The *physconst* package*

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February 3, 2020

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 their current wikipedia entries. If you have an interest and/or need for more reliable data, please contact me.

1.1 Options

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

*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).

*cgs* will provide all constants in cgs, i.e. the units used in astronomy.

*unseparateddecimals* 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

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*This document corresponds to *physconst* v1.0.2, dated 2020/01/26.
1.02176634 \times 10^{-19} \text{ C} instead of 1.602 176 634 \times 10^{-19} \text{ C}. (notice the gaps between digits in the latter.

### 1.2 Macros

### 1.3 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.

#### 1.3.1 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.

#### 1.3.2 Mass

\texttt{\kMassElectron} \texttt{\keVMassElectron} is the mass of an electron.

\texttt{\kMassProton} \texttt{\keVMassProton} is the mass of a proton.

\texttt{\kMassHydrogen} \texttt{\keVMassHydrogen} is the mass of a neutral hydrogen atom.
\texttt{keVMassHydrogenNumeric} is the numeric value of the mass of a neutral hydrogen atom.

\texttt{kMassSun} is the mass of the Sun.

\texttt{kMassSunNumeric} is the numeric value of the mass of the Sun.

\texttt{kMassEarth} is the mass of the Earth.

\texttt{kMassEarthNumeric} is the numeric value of the mass of the Earth.

\texttt{kMassJupiter} is the mass of Jupiter.

\texttt{kMassJupiterNumeric} is the numeric value of the mass of Jupiter.

\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.

1.3.3 Charge

\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.

1.3.4 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).
\textbf{AstronomicalUnitNumeric} is the numeric value of the astronomical unit (the average distance between the Earth and the Sun).

\textbf{Parsec} is the length of a parsec (648000 au).

\textbf{ParsecNumeric} is the numeric value of the length of a parsec (648000 au).

\textbf{RadiusSun} is the mean radius of the Sun.

\textbf{RadiusSunNumeric} is the numeric value of the mean radius of the Sun.

\textbf{RadiusEarth} is the mean radius of the Earth.

\textbf{RadiusEarthNumeric} is the numeric value of the mean radius of the Earth.

\textbf{RadiusJupiter} is the mean radius of Jupiter.

\textbf{RadiusJupiterNumeric} is the numeric value of the mean radius of Jupiter.

\subsection*{1.3.5 Energy, Power, and Luminosity}

\textbf{Rydberg} is the Rydberg energy (the binding energy of Hydrogen).

\textbf{keVRydberg} is the Rydberg energy (the binding energy of Hydrogen).

\textbf{RydbergNumeric} is the numeric value of the Rydberg energy (the binding energy of Hydrogen).

\textbf{keVRydbergNumeric} is the numeric value of the Rydberg energy (the binding energy of Hydrogen).

\textbf{LuminositySun} is the luminosity of the Sun.

\textbf{LuminositySunNumeric} is the numeric value of the luminosity of the Sun.

\subsection*{1.3.6 Pressure}

\textbf{PressureAtmosphere} is the standard atmospheric pressure.

\textbf{PressureAtmosphereNumeric} is the numeric value of the standard atmospheric pressure.

\textbf{PressureStandard} is the standard atmospheric pressure.

\textbf{PressureStandardNumeric} is the numeric value of the standard atmospheric pressure.
1.3.7 Velocity, Speed and Acceleration

\kSpeedLight \kSpeedLight is the speed of light.
\kSpeedLightNumeric \kSpeedLightNumeric is the numeric value of the speed of light.
\kAccelGravity \kAccelGravity is the acceleration due to gravity at the surface of the Earth.
\kAccelGravityNumeric \kAccelGravityNumeric is the numeric value of the acceleration due to gravity at the surface of the Earth.

