SI\short@MassProton}\mbox{}
\texttt{\textbackslash makeatother}

Resulting in
\begin{quote}
The value is 1.67 \times 10^{-27} \text{ kg}
\end{quote}

\texttt{\textbackslash SI\full@MassProton} \texttt{\textbackslash SI\full@MassProton} is the mass of a proton in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}\mbox{}
The value is \texttt{\textbackslash SI\full@MassProton}\mbox{}
\texttt{\textbackslash makeatother}

Resulting in
The value is $1.672547813969 \times 10^{-27}$ kg

$k@\text{cgs@short@MassProton}$ is the mass of a proton in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@\text{cgs@short@MassProton}$
\makeatother

Resulting in

The value is $1.67 \times 10^{-24}$ g

$k@\text{cgs@full@MassProton}$ is the mass of a proton in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@\text{cgs@full@MassProton}$
\makeatother

Resulting in

The value is $1.672547813969 \times 10^{-24}$ g

$k@\text{eV@short@MassProton}$ is the mass of a proton in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@\text{eV@short@MassProton}$
\makeatother

Resulting in

The value is $9.38 \times 10^8$ eV c$^{-2}$

$k@\text{eV@full@MassProton}$ is the mass of a proton in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $k_{\text{eV}}\text{full@MassProton}$

Resulting in

The value is $9.382\,305\,156\,558 \times 10^8\,\text{eV}\,c^{-2}$

$k_{\text{SI@short@MassProton}}$ is a mathematical value of the mass of a proton in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $k_{\text{SI@short@MassProton}}$
\makeatother
\end{verbatim}

Resulting in

The value is $1.67e-27$

$k_{\text{SI@full@MassProton}}$ is a mathematical value of the mass of a proton in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $k_{\text{SI@full@MassProton}}$
\makeatother
\end{verbatim}

Resulting in

The value is $1.672547813969e-27$

$k_{\text{cgs@short@MassProton}}$ is a mathematical value of the mass of a proton in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $k_{\text{cgs@short@MassProton}}$
\makeatother
\end{verbatim}

Resulting in
The value is \(1.67e - 24\).

\texttt{\textbackslash k@cgs@full@MassProtonNumeric} is a mathematical value of the mass of a proton in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@cgs@full@MassProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is \(1.672547813969e - 24\).

\texttt{\textbackslash k@eV@short@MassProtonNumeric} is a mathematical value of the mass of a proton in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV@short@MassProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is \(9.38e + 08\).

\texttt{\textbackslash k@eV@full@MassProtonNumeric} is a mathematical value of the mass of a proton in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV@full@MassProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is \(9.382305156558e + 08\).

\texttt{\textbackslash k@SI@short@MassHydrogen} is the mass of a neutral hydrogen atom in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
Resulting in

\texttt{\texttt{\texttt{\texttt{\makeatletter\texttt{The \texttt{value \texttt{is \texttt{\k@SI@short@MassHydrogen}}\texttt{\makeatother}}}}}}}

\textbf{Resulting in}

\texttt{The \texttt{value \texttt{is \texttt{1.67 \times 10^{-27}} \texttt{kg}}}}

\texttt{\texttt{\texttt{\texttt{\k@SI@full@MassHydrogen}}}} \texttt{is the mass of a neutral hydrogen atom in SI units with full precision. (CODATA 2018)}

The macro can be invoked by (e.g.)

\texttt{\texttt{\texttt{\texttt{\makeatletter\texttt{The \texttt{value \texttt{is \texttt{\k@SI@full@MassHydrogen}}\texttt{\makeatother}}}}}}}

\textbf{Resulting in}

\texttt{The \texttt{value \texttt{is \texttt{1.673\,458\,687\,724 \times 10^{-27}} \texttt{kg}}}}

\texttt{\texttt{\texttt{\texttt{\k@cgs@short@MassHydrogen}}}} \texttt{is the mass of a neutral hydrogen atom in cgs units with reduced precision. (CODATA 2018)}

The macro can be invoked by (e.g.)

\texttt{\texttt{\texttt{\texttt{\makeatletter\texttt{The \texttt{value \texttt{is \texttt{\k@cgs@short@MassHydrogen}}\texttt{\makeatother}}}}}}}

\textbf{Resulting in}

\texttt{The \texttt{value \texttt{is \texttt{1.67 \times 10^{-24}} \texttt{g}}}}

\texttt{\texttt{\texttt{\texttt{\k@cgs@full@MassHydrogen}}}} \texttt{is the mass of a neutral hydrogen atom in cgs units with full precision. (CODATA 2018)}

The macro can be invoked by (e.g.)

\texttt{\texttt{\texttt{\texttt{\makeatletter\texttt{The \texttt{value \texttt{is \texttt{\k@cgs@full@MassHydrogen}}\texttt{\makeatother}}}}}}}

\textbf{Resulting in}

\texttt{The \texttt{value \texttt{is \texttt{1.67 \times 10^{-24}} \texttt{g}}}}
The value is $1.673458687724 \times 10^{-24}$ g

\texttt{\textbackslash k@eV@short@MassHydrogen} is the mass of a neutral hydrogen atom in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV@short@MassHydrogen}
\makeatother
\end{verbatim}

Resulting in

The value is $9.39 \times 10^8$ eV $c^{-2}$

\texttt{\textbackslash k@eV@full@MassHydrogen} is the mass of a neutral hydrogen atom in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV@full@MassHydrogen}
\makeatother
\end{verbatim}

Resulting in

The value is $9.387414783596 \times 10^8$ eV $c^{-2}$

\texttt{\textbackslash k@SI@short@MassHydrogenNumeric} is a mathematical value of the mass of a neutral hydrogen atom in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@short@MassHydrogenNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $1.67e - 27$

\texttt{\textbackslash k@SI@full@MassHydrogenNumeric} is a mathematical value of the mass of a neutral hydrogen atom in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $\nuSI{\text{MassHydrogenNumeric}}$

Resulting in

The value is $1.673458687724e^{-27}$

$k@cgs@short@MassHydrogenNumeric$ is a mathematical value of the mass of a neutral hydrogen atom in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@short@MassHydrogenNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $1.67e^{-24}$

$k@cgs@full@MassHydrogenNumeric$ is a mathematical value of the mass of a neutral hydrogen atom in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@MassHydrogenNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $1.673458687724e^{-24}$

$k@eV@short@MassHydrogenNumeric$ is a mathematical value of the mass of a neutral hydrogen atom in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@eV@short@MassHydrogenNumeric
\makeatother
\end{verbatim}

Resulting in
\texttt{\textbackslash k@eV@full@MassHydrogenNumeric} is a mathematical value of the mass of a neutral hydrogen atom in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV@full@MassHydrogenNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $9.39e + 08$

\texttt{\textbackslash k@SI@short@MassSun} is the mass of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@short@MassSun}
\makeatother
\end{verbatim}

Resulting in

The value is $1.99 \times 10^{30} \text{ kg}$

\texttt{\textbackslash k@SI@full@MassSun} is the mass of the Sun in SI units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@full@MassSun}
\makeatother
\end{verbatim}

Resulting in

The value is $1.988 409 9 \times 10^{30} \text{ kg}$

\texttt{\textbackslash k@cgs@short@MassSun} is the mass of the Sun in cgs units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)
The value is \texttt{\textbackslash \textasciicircum{cgs} \textsc{MassSun}}

Resulting in

\texttt{The value is $1.99 \times 10^{33}$ g} 

\texttt{\textbackslash \textasciicircum{cgs} \textsc{full MassSun}} is the mass of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\texttt{The value is \textasciicircum{cgs} \textsc{full MassSun}}

Resulting in

\texttt{The value is $1.9884099 \times 10^{33}$ g} 

\texttt{\textasciicircum{SI} \textsc{short MassSunNumeric}} is a mathematical value of the mass of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\texttt{The value is \textasciicircum{SI} \textsc{short MassSunNumeric}}

Resulting in

\texttt{The value is $1.99\text{e} + 30$} 

\texttt{\textasciicircum{SI} \textsc{full MassSunNumeric}} is a mathematical value of the mass of the Sun in SI units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\texttt{The value is \textasciicircum{SI} \textsc{full MassSunNumeric}}

Resulting in
\texttt{\textbackslash{}k@cgs@short@MassSunNumeric} is a mathematical value of the mass of the Sun in cgs units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@short@MassSunNumeric
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 1.99e + 33
\end{verbatim}

\texttt{\textbackslash{}k@cgs@full@MassSunNumeric} is a mathematical value of the mass of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@MassSunNumeric
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 1.9884099e + 33
\end{verbatim}

\texttt{\textbackslash{}k@short@MassEarth} is the mass of the Earth with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@short@MassEarth
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 5.97 \times 10^{24} \text{kg}
\end{verbatim}

\texttt{\textbackslash{}k@full@MassEarth} is the mass of the Earth with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)
The value is $\k@full@MassEarth$
\makeatother

Resulting in
The value is $5.972\,168 \times 10^{24}\text{kg}$

\k@short@MassEarthNumeric\k@short@MassEarthNumeric is a mathematical value of the mass of the Earth with reduced precision. (IAU Resolution B3 2015)
The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@short@MassEarthNumeric$
\makeatother

Resulting in
The value is $5.97e+24$

\k@full@MassEarthNumeric\k@full@MassEarthNumeric is a mathematical value of the mass of the Earth with full precision. (IAU Resolution B3 2015)
The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@full@MassEarthNumeric$
\makeatother

Resulting in
The value is $5.972168e+24$

\k@short@MassJupiter\k@short@MassJupiter is the mass of Jupiter with reduced precision. (IAU Resolution B3 2015)
The macro can be invoked by (e.g.)

\makeatletter
The value is $\k@short@MassJupiter$
\makeatother

Resulting in
The value is $1.90 \times 10^{27}$ kg

\texttt{\textbackslash k\texttt{@full@MassJupiter}} is the mass of Jupiter with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{\textbackslash makeatletter}
\texttt{The value is \texttt{\textbackslash k\texttt{@full@MassJupiter}}}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $1.898\,1246 \times 10^{27}$ kg
\end{verbatim}

\texttt{\textbackslash k\texttt{@short@MassJupiterNumeric}} is a mathematical value of the mass of Jupiter with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{\textbackslash makeatletter}
\texttt{The value is \texttt{\textbackslash k\texttt{@short@MassJupiterNumeric}}}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $1.90e+27$
\end{verbatim}

\texttt{\textbackslash k\texttt{@full@MassJupiterNumeric}} is a mathematical value of the mass of Jupiter with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{\textbackslash makeatletter}
\texttt{The value is \texttt{\textbackslash k\texttt{@full@MassJupiterNumeric}}}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $1.8981246e+27$
\end{verbatim}

\texttt{\textbackslash k\texttt{@SI@short@MassAMU}} is the mass of an atomic mass unit in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $\text{kSI\textregistered short\textregistered MassAMU}$

Resulting in

The value is $1.66 \times 10^{-27}$ kg

\text{kSI\textregistered full\textregistered MassAMU} is the mass of an atomic mass unit in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \text{kSI\textregistered full\textregistered MassAMU}
\makeatother
\end{verbatim}

Resulting in

The value is $1.660465492239 \times 10^{-27}$ kg

\text{kCgs\textregistered short\textregistered MassAMU} is the mass of an atomic mass unit in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \text{kCgs\textregistered short\textregistered MassAMU}
\makeatother
\end{verbatim}

Resulting in

The value is $1.66 \times 10^{-24}$ g

\text{kCgs\textregistered full\textregistered MassAMU} is the mass of an atomic mass unit in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \text{kCgs\textregistered full\textregistered MassAMU}
\makeatother
\end{verbatim}

Resulting in
The value is $1.660465492239 \times 10^{-24}$ g

$\texttt{\textbackslash k@eV\textbackslash short\textbackslash MassAMU}$ is the mass of an atomic mass unit in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \k@eV\short\MassAMU
\makeatother
\end{verbatim}

Resulting in

The value is $9.31 \times 10^8$ eV $c^{-2}$

$\texttt{\textbackslash k@eV\textbackslash full\textbackslash MassAMU}$ is the mass of an atomic mass unit in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \k@eV\full\MassAMU
\makeatother
\end{verbatim}

Resulting in

The value is $9.314528302276 \times 10^8$ eV $c^{-2}$

$\texttt{\textbackslash k@SI\textbackslash short\textbackslash MassAMUNumeric}$ is a mathematical value of the mass of an atomic mass unit in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \k@SI\short\MassAMUNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $1.66e - 27$

$\texttt{\textbackslash k@SI\textbackslash full\textbackslash MassAMUNumeric}$ is a mathematical value of the mass of an atomic mass unit in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
<table>
<thead>
<tr>
<th>Macro</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\k@SI@full@MassAMUNumeric</code></td>
<td>The value is $1.660465492239e^{-27}$</td>
<td>Resulting in</td>
</tr>
<tr>
<td><code>\k@cgs@short@MassAMUNumeric</code></td>
<td>A mathematical value of the mass of an atomic mass unit in cgs units with reduced precision. (CODATA 2018)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
<tr>
<td><code>\k@cgs@full@MassAMUNumeric</code></td>
<td>A mathematical value of the mass of an atomic mass unit in cgs units with full precision. (CODATA 2018)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
<tr>
<td><code>\k@eV@short@MassAMUNumeric</code></td>
<td>A mathematical value of the mass of an atomic mass unit in eV with reduced precision. (CODATA 2018)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
</tbody>
</table>
\textit{\texttt{\textbackslash k@eV\textbackslash full\textbackslash MassAMUNumeric}} is a mathematical value of the mass of an atomic mass unit in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@eV\textbackslash full\textbackslash MassAMUNumeric}
\makeatother
\end{verbatim}

Resulting in

\textbf{The value is 9.314528302276e + 08}

\section*{5.2.3 Charge}

\textit{\texttt{\textbackslash k@SI\textbackslash short\textbackslash ChargeFundamental}} is the fundamental charge in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI\textbackslash short\textbackslash ChargeFundamental}
\makeatother
\end{verbatim}

Resulting in

\textbf{The value is 1.60 \times 10^{-19} C}

\textit{\texttt{\textbackslash k@SI\textbackslash full\textbackslash ChargeFundamental}} is the fundamental charge in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI\textbackslash full\textbackslash ChargeFundamental}
\makeatother
\end{verbatim}

Resulting in
The value is $1.602\,176\,634 \times 10^{-19}$ C

$k@\text{cgs@short@ChargeFundamental}$ is the fundamental charge in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is $k@\text{cgs@short@ChargeFundamental}$
\makeatother
```

Resulting in

```
The value is $4.80 \times 10^{-10}$ esu
```

$k@\text{cgs@full@ChargeFundamental}$ is the fundamental charge in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is $k@\text{cgs@full@ChargeFundamental}$
\makeatother
```

Resulting in

```
The value is $4.803\,204\,713 \times 10^{-10}$ esu
```

$k@\text{SI@short@ChargeFundamentalNumeric}$ is a mathematical value of the fundamental charge in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is $k@\text{SI@short@ChargeFundamentalNumeric}$
\makeatother
```

Resulting in