1.3.8 Other Constants

\kCoulomb \kCoulomb is the Coulomb constant ($\frac{1}{4\pi\epsilon_0}$).
\kCoulombNumeric \kCoulombNumeric is the numeric value of the Coulomb constant ($\frac{1}{4\pi\epsilon_0}$).
\kVacuumPermittivity \kVacuumPermittivity is the electric permittivity of the vacuum.
\kVacuumPermittivityNumeric \kVacuumPermittivityNumeric is the numeric value of the electric permittivity of the vacuum.
\kVacuumPermeability \kVacuumPermeability is the magnetic permeability of the vacuum.
\kVacuumPermeabilityNumeric \kVacuumPermeabilityNumeric is the numeric value of the magnetic permeability of the vacuum.
\kVacuumImpedance \kVacuumImpedance is the characteristic impedance of the vacuum.
\kVacuumImpedanceNumeric \kVacuumImpedanceNumeric is the numeric value of the characteristic impedance of the vacuum.
\kBoltzmann \kBoltzmann is the Boltzmann constant.
\keVboltzmann \keVboltzmann is the Boltzmann constant.
\kBoltzmannNumeric \kBoltzmannNumeric is the numeric value of the Boltzmann constant.
\keVboltzmannNumeric \keVboltzmannNumeric is the numeric value of the Boltzmann constant.
\kPlanck \kPlanck is the Planck constant.
\keVplanck \keVplanck is the Planck constant.
\kPlanckNumeric \kPlanckNumeric is the numeric value of the Planck constant.
\keVplanckNumeric \keVplanckNumeric is the numeric value of the Planck constant.
\kPlanckReduced \kPlanckReduced is the Reduced Planck constant \( \left( \frac{\hbar}{2\pi} \right) \).

\kPlanckReducedNumeric \kPlanckReducedNumeric is the numeric value of the Reduced Planck constant \( \left( \frac{\hbar}{2\pi} \right) \).

\keVPlanckReduced \keVPlanckReduced is the Reduced Planck constant \( \left( \frac{\hbar}{2\pi} \right) \).

\keVPlanckReducedNumeric \keVPlanckReducedNumeric is the numeric value of the Reduced Planck constant \( \left( \frac{\hbar}{2\pi} \right) \).

\kGravity \kGravity is Newton’s gravitational constant.

\kGravityNumeric \kGravityNumeric is the numeric value of Newton’s gravitational constant.

\kStefanBoltzmann \kStefanBoltzmann is the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^5k^4}{15\hbar^3c^2} \right) \).

\kStefanBoltzmannNumeric \kStefanBoltzmannNumeric is the numeric value of the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^5k^4}{15\hbar^3c^2} \right) \).

\kRadiation \kRadiation is the radiation constant, \( a \left( \frac{8\pi^2k^4}{15c^2}\hbar \right) \).

\kRadiationNumeric \kRadiationNumeric is the numeric value of the radiation constant, \( a \left( \frac{8\pi^2k^4}{15c^2}\hbar \right) \).

\kFineStructure \kFineStructure is the fine structure constant.

\kFineStructureNumeric \kFineStructureNumeric is the numeric value of the fine structure constant.

\kFineStructureReciprocal \kFineStructureReciprocal is the reciprocal of the fine structure constant.

\kFineStructureReciprocalNumeric \kFineStructureReciprocalNumeric is the numeric value of the reciprocal of the fine structure constant.

\kAvogadro \kAvogadro is Avogadro’s Number (the number of particles in a mole).

\kAvogadroNumeric \kAvogadroNumeric is the numeric value of Avogadro’s Number (the number of particles in a mole).

1.4 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.)
1.4.1 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.

1.4.2 Mass

\k@SI@short@MassElectron is the mass of an electron in SI units with reduced precision. (CODATA 2018)

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

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

Resulting in

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

\k@SI@full@MassElectron is the mass of an electron in SI units with full precision. (CODATA 2018)

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

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

Resulting in

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

\k@cgs@short@MassElectron is the mass of an electron in cgs units with reduced precision. (CODATA 2018)

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

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

Resulting in

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

\k@cgs@full@MassElectron \k@cgs@full@MassElectron is the mass of an electron in cgs units with full precision. (CODATA 2018)

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

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

Resulting in

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

\k@eV@short@MassElectron \k@eV@short@MassElectron is the mass of an electron in eV with reduced precision. (CODATA 2018)

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

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

Resulting in

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

\k@eV@full@MassElectron \k@eV@full@MassElectron is the mass of an electron in eV with full precision. (CODATA 2018)

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

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

Resulting in

\begin{verbatim}
8
\end{verbatim}
The value is \(5.109 \, 763 \, 089 \, 046 \times 10^8 \text{eV} \cdot c^{-2}\)

\(\k@SI@short@MassElectronNumeric\) 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.)