```
The value is $1.60e-19$
```

$k@\text{SI@full@ChargeFundamentalNumeric}$ is a mathematical value of the fundamental charge in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $1.602176634 \times 10^{-19}$.

\texttt{k@cgs@short@ChargeFundamentalNumeric} is a mathematical value of the fundamental charge in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@short@ChargeFundamentalNumeric} \makeatother
\end{verbatim}

Resulting in

The value is $4.80 \times 10^{-10}$.

\texttt{k@cgs@full@ChargeFundamentalNumeric} is a mathematical value of the fundamental charge in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@full@ChargeFundamentalNumeric} \makeatother
\end{verbatim}

Resulting in

The value is $4.803204713 \times 10^{-10}$.

\texttt{k@SI@short@ChargeElectron} is the charge of an electron in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@short@ChargeElectron} \makeatother
\end{verbatim}

Resulting in
The value is $-1.60 \times 10^{-19} \text{C}$

\texttt{\textbackslash k@SI\textbackslash full\textbackslash ChargeElectron} is the charge of an electron in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@full@ChargeElectron}
\makeatother
\end{verbatim}

Resulting in

The value is $-1.602176634 \times 10^{-19} \text{C}$

\texttt{\textbackslash k@cgs\textbackslash short\textbackslash ChargeElectron} is the charge of an electron in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@short@ChargeElectron}
\makeatother
\end{verbatim}

Resulting in

The value is $-4.80 \times 10^{-10} \text{esu}$

\texttt{\textbackslash k@cgs\textbackslash full\textbackslash ChargeElectron} is the charge of an electron in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@full@ChargeElectron}
\makeatother
\end{verbatim}

Resulting in

The value is $-4.803204713 \times 10^{-10} \text{esu}$

\texttt{\textbackslash k@SI\textbackslash short\textbackslash ChargeElectronNumeric} is a mathematical value of the charge of an electron in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is \SI{\short@ChargeElectronNumeric}

Resulting in

The value is $-1.60 e^{-19}$

\SI{\full@ChargeElectronNumeric} is a mathematical value of the charge of an electron in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\l@SI\@short\@ChargeElectronNumeric
\makeatother

Resulting in

The value is $-1.602176634 e^{-19}$

\SI{\short@ChargeElectronNumeric} is a mathematical value of the charge of an electron in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\l@cgs\@short\@ChargeElectronNumeric
\makeatother

Resulting in

The value is $-4.80 e^{-10}$

\SI{\full@ChargeElectronNumeric} is a mathematical value of the charge of an electron in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\l@cgs\@full\@ChargeElectronNumeric
\makeatother

Resulting in
\SI{\text{short}}{\text{ChargeProton}} is the charge of a proton in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\text{The value is } \SI{\text{short}}{\text{ChargeProton}}
\makeatother
\end{verbatim}

Resulting in

The value is \SI{1.60 \times 10^{-19}}{\text{C}}

\SI{\text{full}}{\text{ChargeProton}} is the charge of a proton in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\text{The value is } \SI{\text{full}}{\text{ChargeProton}}
\makeatother
\end{verbatim}

Resulting in

The value is \SI{1.602176634 \times 10^{-19}}{\text{C}}

\SI{\text{short}}{\text{ChargeProton}} is the charge of a proton in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\text{The value is } \SI{\text{short}}{\text{ChargeProton}}
\makeatother
\end{verbatim}

Resulting in

The value is \SI{4.80 \times 10^{-10}}{\text{esu}}

\SI{\text{full}}{\text{ChargeProton}} is the charge of a proton in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
\text{The value is } \SI{\text{full}}{\text{ChargeProton}}
\makeatother
\end{verbatim}

The value is \SI{4.803204713 \times 10^{-10}}{\text{esu}}
The value is \k@cgs@full@ChargeProton
\makeatother

Resulting in

The value is $4.803\,204\,713 \times 10^{-10}$ esu

\k@SI@short@ChargeProtonNumeric
\k@SI@short@ChargeProtonNumeric is a mathematical value of the charge of a proton in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@short@ChargeProtonNumeric
\makeatother

Resulting in

The value is $1.60 e^{-19}$

\k@SI@full@ChargeProtonNumeric
\k@SI@full@ChargeProtonNumeric is a mathematical value of the charge of a proton in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@full@ChargeProtonNumeric
\makeatother

Resulting in

The value is $1.602176634 e^{-19}$

\k@cgs@short@ChargeProtonNumeric
\k@cgs@short@ChargeProtonNumeric is a mathematical value of the charge of a proton in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@short@ChargeProtonNumeric
\makeatother

Resulting in

The value is $32$
\texttt{k@cgs@full@ChargeProtonNumeric} is a mathematical value of the charge of a proton in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@full@ChargeProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is 4.803204713e \textminus 10

\subsection{Distances and Lengths}
\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@short@RadiusBohr}
\makeatother
\end{verbatim}

Resulting in

The value is 5.29 \times 10^{-11} \text{ m}

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@full@RadiusBohr}
\makeatother
\end{verbatim}

Resulting in
The value is $5.292 \times 10^{-11}$ m

\[ \text{\texttt{k@cgs@short@RadiusBohr}} \]
\[ \text{\texttt{k@cgs@short@RadiusBohr}} \text{ is Bohr radius of an atom in cgs units with reduced precision. (Calculated)} \]

The macro can be invoked by (e.g.)

\[
\text{\texttt{\textbackslash makeatletter}}
\text{\texttt{The value is \texttt{k@cgs@short@RadiusBohr}}}
\text{\texttt{\textbackslash makeatother}}
\]

Resulting in

The value is $5.29 \times 10^{-9}$ cm

\[ \text{\texttt{k@cgs@full@RadiusBohr}} \]
\[ \text{\texttt{k@cgs@full@RadiusBohr}} \text{ is Bohr radius of an atom in cgs units with full precision. (Calculated)} \]

The macro can be invoked by (e.g.)

\[
\text{\texttt{\textbackslash makeatletter}}
\text{\texttt{The value is \texttt{k@cgs@full@RadiusBohr}}}
\text{\texttt{\textbackslash makeatother}}
\]

Resulting in

The value is $5.292 \times 10^{-9}$ cm

\[ \text{\texttt{k@SI@short@RadiusBohrNumeric}} \]
\[ \text{\texttt{k@SI@short@RadiusBohrNumeric}} \text{ is a mathematical value of Bohr radius of an atom in SI units with reduced precision. (Calculated)} \]

The macro can be invoked by (e.g.)

\[
\text{\texttt{\textbackslash makeatletter}}
\text{\texttt{The value is \texttt{k@SI@short@RadiusBohrNumeric}}}
\text{\texttt{\textbackslash makeatother}}
\]

Resulting in

The value is $5.29e - 11$

\[ \text{\texttt{k@SI@full@RadiusBohrNumeric}} \]
\[ \text{\texttt{k@SI@full@RadiusBohrNumeric}} \text{ is a mathematical value of Bohr radius of an atom in SI units with full precision. (Calculated)} \]

The macro can be invoked by (e.g.)
The value is \SI{5.29200659e-11}.

\cgs{RadiusBohrNumeric} is a mathematical value of Bohr radius of an atom in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
\makeatother

Resulting in

The value is 5.29e−09

\cgs{RadiusBohrNumeric} is a mathematical value of Bohr radius of an atom in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
\makeatother

Resulting in

The value is 5.29200659e−09

\SI{AstronomicalUnit} is the astronomical unit (the average distance between the Earth and the Sun) in SI units with reduced precision. (IAU Resolution B2 2012)

The macro can be invoked by (e.g.)

\makeatletter
\makeatother

Resulting in

The value is 5.29200659e−09
Resulting in

\text{The value is } 1.50 \times 10^{11} \text{ m}

\texttt{\SI{\text{full@AstronomicalUnit}}} \texttt{\SI{\text{full@AstronomicalUnit}}} is the astronomical unit (the average distance between the Earth and the Sun) in SI units with full precision. (IAU Resolution B2 2012)

The macro can be invoked by (e.g.)

\texttt{\makeatletter}
\texttt{\text{The value is } \SI{\text{full@AstronomicalUnit}}}
\texttt{\makeatother}

Resulting in

\text{The value is } 1.495\,978\,707 \times 10^{11} \text{ m}

\texttt{\cgs{\text{short@AstronomicalUnit}}} \texttt{\cgs{\text{short@AstronomicalUnit}}} is the astronomical unit (the average distance between the Earth and the Sun) in cgs units with reduced precision. (IAU Resolution B2 2012)

The macro can be invoked by (e.g.)

\texttt{\makeatletter}
\texttt{\text{The value is } \cgs{\text{short@AstronomicalUnit}}}
\texttt{\makeatother}

Resulting in

\text{The value is } 1.50 \times 10^{13} \text{ cm}

\texttt{\cgs{\text{full@AstronomicalUnit}}} \texttt{\cgs{\text{full@AstronomicalUnit}}} is the astronomical unit (the average distance between the Earth and the Sun) in cgs units with full precision. (IAU Resolution B2 2012)

The macro can be invoked by (e.g.)

\texttt{\makeatletter}
\texttt{\text{The value is } \cgs{\text{full@AstronomicalUnit}}}
\texttt{\makeatother}
The value is $1.495 \times 10^{13}$ cm

The macro can be invoked by (e.g.)

```latex
\makeatletter
\The value is \k@SI@short@AstronomicalUnitNumeric
\makeatother
```

Resulting in

The value is $1.50 \times 10^{11}$

The macro can be invoked by (e.g.)

```latex
\makeatletter
\The value is \k@SIfull@AstronomicalUnitNumeric
\makeatother
```

Resulting in

The value is $1.495978\times 10^{11}$

The macro can be invoked by (e.g.)

```latex
\makeatletter
\The value is \k@cgs@short@AstronomicalUnitNumeric
\makeatother
```

Resulting in

The value is $37$
The value is $1.50e + 13$.

\k@cgs@full@AstronomicalUnitNumeric is a mathematical value of the astronomical unit (the average distance between the Earth and the Sun) in cgs units with full precision. (IAU Resolution B2 2012)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@cgs@full@AstronomicalUnitNumeric
\makeatother
```

Resulting in

The value is $1.495978707e + 13$

\k@SI@short@Parsec \k@SI@short@Parsec is the length of a parsec ($\frac{648000 \text{ au}}{\pi}$) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@SI@short@Parsec
\makeatother
```

Resulting in

The value is $3.09 \times 10^{16}$ m

\k@SI@full@Parsec \k@SI@full@Parsec is the length of a parsec ($\frac{648000 \text{ au}}{\pi}$) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@SI@full@Parsec
\makeatother
```

Resulting in

The value is $3.085677581 \times 10^{16}$ m

\k@cgs@short@Parsec \k@cgs@short@Parsec is the length of a parsec ($\frac{648000 \text{ au}}{\pi}$) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
The value is \texttt{\k@cgs@short@Parsec}
\makeatletter
\makeatother

Resulting in

The value is \texttt{3.09 \times 10^{18} \text{ cm}}

\texttt{\k@cgs@full@Parsec} is the length of a parsec \((\frac{548000 \text{ au}}{\pi})\) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@Parsec
\makeatother
\end{verbatim}

Resulting in

The value is \texttt{3.085677581 \times 10^{18} \text{ cm}}

\texttt{\k@SI@short@ParsecNumeric} is a mathematical value of the length of a parsec \((\frac{648000 \text{ au}}{\pi})\) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@SI@short@ParsecNumeric
\makeatother
\end{verbatim}

Resulting in

The value is \texttt{3.09e+16}

\texttt{\k@SI@full@ParsecNumeric} is a mathematical value of the length of a parsec \((\frac{648000 \text{ au}}{\pi})\) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@SI@full@ParsecNumeric
\makeatother
\end{verbatim}

Resulting in
The value is $3.085677581e + 16$

\texttt{\textbackslash k@cgs@short@ParsecNumeric} is a mathematical value of the length of a parsec \( \left( \frac{648000\text{ au}}{\pi} \right) \) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \texttt{\textbackslash k@cgs@short@ParsecNumeric}
\makeatother
\end{verbatim}

Resulting in

\texttt{\textbackslash k@cgs@full@ParsecNumeric} is a mathematical value of the length of a parsec \( \left( \frac{648000\text{ au}}{\pi} \right) \) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \texttt{\textbackslash k@cgs@full@ParsecNumeric}
\makeatother
\end{verbatim}

Resulting in

\texttt{\textbackslash k@SI@short@RadiusSun} is the mean radius of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \texttt{\textbackslash k@SI@short@RadiusSun}
\makeatother
\end{verbatim}

Resulting in

\texttt{\textbackslash k@SI@full@RadiusSun} is the mean radius of the Sun in SI units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \texttt{\textbackslash k@SI@full@RadiusSun}
\makeatother
\end{verbatim}

Resulting in

The value is $6.96 \times 10^8$ m
The value is $\k@SI@full@RadiusSun$

Resulting in

The value is $6.957 \times 10^8$ m

$\k@cgs@short@RadiusSun$ is the mean radius of the Sun in cgs units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $\k@cgs@short@RadiusSun$
\makeatother
\end{verbatim}

Resulting in

The value is $6.96 \times 10^{10}$ cm

$\k@cgs@full@RadiusSun$ is the mean radius of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $\k@cgs@full@RadiusSun$
\makeatother
\end{verbatim}

Resulting in

The value is $6.957 \times 10^{10}$ cm

$\k@SI@short@RadiusSun$ is a mathematical value of the mean radius of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is $\k@SI@short@RadiusSun$numeric
\makeatother
\end{verbatim}

Resulting in

The value is $41$
The value is $6.96 \times 10^8$.