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

Resulting in

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

\(\k@SI@full@MassElectronNumeric\) 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
The value is \k@SI@full@MassElectronNumeric
\makeatother
\end{verbatim}

Resulting in

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

\(\k@cgs@short@MassElectronNumeric\) 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
The value is \k@cgs@short@MassElectronNumeric
\makeatother
\end{verbatim}

Resulting in

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

\(\k@cgs@full@MassElectronNumeric\) 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.)
The value is \k@cgs@full@MassElectronNumeric
\makeatother

Resulting in

The value is 9.108980087382e – 28

\k@eV@short@MassElectronNumeric\k@eV@short@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.)

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

Resulting in

The value is 5.11e + 05

\k@eV@full@MassElectronNumeric\k@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.)

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

Resulting in

The value is 5.109763089046e + 05

\k@SI@short@MassProton \k@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.)

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

Resulting in

10
\k@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.)

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

Resulting in

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

\k@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@cgs@short@MassProton
\makeatother

Resulting in

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

\k@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@cgs@full@MassProton
\makeatother

Resulting in

The value is $1.672 \, 547 \, 813 \, 969 \times 10^{-24}$ g

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

The macro can be invoked by (e.g.)
\k@eV@full@MassProton \k@eV@full@MassProton is the mass of a proton in eV with full precision. (CODATA 2018)

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

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

Resulting in

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

\k@SI@short@MassProtonNumeric \k@SI@short@MassProtonNumeric 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.)

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

Resulting in

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

\k@SI@full@MassProtonNumeric \k@SI@full@MassProtonNumeric 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.)

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

Resulting in
The value is $1.672547813969e^{-27}$

\texttt{\textbackslash k@cgs@short@MassProtonNumeric\textbackslash k@cgs@short@MassProtonNumeric} 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 \texttt{\textbackslash k@cgs@short@MassProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

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

\texttt{\textbackslash k@cgs@full@MassProtonNumeric\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\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\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.)
The value is `\k@eV@full@MassProtonNumeric`

Resulting in

```
\makeatletter
The value is \k@eV@full@MassProtonNumeric
\makeatother
```

The value is 9.382305156558\(e + 08\)

`\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.)

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

Resulting in

```
\makeatletter
The value is 1.67 \times 10^{-27} \text{ kg}
\makeatother
```

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

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

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

Resulting in

```
\makeatletter
The value is 1.673458687724 \times 10^{-27} \text{ kg}
\makeatother
```

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

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

```
\makeatletter
The value is \k@cgs@short@MassHydrogen
\makeatother
```

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

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

Resulting in

The value is $1.673 458 687 724 \times 10^{-24}$ g

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

Resulting in

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

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

Resulting in

The value is $9.387 414 783 596 \times 10^8$ eV $c^{-2}$

\texttt{\textbackslash k@SI@short@MassHydrogenNumeric} \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.)
Resulting in

\[ \text{The value is } 1.67 \times 10^{-27} \]

\( \SI{1.67e-27} \) 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.)

\[ \text{The value is } \SI{1.67e-27} \]

Resulting in

\[ \text{The value is } 1.673458687724 \times 10^{-27} \]

\( \SI{1.673458687724e-27} \) 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.)

\[ \text{The value is } \SI{1.67e-24} \]

Resulting in

\[ \text{The value is } 1.67 \times 10^{-24} \]

\( \SI{1.67e-24} \) 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.)

\[ \text{The value is } \SI{1.67e-24} \]
\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.)

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

Resulting in

The value is 9.39e + 08

\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.)

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

Resulting in

The value is 9.387414783596e + 08

\k@SI@short@MassSun \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.)