\texttt{\textbackslash SI@full@RadiusSunNumeric} is a mathematical value of the mean radius of the Sun in SI units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash SI@full@RadiusSunNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $6.957 \times 10^8$.

\texttt{\textbackslash cgs@short@RadiusSunNumeric} is a mathematical value of the mean radius of the Sun in cgs units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash cgs@short@RadiusSunNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $6.96 \times 10^9$.

\texttt{\textbackslash cgs@full@RadiusSunNumeric} is a mathematical value of the mean radius of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash cgs@full@RadiusSunNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $6.957 \times 10^9$.

\texttt{\textbackslash short@RadiusEarth} is the mean radius of the Earth with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\end{verbatim}
<table>
<thead>
<tr>
<th>\texttt{\textbackslash makeatletter}</th>
<th>The value is \texttt{\short@RadiusEarth}</th>
<th>\texttt{\textbackslash makeatother}</th>
</tr>
</thead>
</table>

Resulting in

| The value is $6.37 \times 10^6$ m |

\texttt{\full@RadiusEarth}  \texttt{\textbackslash full@RadiusEarth} is the mean radius of the Earth with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

<table>
<thead>
<tr>
<th>\texttt{\textbackslash makeatletter}</th>
<th>The value is \texttt{\full@RadiusEarth}</th>
<th>\texttt{\textbackslash makeatother}</th>
</tr>
</thead>
</table>

Resulting in

| The value is $6.371 \times 10^6$ m |

\texttt{\short@RadiusEarth}  \texttt{\short@RadiusEarth} is a mathematical value of the mean radius of the Earth with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

<table>
<thead>
<tr>
<th>\texttt{\textbackslash makeatletter}</th>
<th>The value is \texttt{\short@RadiusEarth}</th>
<th>\texttt{\textbackslash makeatother}</th>
</tr>
</thead>
</table>

Resulting in

| The value is $6.37e+06$ |

\texttt{\full@RadiusEarth}  \texttt{\full@RadiusEarth} is a mathematical value of the mean radius of the Earth with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

<table>
<thead>
<tr>
<th>\texttt{\textbackslash makeatletter}</th>
<th>The value is \texttt{\full@RadiusEarth}</th>
<th>\texttt{\textbackslash makeatother}</th>
</tr>
</thead>
</table>

Resulting in

| The value is $6.37e+06$ |
The value is $6.3710\times10^6$ m

$\kappa_{\text{RadiusJupiter}}$ is the mean radius of Jupiter with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \kappa_{\text{RadiusJupiter}}
\makeatother
\end{verbatim}

Resulting in

The value is $6.991\times10^7$ m

$\kappa_{\text{fullRadiusJupiter}}$ is the mean radius of Jupiter with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \kappa_{\text{fullRadiusJupiter}}
\makeatother
\end{verbatim}

Resulting in

The value is $6.991\,1\times10^7$ m

$\kappa_{\text{shortRadiusJupiterNumeric}}$ is a mathematical value of the mean radius of Jupiter with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \kappa_{\text{shortRadiusJupiterNumeric}}
\makeatother
\end{verbatim}

Resulting in

The value is $6.99e+07$

$\kappa_{\text{fullRadiusJupiterNumeric}}$ is a mathematical value of the mean radius of Jupiter with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)
Resulting in

The value is $6.9911 \times 10^7$

5.2.5 Energy, Power, and Luminosity

$\textsc{SIshortRydberg}$ $\textsc{SIshortRydberg}$ is the Rydberg energy (the binding energy of Hydrogen) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

Resulting in

The value is $2.18 \times 10^{-18}$ J

$\textsc{SIfullRydberg}$ $\textsc{SIfullRydberg}$ is the Rydberg energy (the binding energy of Hydrogen) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

Resulting in

The value is $2.17977577 \times 10^{-18}$ J

$\textsc{cgsshortRydberg}$ $\textsc{cgsshortRydberg}$ is the Rydberg energy (the binding energy of Hydrogen) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
\makeatletter
\text{The value is } \texttt{k@cgs@short@Rydberg} \\
\makeatother
Resulting in

\text{The value is } 2.18 \times 10^{-11} \text{ erg}

\texttt{k@cgs@full@Rydberg} \quad \texttt{k@cgs@full@Rydberg} \text{ is the Rydberg energy (the binding energy of Hydrogen) in cgs units with full precision. (Calculated)}

The macro can be invoked by (e.g.)

\makeatletter
\text{The value is } \texttt{k@cgs@full@Rydberg} \\
\makeatother
Resulting in

\text{The value is } 2.17977577 \times 10^{-11} \text{ erg}

\texttt{k@eV@short@Rydberg} \quad \texttt{k@eV@short@Rydberg} \text{ is the Rydberg energy (the binding energy of Hydrogen) in eV with reduced precision. (Calculated)}

The macro can be invoked by (e.g.)

\makeatletter
\text{The value is } \texttt{k@eV@short@Rydberg} \\
\makeatother
Resulting in

\text{The value is } 1.36 \times 10^1 \text{ eV}

\texttt{k@eV@full@Rydberg} \quad \texttt{k@eV@full@Rydberg} \text{ is the Rydberg energy (the binding energy of Hydrogen) in eV with full precision. (Calculated)}

The macro can be invoked by (e.g.)

\makeatletter
\text{The value is } \texttt{k@eV@full@Rydberg} \\
\makeatother
Resulting in

46
<table>
<thead>
<tr>
<th>Macro</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\k@SI@short@RydbergNumeric</code></td>
<td>A mathematical value of the Rydberg energy (the binding energy of Hydrogen) in SI units with reduced precision. (Calculated)</td>
<td>The value is $1.360,509,03 \times 10^1$ eV</td>
</tr>
<tr>
<td><code>\makeatletter\text{The value is } \k@SI@short@RydbergNumeric\makeatother</code></td>
<td>The macro can be invoked by (e.g.)</td>
<td>Resulting in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The value is $2.18 \times 10^{-18}$</td>
</tr>
<tr>
<td><code>\k@SI@full@RydbergNumeric</code></td>
<td>A mathematical value of the Rydberg energy (the binding energy of Hydrogen) in SI units with full precision. (Calculated)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resulting in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The value is $2.17977577 \times 10^{-18}$</td>
</tr>
<tr>
<td><code>\k@cgs@short@RydbergNumeric</code></td>
<td>A mathematical value of the Rydberg energy (the binding energy of Hydrogen) in cgs units with reduced precision. (Calculated)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resulting in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The value is $2.18 \times 10^{-11}$</td>
</tr>
<tr>
<td><code>\k@cgs@full@RydbergNumeric</code></td>
<td>A mathematical value of the Rydberg energy (the binding energy of Hydrogen) in cgs units with full precision. (Calculated)</td>
<td>The macro can be invoked by (e.g.)</td>
</tr>
</tbody>
</table>
\makeatletter
The value is \cgsfullRydbergNumeric
\makeatother

Resulting in

The value is $2.17977577e^{-11}$

\evshortRydbergNumeric \evfullRydbergNumeric is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in eV with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \evshortRydbergNumeric
\makeatother

Resulting in

The value is $1.36e+01$

\evfullRydbergNumeric is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in eV with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \evfullRydbergNumeric
\makeatother

Resulting in

The value is $1.36050903e+01$

\SIshortLuminositySun \SIfullLuminositySun is the luminosity of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\makeatletter
The value is \SIshortLuminositySun
\makeatother

Resulting in

48
The value is $3.83 \times 10^{26}$ W

$k@SI@full@LuminositySun$ is the luminosity of the Sun in SI units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@SI@full@LuminositySun
\makeatother
\end{verbatim}

Resulting in

The value is $3.828 \times 10^{26}$ W

$k@cgs@short@LuminositySun$ is the luminosity of the Sun in cgs units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@short@LuminositySun
\makeatother
\end{verbatim}

Resulting in

The value is $3.83 \times 10^{33}$ erg s\(^{-1}\)

$k@cgs@full@LuminositySun$ is the luminosity of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@LuminositySun
\makeatother
\end{verbatim}

Resulting in

The value is $3.828 \times 10^{33}$ erg s\(^{-1}\)

$k@SI@short@LuminositySunNumeric$ is a mathematical value of the luminosity of the Sun in SI units with reduced precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)
The value is \SI{3.83e+26}{\luminosity\sun}

\SI{3.828e+26}{\luminosity\sun}

\SI{3.83e+33}{\luminosity\sun}

\SI{3.83e+33}{\luminosity\sun} is a mathematical value of the luminosity of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

The macro can be invoked by (e.g.)
The value is $3.828e + 33$

5.2.6 Pressure

\SI@short@PressureAtmosphere is the standard atmospheric pressure in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \SI@short@PressureAtmosphere
\makeatother

Resulting in

The value is $1.01 \times 10^5$ Pa

\SI@full@PressureAtmosphere is the standard atmospheric pressure in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \SI@full@PressureAtmosphere
\makeatother

Resulting in

The value is $1.01325 \times 10^5$ Pa

\SI@short@PressureAtmosphere is the standard atmospheric pressure in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \SI@short@PressureAtmosphere
\makeatother

Resulting in

The value is $5.1$
The value is 1.01 bar

\texttt{\textbackslash k@cgs@full@PressureAtmosphere\textbackslash k@cgs@full@PressureAtmosphere} is the standard atmospheric pressure in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\
The value is \textbackslash k@cgs@full@PressureAtmosphere
\makeatother}

Resulting in

The value is 1.01325 bar

\texttt{\textbackslash k@SI@short@PressureAtmosphereNumeric\textbackslash k@SI@short@PressureAtmosphereNumeric} is a mathematical value of the standard atmospheric pressure in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\
The value is \textbackslash k@SI@short@PressureAtmosphereNumeric
\makeatother}

Resulting in

The value is 1.01e + 05

\texttt{\textbackslash k@SI@full@PressureAtmosphereNumeric\textbackslash k@SI@full@PressureAtmosphereNumeric} is a mathematical value of the standard atmospheric pressure in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\
The value is \textbackslash k@SI@full@PressureAtmosphereNumeric
\makeatother}

Resulting in

The value is 1.01325e + 05

\texttt{\textbackslash k@cgs@short@PressureAtmosphereNumeric\textbackslash k@cgs@short@PressureAtmosphereNumeric} is a mathematical value of the standard atmospheric pressure in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is \texttt{\textbackslash k@cgs@short@PressureAtmosphereNumeric}
\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is \textbackslash k@cgs@short@PressureAtmosphereNumeric}

\texttt{\textbackslash makeatother}

\texttt{Resulting in}

\texttt{The value is 1.01e + 00}

\texttt{\textbackslash k@cgs@full@PressureAtmosphereNumeric} is a mathematical value of the standard atmospheric pressure in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\texttt{The value is \textbackslash k@cgs@full@PressureAtmosphereNumeric}
\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.01325e + 00}

\texttt{\textbackslash k@SI@short@PressureStandard} \texttt{\textbackslash k@SI@short@PressureStandard} is the standard atmospheric pressure in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\texttt{The value is \textbackslash k@SI@short@PressureStandard}
\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.00 \times 10^5 \text{Pa}}

\texttt{\textbackslash k@SI@full@PressureStandard} \texttt{\textbackslash k@SI@full@PressureStandard} is the standard atmospheric pressure in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\texttt{The value is \textbackslash k@SI@full@PressureStandard}
\texttt{\textbackslash makeatother}

Resulting in

\texttt{53}
The value is \( 1.0000 \times 10^5 \) Pa.

\cgs{\text{Pressure Standard}} is the standard atmospheric pressure in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
    \text{The value is } \cgs{\text{Pressure Standard}}
\makeatother
\end{verbatim}

Resulting in

The value is 1.00 bar

\cgs{\text{Pressure Standard}} is the standard atmospheric pressure in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
    \text{The value is } \cgs{\text{Pressure Standard}}
\makeatother
\end{verbatim}

Resulting in

The value is 1.0000 bar

\SI{\text{Pressure Standard Numeric}} is a mathematical value of the standard atmospheric pressure in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
    \text{The value is } \SI{\text{Pressure Standard Numeric}}
\makeatother
\end{verbatim}

Resulting in

The value is 1.00e+05

\SI{\text{Pressure Standard Numeric}} is a mathematical value of the standard atmospheric pressure in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\makeatletter
The value is \k@SI@full@PressureStandardNumeric
\makeatother

Resulting in
The value is 1.00000e+05

\makeatletter
The value is \k@cgs@short@PressureStandardNumeric
\makeatother

Resulting in
The value is 1.00e+00

\makeatletter
The value is \k@cgs@full@PressureStandardNumeric
\makeatother

Resulting in
The value is 1.00000e+00

5.2.7 Velocity, Speed and Acceleration

\k@SI@short@SpeedLight

\k@SI@short@SpeedLight is the speed of light in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $k_{\text{SI\,\text{short}}}$ \texttt{SpeedLight}\makeatother
Resulting in
The value is $3.00 \times 10^8 \, \text{m s}^{-1}$

\texttt{k_{\text{SI\,\text{full}}}} \texttt{SpeedLight} is the speed of light in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \texttt{k_{\text{SI\,\text{full}}}} \texttt{SpeedLight}\makeatother
Resulting in
The value is $2.997\,924\,58 \times 10^8 \, \text{m s}^{-1}$

\texttt{k_{\text{cgs\,\text{short}}}} \texttt{SpeedLight} is the speed of light in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \texttt{k_{\text{cgs\,\text{short}}}} \texttt{SpeedLight}\makeatother
Resulting in
The value is $3.00 \times 10^{10} \, \text{cm s}^{-1}$

\texttt{k_{\text{cgs\,\text{full}}}} \texttt{SpeedLight} is the speed of light in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \texttt{k_{\text{cgs\,\text{full}}}} \texttt{SpeedLight}\makeatother
Resulting in

56
The value is $2.997\,924\,58 \times 10^{10} \text{ cm s}^{-1}$.

\(\text{\texttt{k@SI@short@SpeedLightNumeric}}\) is a mathematical value of the speed of light in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@short@SpeedLightNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 3.00e + 08
\end{verbatim}

\(\text{\texttt{k@SI@full@SpeedLightNumeric}}\) is a mathematical value of the speed of light in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@full@SpeedLightNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 2.99792458e + 08
\end{verbatim}

\(\text{\texttt{k@cgs@short@SpeedLightNumeric}}\) is a mathematical value of the speed of light in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@short@SpeedLightNumeric}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 3.00e + 10
\end{verbatim}

\(\text{\texttt{k@cgs@full@SpeedLightNumeric}}\) is a mathematical value of the speed of light in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}
\begin{quote}
The value is \texttt{\textbackslash k@cgs@full@SpeedLightNumeric}
\end{quote}
\texttt{\textbackslash makeatother}

Resulting in

\begin{quote}
The value is $2.99792458 \times 10^9$
\end{quote}

\texttt{\textbackslash k@SI@short@AccelGravity}
\texttt{\textbackslash k@SI@short@AccelGravity} is the acceleration due to gravity at the surface of the Earth in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\begin{quote}
The value is \texttt{\textbackslash k@SI@short@AccelGravity}
\end{quote}
\texttt{\textbackslash makeatother}

Resulting in

\begin{quote}
The value is 9.81 m s$^{-2}$
\end{quote}

\texttt{\textbackslash k@SI@full@AccelGravity}
\texttt{\textbackslash k@SI@full@AccelGravity} is the acceleration due to gravity at the surface of the Earth in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\begin{quote}
The value is \texttt{\textbackslash k@SI@full@AccelGravity}
\end{quote}
\texttt{\textbackslash makeatother}

Resulting in

\begin{quote}
The value is 9.80665 m s$^{-2}$
\end{quote}

\texttt{\textbackslash k@cgs@short@AccelGravity}
\texttt{\textbackslash k@cgs@short@AccelGravity} is the acceleration due to gravity at the surface of the Earth in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter}
\begin{quote}
The value is \texttt{\textbackslash k@cgs@short@AccelGravity}
\end{quote}
\texttt{\textbackslash makeatother}

Resulting in
The value is $9.81 \times 10^2 \text{ cm s}^{-2}$

\texttt{\textbackslash k@cgs@full@AccelGravity} \texttt{\textbackslash k@cgs@full@AccelGravity} is the acceleration due to gravity at the surface of the Earth in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@cgs@full@AccelGravity}
\makeatother
\end{verbatim}

Resulting in

The value is $9.80665 \times 10^2 \text{ cm s}^{-2}$

\texttt{\textbackslash k@SI@short@AccelGravityNumeric} \texttt{\textbackslash k@SI@short@AccelGravityNumeric} is a mathematical value of the acceleration due to gravity at the surface of the Earth in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@short@AccelGravityNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $9.81e + 00$

\texttt{\textbackslash k@SI@full@AccelGravityNumeric} \texttt{\textbackslash k@SI@full@AccelGravityNumeric} is a mathematical value of the acceleration due to gravity at the surface of the Earth in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@full@AccelGravityNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $9.80665e + 00$