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

Resulting in

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

\k@SI@full@MassSun \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.)
The value is $\kSI\full\MassSun$ 

Resulting in

The value is $1.988 \, 409.9 \times 10^{30}$ kg

$k\cgs\short\MassSun$ 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 $1.99 \times 10^{33}$ g

$k\cgs\full\MassSun$ is the mass of the Sun in cgs units with full precision. (IAU Resolution B3 2015)

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

The value is $1.988 \, 409.9 \times 10^{33}$ g

$k\SI\short\MassSun\Numeric$ 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.)

Resulting in

$18$
The value is $1.99e + 30$

`\@SI@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.)

```latex
\texttt{\makeatletter}
\texttt{The value is \@SI@full@MassSunNumeric}
\texttt{\makeatother}
```

Resulting in

The value is $1.9884099e + 30$

`\@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.)

```latex
\texttt{\makeatletter}
\texttt{The value is \@cgs@short@MassSunNumeric}
\texttt{\makeatother}
```

Resulting in

The value is $1.99e + 33$

`\@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.)

```latex
\texttt{\makeatletter}
\texttt{The value is \@cgs@full@MassSunNumeric}
\texttt{\makeatother}
```

Resulting in

The value is $1.9884099e + 33$

`\@short@MassEarth` is 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@MassEarth
\makeatother

Resulting in
The value is $5.97 \times 10^{24}$ kg

\k@full@MassEarth \k@full@MassEarth is 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@MassEarth
\makeatother

Resulting in
The value is $5.972168 \times 10^{24}$ 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
\shortMassJupiter\shortMassJupiter is the mass of Jupiter with reduced precision. (IAU Resolution B3 2015)

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

\makeatletter
The value is \shortMassJupiter
\makeatother

Resulting in

The value is $5.972168e + 24$

\fullMassJupiter\fullMassJupiter is the mass of Jupiter with full precision. (IAU Resolution B3 2015)

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

\makeatletter
The value is \fullMassJupiter
\makeatother

Resulting in

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

\shortMassJupiterNumeric\shortMassJupiterNumeric is a mathematical value of the mass of Jupiter with reduced precision. (IAU Resolution B3 2015)

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

\makeatletter
The value is \shortMassJupiterNumeric
\makeatother

Resulting in

The value is $1.90e + 27$

\fullMassJupiterNumeric\fullMassJupiterNumeric is a mathematical value of the mass of Jupiter with full precision. (IAU Resolution B3 2015)

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

Resulting in

The value is \( 1.8981246 \times 10^{27} \)

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

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

\[
\text{The value is } \text{MassAMU} \\
\text{Resulting in}
\]

The value is \( 1.66 \times 10^{-27} \text{ kg} \)

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

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

\[
\text{The value is } \text{MassAMU} \\
\text{Resulting in}
\]

The value is \( 1.660465492239 \times 10^{-27} \text{ kg} \)

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

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

\[
\text{The value is } \text{MassAMU} \\
\text{Resulting in}
\]
The value is $1.66 \times 10^{-24}$ g

$k\@cgs@full@MassAMU$ is the mass of an atomic mass unit in cgs units with full precision. (CODATA 2018)

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

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

Resulting in

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

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

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

```
\makeatletter
The value is \k@eV@short@MassAMU
\makeatother
```

Resulting in

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

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

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

```
\makeatletter
The value is \k@eV@full@MassAMU
\makeatother
```

Resulting in

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

$k\@SI@short@MassAMUNumeric$ 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.)

```
```
\texttt{\textbackslash makeatletter} \texttt{The value is \texttt{k\textasciitilde SI\textasciitilde short\textasciitilde MassAMUNumeric}} \texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.66e - 27}

\texttt{\textbackslash k\textasciitilde SI\textasciitilde full\textasciitilde MassAMUNumeric} \texttt{\textbackslash k\textasciitilde SI\textasciitilde full\textasciitilde 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.)