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\texttt{cgs@short@AccelGravity} is a mathematical value of the acceleration due to gravity at the surface of the Earth in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{cgs@short@AccelGravity}
\makeatother
\end{verbatim}

Resulting in

The value is $9.81 \times 10^2$

\texttt{cgs@full@AccelGravity} is a mathematical value of the acceleration due to gravity at the surface of the Earth in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{cgs@full@AccelGravity}
\makeatother
\end{verbatim}

Resulting in

The value is $9.80665 \times 10^2$

5.2.8 Other Constants

\texttt{SI@short@Coulomb} is the Coulomb constant ($\frac{1}{4\pi\epsilon_0}$) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{SI@short@Coulomb}
\makeatother
\end{verbatim}

Resulting in

The value is $8.99 \times 10^9 \text{ N m}^2\text{ C}^{-2}$
\SI{full}{\text{Coulomb}} is the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  \makeatother
\end{verbatim}

Resulting in

The value is \SI{8.987\,551\,79 \times 10^9}{\text{N} \cdot \text{m}^2 \cdot \text{C}^{-2}}

\SI{short}{\text{Coulomb}} is the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  \makeatother
\end{verbatim}

Resulting in

The value is 1.00

\SI{full}{\text{Coulomb}} is the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  \makeatother
\end{verbatim}

Resulting in

The value is 1.000\,000\,00

\SI{short\,Numeric}{\text{Coulomb}} is a mathematical value of the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
The value is \k@SI@short@CoulombNumeric
\makeatother

Resulting in

The value is 8.99e + 09

\k@SI@full@CoulombNumeric
\k@SI@full@CoulombNumeric is a mathematical value of the Coulomb constant
\( \frac{1}{4\pi\epsilon_0} \) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@full@CoulombNumeric
\makeatother

Resulting in

The value is 8.98755179e + 09

\k@cgs@short@CoulombNumeric
\k@cgs@short@CoulombNumeric is a mathematical value of the Coulomb constant
\( \frac{1}{4\pi\epsilon_0} \) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@short@CoulombNumeric
\makeatother

Resulting in

The value is 1.00e + 00

\k@cgs@full@CoulombNumeric
\k@cgs@full@CoulombNumeric is a mathematical value of the Coulomb constant
\( \frac{1}{4\pi\epsilon_0} \) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@full@CoulombNumeric
\makeatother

Resulting in
The value is $1.00000000e + 00$

\(k\text{\short@VacuumPermittivity}\)\(k\text{\short@VacuumPermittivity}\) is the electric permittivity of the vacuum in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[
\text{\makeatletter}
\text{The value is } k\text{\short@VacuumPermittivity}
\text{\makeatother}
\]

Resulting in

\[
\text{The value is } 8.85 \times 10^{-12} \text{ F m}^{-1}
\]

\(k\text{\full@VacuumPermittivity}\)\(k\text{\full@VacuumPermittivity}\) is the electric permittivity of the vacuum in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[
\text{\makeatletter}
\text{The value is } k\text{\full@VacuumPermittivity}
\text{\makeatother}
\]

Resulting in

\[
\text{The value is } 8.8541878128 \times 10^{-12} \text{ F m}^{-1}
\]

\(k\text{\short@VacuumPermittivity}\)\(k\text{\short@VacuumPermittivity}\) is the electric permittivity of the vacuum in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[
\text{\makeatletter}
\text{The value is } k\text{\short@VacuumPermittivity}
\text{\makeatother}
\]

Resulting in

\[
\text{The value is } 7.96 \times 10^{-2}
\]

\(k\text{\full@VacuumPermittivity}\)\(k\text{\full@VacuumPermittivity}\) is the electric permittivity of the vacuum in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $\k\@cgs@full@VacuumPermittivity$

Resulting in

The value is $7.957\,747\,154\,6 \times 10^{-2}$

\k\@SI@short@VacuumPermittivityNumeric is a mathematical value of the electric permittivity of the vacuum in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\begin{verbatim}
\makeatother
\end{verbatim}

Resulting in

The value is $8.85e-12$

\k\@SI@full@VacuumPermittivityNumeric is a mathematical value of the electric permittivity of the vacuum in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\begin{verbatim}
\makeatother
\end{verbatim}

Resulting in

The value is $8.8541878128e-12$

\k\@cgs@short@VacuumPermittivityNumeric is a mathematical value of the electric permittivity of the vacuum in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\makeatletter
The value is \k@cgs@short@VacuumPermittivityNumeric
\makeatother

Resulting in

The value is $7.96e-02$

\k@cgs@full@VacuumPermittivityNumeric is a mathematical value of the electric permittivity of the vacuum in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@full@VacuumPermittivityNumeric
\makeatother

Resulting in

The value is $7.9577471546e-02$

\k@SI@short@VacuumPermeability is the magnetic permeability of the vacuum in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@short@VacuumPermeability
\makeatother

Resulting in

The value is $1.26 \times 10^{-6} \text{ N A}^{-2}$

\k@SI@full@VacuumPermeability is the magnetic permeability of the vacuum in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@full@VacuumPermeability
\makeatother

Resulting in
The value is $1.256 \times 10^{-6}$ N A$^{-2}$

\cgs{VacuumPermeability} is the magnetic permeability of the vacuum in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \cgs{VacuumPermeability}
\makeatother

Resulting in

The value is $1.26 \times 10^4$

\cgsfull{VacuumPermeability} is the magnetic permeability of the vacuum in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \cgsfull{VacuumPermeability}
\makeatother

Resulting in

The value is $1.256 \times 10^4$

\sis{VacuumPermeabilityNumeric} is a mathematical value of the magnetic permeability of the vacuum in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \sis{VacuumPermeabilityNumeric}
\makeatother

Resulting in

The value is $1.26e-06$

\sisfull{VacuumPermeabilityNumeric} is a mathematical value of the magnetic permeability of the vacuum in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)
The value is $\kappa@SI@full@VacuumPermeabilityNumeric$

Resulting in

The value is $1.2566370621e - 06$

$k@short@VacuumPermeabilityNumeric$ is a mathematical value of the magnetic permeability of the vacuum in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
\makeatother
```

Resulting in

The value is $1.26e + 01$

$k@full@VacuumPermeabilityNumeric$ is a mathematical value of the magnetic permeability of the vacuum in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
\makeatother
```

Resulting in

The value is $1.2566370614e + 01$

$k@short@VacuumImpedance$ is the characteristic impedance of the vacuum with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
\makeatother
```

Resulting in

The value is $67$
The value is $3.77 \times 10^2 \Omega$

\full\VacuumImpedance \full\VacuumImpedance is the characteristic impedance of the vacuum with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\The value is \full\VacuumImpedance
\makeatother

Resulting in

The value is $3.767\,303\,136\,68 \times 10^2 \Omega$

\short\VacuumImpedance\new\VacuumImpedance\numeric \short\VacuumImpedance\new\VacuumImpedance\numeric is a mathematical value of the characteristic impedance of the vacuum with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\The value is \short\VacuumImpedance\numeric
\makeatother

Resulting in

The value is $3.77e+02$

\full\VacuumImpedance\new\VacuumImpedance\numeric \full\VacuumImpedance\new\VacuumImpedance\numeric is a mathematical value of the characteristic impedance of the vacuum with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
\The value is \full\VacuumImpedance\numeric
\makeatother

Resulting in

The value is $3.76730313668e+02$

\SI\short\Boltzmann \SI\short\Boltzmann is the Boltzmann constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is $k_{\text{SI\shortBoltzmann}}$

Resulting in

\[1.38 \times 10^{-23} \text{ J K}^{-1}\]

\(k_{\text{SI\fullBoltzmann}}\) is the Boltzmann constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[\text{The value is } k_{\text{SI\fullBoltzmann}}\]

Resulting in

\[1.380649 \times 10^{-23} \text{ J K}^{-1}\]

\(k_{\text{cgs\shortBoltzmann}}\) is the Boltzmann constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[\text{The value is } k_{\text{cgs\shortBoltzmann}}\]

Resulting in

\[1.38 \times 10^{-16} \text{ erg K}^{-1}\]

\(k_{\text{cgs\fullBoltzmann}}\) is the Boltzmann constant in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\[\text{The value is } k_{\text{cgs\fullBoltzmann}}\]

Resulting in
The value is $1.380\,649 \times 10^{-16}$ erg K$^{-1}$

$k_{\text{short Boltzmann}}$ is the Boltzmann constant in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is $k_{\text{short Boltzmann}}$
\makeatother
\end{verbatim}

Resulting in

The value is $8.62 \times 10^{-5}$ eV K$^{-1}$

$k_{\text{full Boltzmann}}$ is the Boltzmann constant in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is $k_{\text{full Boltzmann}}$
\makeatother
\end{verbatim}

Resulting in

The value is $8.617\,333 \times 10^{-5}$ eV K$^{-1}$

$k_{\text{short Boltzmann Numeric}}$ is a mathematical value of the Boltzmann constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is $k_{\text{short Boltzmann Numeric}}$
\makeatother
\end{verbatim}

Resulting in

The value is $1.38 \times 10^{-23}$

$k_{\text{full Boltzmann Numeric}}$ is a mathematical value of the Boltzmann constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is k\text@SI@full@BoltzmannNumeric

Resulting in

The value is $1.380649 \times 10^{-23}$

k\text@cgs@short@BoltzmannNumeric is a mathematical value of the Boltzmann constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is k\text@cgs@short@BoltzmannNumeric
\makeatother

Resulting in

The value is $1.38 \times 10^{-16}$

k\text@cgs@full@BoltzmannNumeric is a mathematical value of the Boltzmann constant in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is k\text@cgs@full@BoltzmannNumeric
\makeatother

Resulting in

The value is $1.380649 \times 10^{-16}$

k\text@eV@short@BoltzmannNumeric is a mathematical value of the Boltzmann constant in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is k\text@eV@short@BoltzmannNumeric
\makeatother

Resulting in

The value is $7.1 \times 10^{-16}$
The value is \(8.62e - 05\).

\(\text{eV}\) full Boltzmann numeric is a mathematical value of the Boltzmann constant in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@eV@full@BoltzmannNumeric
\makeatother
\end{verbatim}

Resulting in

The value is 8.617333e - 05

\(\text{SI}\) short Planck is the Planck constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@SI@short@Planck
\makeatother
\end{verbatim}

Resulting in

The value is 6.63 \times 10^{-34} \text{ J s}

\(\text{SI}\) full Planck is the Planck constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@SI@full@Planck
\makeatother
\end{verbatim}

Resulting in

The value is 6.62607015 \times 10^{-34} \text{ J s}

\(\text{cgs}\) short Planck is the Planck constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is \k@cgs@short@Planck
\makeatother

Resulting in

The value is $6.63 \times 10^{-27}$ erg s

\k@cgs@full@Planck \k@cgs@full@Planck is the Planck constant in cgs units with full precision. (CO-DATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@full@Planck
\makeatother

Resulting in

The value is $6.62607015 \times 10^{-27}$ erg s

\k@eV@short@Planck \k@eV@short@Planck is the Planck constant in eV with reduced precision. (CO-DATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@eV@short@Planck
\makeatother

Resulting in

The value is $4.14 \times 10^{-15}$ eV s

\k@eV@full@Planck \k@eV@full@Planck is the Planck constant in eV with full precision. (CO-DATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@eV@full@Planck
\makeatother

Resulting in
The value is $4.135\,667\,70 \times 10^{-15}$ eVs

\texttt{\textbackslash SI@short\textbackslash PlanckNumeric} is a mathematical value of the Planck constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \SI@short\PlanckNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.63e - 34$

\texttt{\textbackslash SI@full\textbackslash PlanckNumeric} is a mathematical value of the Planck constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \SI@full\PlanckNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.62607015e - 34$

\texttt{\textbackslash cgs@short\textbackslash PlanckNumeric} is a mathematical value of the Planck constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \cgs@short\PlanckNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.63e - 27$

\texttt{\textbackslash cgs@full\textbackslash PlanckNumeric} is a mathematical value of the Planck constant in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\makeatletter
The value is \k@cgs@full@PlanckNumeric
\makeatother

Resulting in

The value is 6.62607015e − 27

\k@eV@short@PlanckNumeric \k@eV@short@PlanckNumeric is a mathematical value of the Planck constant in eV with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@eV@short@PlanckNumeric
\makeatother

Resulting in

The value is 4.14e − 15

\k@eV@full@PlanckNumeric \k@eV@full@PlanckNumeric is a mathematical value of the Planck constant in eV with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@eV@full@PlanckNumeric
\makeatother

Resulting in

The value is 4.13566770e − 15

\k@SI@short@PlanckReduced \k@SI@short@PlanckReduced is the Reduced Planck constant \( \frac{k}{2\pi} \) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@short@PlanckReduced
\makeatother

Resulting in

4.13566770e − 15
The value is $1.05 \times 10^{-34}$ Js

\texttt{\textbackslash k@SI@full@PlanckReduced} is the Reduced Planck constant $h/2\pi$ in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@SI@full@PlanckReduced}
\makeatother
\end{verbatim}

Resulting in

The value is $1.05457182 \times 10^{-34}$ Js

\texttt{\textbackslash k@cgs@short@PlanckReduced} is the Reduced Planck constant $h/2\pi$ in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@short@PlanckReduced}
\makeatother
\end{verbatim}

Resulting in

The value is $1.05 \times 10^{-27}$ erg s

\texttt{\textbackslash k@cgs@full@PlanckReduced} is the Reduced Planck constant $h/2\pi$ in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{k@cgs@full@PlanckReduced}
\makeatother
\end{verbatim}

Resulting in

The value is $1.05457182 \times 10^{-27}$ erg s

\texttt{\textbackslash k@eV@short@PlanckReduced} is the Reduced Planck constant $h/2\pi$ in eV with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
The value is $\kappa@{short\text{PlanckReduced}}$

Resulting in

The value is $6.58 \times 10^{-16}$ eV s

$\kappa@{full\text{PlanckReduced}}$ is the Reduced Planck constant ($\frac{h}{2\pi}$) in eV with full precision. (Calculated)

The macro can be invoked by (e.g.)

The value is $6.582\,119\,57 \times 10^{-16}$ eV s

$\kappa@{short\text{PlanckReducedNumeric}}$ is a mathematical value of the Reduced Planck constant ($\frac{h}{2\pi}$) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

The value is $1.05e^{-34}$

$\kappa@{full\text{PlanckReducedNumeric}}$ is a mathematical value of the Reduced Planck constant ($\frac{h}{2\pi}$) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

Resulting in
\texttt{\k@cgs@short@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@short@PlanckReducedNumeric
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 1.05 \times e^{-34}
\end{verbatim}

\texttt{\k@cgs@full@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@PlanckReducedNumeric
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 1.05e - 27
\end{verbatim}

\texttt{\k@eV@short@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\) in eV with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@eV@short@PlanckReducedNumeric
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 6.58e - 16
\end{verbatim}

\texttt{\k@eV@full@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \((\frac{\hbar}{2\pi})\) in eV with full precision. (Calculated)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter\n\hspace{1em}The value is \texttt{\textbackslash k@eV@full@PlanckReducedNumeric}}\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 6.58211957e−16}

\texttt{\textbackslash k@SI@short@Gravity}\texttt{\textbackslash k@SI@short@Gravity} is Newton’s gravitational constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter\n\hspace{1em}The value is \texttt{\textbackslash k@SI@short@Gravity}}\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 6.67 \times 10^{-11} \text{N kg}^{-2} \text{m}^{2}}

\texttt{\textbackslash k@SI@full@Gravity}\texttt{\textbackslash k@SI@full@Gravity} is Newton’s gravitational constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter\n\hspace{1em}The value is \texttt{\textbackslash k@SI@full@Gravity}}\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 6.67430 \times 10^{-11} \text{N kg}^{-2} \text{m}^{2}}

\texttt{\textbackslash k@cgs@short@Gravity}\texttt{\textbackslash k@cgs@short@Gravity} is Newton’s gravitational constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\textbackslash makeatletter\n\hspace{1em}The value is \texttt{\textbackslash k@cgs@short@Gravity}}\texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 6.67 \times 10^{-11} \text{N kg}^{-2} \text{m}^{2}}
The value is $6.67 \times 10^{-8}$ dyn g$^{-2}$ cm$^2$

$k@\text{cgs@full@Gravity}$

$k@\text{cgs@full@Gravity}$ is Newton’s gravitational constant in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@cgs@full@Gravity
\makeatother
```

Resulting in

The value is $6.6743 \times 10^{-8}$ dyn g$^{-2}$ cm$^2$

$k@\text{SI@short@GravityNumeric}$

$k@\text{SI@short@GravityNumeric}$ is a mathematical value of Newton’s gravitational constant in SI units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@SI@short@GravityNumeric
\makeatother
```

Resulting in

The value is $6.67e-11$

$k@\text{SI@full@GravityNumeric}$

$k@\text{SI@full@GravityNumeric}$ is a mathematical value of Newton’s gravitational constant in SI units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@SI@full@GravityNumeric
\makeatother
```

Resulting in

The value is $6.67430e-11$

$k@\text{cgs@short@GravityNumeric}$

$k@\text{cgs@short@GravityNumeric}$ is a mathematical value of Newton’s gravitational constant in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\texttt{\makeatletter\The\ value\ is\ \texttt{\k@cgs@short@GravityNumeric}  \\
\makeatother}

Resulting in

\texttt{\The\ value\ is\ \texttt{6.67e - 08}}

\texttt{\k@cgs@full@GravityNumeric} is a mathematical value of Newton’s gravitational constant in cgs units with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\The\ value\ is\ \texttt{\k@cgs@full@GravityNumeric}  \\
\makeatother}

Resulting in

\texttt{\The\ value\ is\ \texttt{6.67430e - 08}}

\texttt{\k@SI@short@StefanBoltzmann} is the Stefan-Boltzmann blackbody constant \(\frac{2\pi^5k_B}{15h^3c^2}\) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\The\ value\ is\ \texttt{\k@SI@short@StefanBoltzmann}  \\
\makeatother}

Resulting in

\texttt{\The\ value\ is\ \texttt{5.67 \times 10^{-8} J K^{-4} m^{-2} s^{-1}}}

\texttt{\k@SI@full@StefanBoltzmann} is the Stefan-Boltzmann blackbody constant \(\frac{2\pi^5k_B}{15h^3c^2}\) in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\texttt{\makeatletter\The\ value\ is\ \texttt{\k@SI@full@StefanBoltzmann}  \\
\makeatother}
Resulting in

The value is $5.670\,374 \times 10^{-8} \, J \, K^{-4} \, m^{-2} \, s^{-1}$

\texttt{\textbackslash k@cgs@short@StefanBoltzmann} \texttt{\textbackslash k@cgs@short@StefanBoltzmann} is the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2 k_B}{15\hbar c^2} \right) \) in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@cgs@short@StefanBoltzmann}
\makeatother
\end{verbatim}

Resulting in

The value is $5.67 \times 10^{-5} \, erg \, K^{-4} \, cm^{-2} \, s^{-1}$

\texttt{\textbackslash k@cgs@full@StefanBoltzmann} \texttt{\textbackslash k@cgs@full@StefanBoltzmann} is the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2 k_B}{15\hbar c^2} \right) \) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@cgs@full@StefanBoltzmann}
\makeatother
\end{verbatim}

Resulting in

The value is $5.670\,374 \times 10^{-5} \, erg \, K^{-4} \, cm^{-2} \, s^{-1}$

\texttt{\textbackslash k@SI@short@StefanBoltzmannNumeric} \texttt{\textbackslash k@SI@short@StefanBoltzmannNumeric} is a mathematical value of the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2 k_B}{15\hbar c^2} \right) \) in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash k@SI@short@StefanBoltzmannNumeric}
\makeatother
\end{verbatim}

Resulting in

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The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@full@StefanBoltzmannNumeric
\makeatother

Resulting in

The value is 5.670374e – 08

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@short@StefanBoltzmannNumeric
\makeatother

Resulting in

The value is 5.67e – 05

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@full@StefanBoltzmannNumeric
\makeatother

Resulting in
The value is $5.670374 \times 10^{-5}$.

\texttt{\textbackslash \text{k@SI@short\text@Radiation}} is the radiation constant, $a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)$ in SI units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash \text{k@SI@short\text@Radiation}}
\makeatother
\end{verbatim}

Resulting in

The value is $7.57 \times 10^{-16}$ J m$^{-3}$ K$^{-4}$

\texttt{\textbackslash \text{k@SI@full\text@Radiation}} is the radiation constant, $a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)$ in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash \text{k@SI@full\text@Radiation}}
\makeatother
\end{verbatim}

Resulting in

The value is $7.565733 \times 10^{-16}$ J m$^{-3}$ K$^{-4}$

\texttt{\textbackslash \text{k@cgs@short\text@Radiation}} is the radiation constant, $a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)$ in cgs units with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \texttt{\textbackslash \text{k@cgs@short\text@Radiation}}
\makeatother
\end{verbatim}

Resulting in

The value is $7.57 \times 10^{-15}$ erg cm$^{-3}$ K$^{-4}$
\k@cgs@full@Radiation  \k@cgs@full@Radiation is the radiation constant, \(a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)\) in cgs units with full precision.  (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@cgs@full@Radiation
\makeatother

Resulting in

The value is 7.565733 \times 10^{-15} \text{ erg cm}^{-3} \text{ K}^{-4}

\k@SI@short@RadiationNumeric \k@SI@short@RadiationNumeric is a mathematical value of the radiation constant, \(a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)\) in SI units with reduced precision.  (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@short@RadiationNumeric
\makeatother

Resulting in

The value is 7.57e-16

\k@SI@full@RadiationNumeric \k@SI@full@RadiationNumeric is a mathematical value of the radiation constant, \(a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)\) in SI units with full precision.  (Calculated)

The macro can be invoked by (e.g.)

\makeatletter
The value is \k@SI@full@RadiationNumeric
\makeatother

Resulting in

The value is 7.565733e-16

\k@cgs@short@RadiationNumeric \k@cgs@short@RadiationNumeric is a mathematical value of the radiation constant, \(a \left( \frac{8\pi^5 k^4}{15c^3 h^3} \right)\) in cgs units with reduced precision.  (Calculated)

The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \k@cgs@short@RadiationNumeric
\makeatother

Resulting in

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@RadiationNumeric
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\begin{verbatim}
\makeatletter
The value is \k@short@FineStructure
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
\makeatletter
The value is \k@full@FineStructure
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\end{verbatim}

\k@cgs@full@RadiationNumeric is a mathematical value of the radiation constant, \( a \left( \frac{8\pi^2k_B}{15c^2h} \right) \) in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@cgs@full@RadiationNumeric
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\k@short@FineStructure is the fine structure constant with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@short@FineStructure
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\k@full@FineStructure is the fine structure constant with full precision. (Calculated)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
The value is \k@full@FineStructure
\makeatother
\end{verbatim}

\makeatletter
\makeatother

Resulting in

\begin{verbatim}
\makeatletter
The value is 7.57e-15
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\begin{verbatim}
\makeatletter
The value is 7.565733e-15
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\begin{verbatim}
\makeatletter
The value is 7.30 \times 10^{-3}
\makeatother
\end{verbatim}

\makeatletter
\makeatother

\begin{verbatim}
\makeatletter
The value is 8.6 \times 10^{-4}
\makeatother
\end{verbatim}

\makeatletter
\makeatother

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The value is $7.29735257 \times 10^{-3}$

`\k@short@FineStructureNumeric` is a mathematical value of the fine structure constant with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@short@FineStructureNumeric
\makeatother
```

Resulting in

```
The value is 7.30e − 03
```

`\k@full@FineStructureNumeric` is a mathematical value of the fine structure constant with full precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@full@FineStructureNumeric
\makeatother
```

Resulting in

```
The value is 7.29735257e − 03
```

`\k@short@FineStructureReciprocal` is the reciprocal of the fine structure constant with reduced precision. (Calculated)

The macro can be invoked by (e.g.)

```
\makeatletter
The value is \k@short@FineStructureReciprocal
\makeatother
```

Resulting in

```
The value is 1.37 \times 10^2
```

`\k@full@FineStructureReciprocal` is the reciprocal of the fine structure constant with full precision. (Calculated)

The macro can be invoked by (e.g.)
\texttt{FineStructureReciprocal\shortname} is a mathematical value of the reciprocal of the fine structure constant with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \k@short@FineStructureReciprocal\shortname
\makeatother
\end{verbatim}

Resulting in
\begin{verbatim}
The value is 1.37e+02
\end{verbatim}

\texttt{FineStructureReciprocal\fullname} is a mathematical value of the reciprocal of the fine structure constant with full precision. (Calculated)

The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \k@full@FineStructureReciprocal\fullname
\makeatother
\end{verbatim}

Resulting in
\begin{verbatim}
The value is 1.37035999e+02
\end{verbatim}

\texttt{Avogadro\shortname} is Avogadro’s Number (the number of particles in a mole) with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \k@short@Avogadro\shortname
\makeatother
\end{verbatim}

Resulting in
\begin{verbatim}
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\end{verbatim}
The value is $6.02 \times 10^{23}$

\texttt{\textbackslash kfull@Avogadro} \texttt{\textbackslash kfull@Avogadro} is Avogadro’s Number (the number of particles in a mole) with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \kfull@Avogadro
\makeatother
\end{verbatim}

Resulting in

The value is $6.02240760 \times 10^{23}$

\texttt{\textbackslash kshort@Avogadro} \texttt{\textbackslash kshort@Avogadro} is a mathematical value of Avogadro’s Number (the number of particles in a mole) with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \kshort@AvogadroNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.02e + 23$

\texttt{\textbackslash kfull@Avogadro} \texttt{\textbackslash kfull@Avogadro} is a mathematical value of Avogadro’s Number (the number of particles in a mole) with full precision. (CODATA 2018)

The macro can be invoked by (e.g.)

\begin{verbatim}
\makeatletter
  The value is \kfull@AvogadroNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.02240760e + 23$
Change History

v1.0.0
General: Initial version. 1

v1.0.1
General: Add options section and fix formatting. 1

v1.0.2
General: External changes for distribution. 1

v1.1.0
General: Add Earth, Sun, Jupiter mass and radius, fix Coulomb constant. 1
Add mass of Earth 3, 20, 21
Add mass of Jupiter 3, 21, 22
Add radius of Earth 4, 42, 43
Add radius of Jupiter 5, 44
Correct value in eV. 3, 4, 8–18, 22–26
Correct value. 5, 58–60
Fix order of magnitude of Coulomb constant. 3, 4, 6–18, 22–26, 60–62, 72–78, 81–83
Fix prefix of units. 5, 51–55
Fix units. 5, 58–60
Fix value of constant. 6, 7, 65–67, 79–81

v1.1.1
General: Added section for acknowledgements. 2
Added section for bug reporting. 2
Added section for dependencies. 2
Corrected source of astronomical constants within the introduction. 1
Fixed bug that shortconst was having the opposite effect than intended. Additions and corrections to documentation. 1
Upgraded macros to a section instead of a subsection. 2

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