\texttt{\textbackslash makeatletter} \texttt{The value is \texttt{k\textasciitilde SI\textasciitilde full\textasciitilde MassAMUNumeric}} \texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.660465492239e - 27}

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

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

\texttt{\textbackslash makeatletter} \texttt{The value is \texttt{k\textasciitilde cgs\textasciitilde short\textasciitilde MassAMUNumeric}} \texttt{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.66e - 24}

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

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

\texttt{\textbackslash makeatletter} \texttt{The value is \texttt{k\textasciitilde cgs\textasciitilde full\textasciitilde MassAMUNumeric}} \texttt{\textbackslash makeatother}

Resulting in
The value is $1.660465492239e^{-24}$

\textbf{\texttt{\textbackslash k\textbackslash e\textbackslash v\textbackslash short\textbackslash MassAMUNumeric}} is a mathematical value of 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 \texttt{\textbackslash k\textbackslash e\textbackslash v\textbackslash short\textbackslash MassAMUNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $9.31e+08$

\textbf{\texttt{\textbackslash k\textbackslash e\textbackslash v\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\textbackslash e\textbackslash v\textbackslash full\textbackslash MassAMUNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $9.314528302276e+08$

\subsection{1.4.3 Charge}

\textbf{\texttt{\textbackslash k\textbackslash 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\textbackslash SI\textbackslash short\textbackslash ChargeFundamental}
\makeatother
\end{verbatim}

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

\texttt{\textbackslash k@SI@full@ChargeFundamental} \texttt{\textbackslash k@SI@full@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@full@ChargeFundamental}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 1.602176634 \times 10^{-19} \text{ C}
\end{verbatim}

\texttt{\textbackslash k@cgs@short@ChargeFundamental} \texttt{\textbackslash k@cgs@short@ChargeFundamental} is 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{\textbackslash k@cgs@short@ChargeFundamental}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 4.80 \times 10^{-10} \text{ esu}
\end{verbatim}

\texttt{\textbackslash k@cgs@full@ChargeFundamental} \texttt{\textbackslash k@cgs@full@ChargeFundamental} is 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{\textbackslash k@cgs@full@ChargeFundamental}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is 4.803204713 \times 10^{-10} \text{ esu}
\end{verbatim}

\texttt{\textbackslash k@SI@short@ChargeFundamental} \texttt{\textbackslash k@SI@short@ChargeFundamental} is a mathematical value of 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@short@ChargeFundamental} \texttt{\textbackslash makeatother}
\end{verbatim}
\makeatletter
The value is \SI{\text{ChargeFundamentalNumeric}}\makeatother
Resulting in
The value is 1.60e – 19

\SI{\text{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.)
\makeatletter
The value is \SI{\text{ChargeFundamentalNumeric}}\makeatother
Resulting in
The value is 1.602176634e – 19

\cgs\SI{\text{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.)
\makeatletter
The value is \cgs\SI{\text{ChargeFundamentalNumeric}}\makeatother
Resulting in
The value is 4.80e – 10

\cgs\SI{\text{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.)
\makeatletter
The value is \cgs\SI{\text{ChargeFundamentalNumeric}}\makeatother
Resulting in
The value is $4.803204713e-10$

\texttt{\textbackslash SIshortChargeElectron} 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 \SIshortChargeElectron
\makeatother
\end{verbatim}

Resulting in

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

\texttt{\textbackslash SIfullChargeElectron} 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 \SIfullChargeElectron
\makeatother
\end{verbatim}

Resulting in

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

\texttt{\textbackslash cgsshortChargeElectron} 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 \cgsshortChargeElectron
\makeatother
\end{verbatim}

Resulting in

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

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

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

Resulting in

The value is \(-4.803\ 204\ 713 \times 10^{-10}\) esu

\texttt{\textbackslash k@SI@short@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.)

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

Resulting in

The value is \(-1.60e - 19\)

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

Resulting in

The value is \(-1.602176634e - 19\)

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

Resulting in
\texttt{\k@cgs@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.)

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

Resulting in

The value is \(-4.80 \times 10^{-10}\)

\texttt{\k@SI@short@ChargeProton} \texttt{\k@SI@short@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
The value is \k@SI@short@ChargeProton
\makeatother
\end{verbatim}

Resulting in

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

\texttt{\k@SI@full@ChargeProton} \texttt{\k@SI@full@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
The value is \k@SI@full@ChargeProton
\makeatother
\end{verbatim}

Resulting in

The value is \(1.602176634 \times 10^{-19}\) C

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

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

Resulting in

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

\texttt{\textbackslash k@cgs@full@ChargeProton} \texttt{\textbackslash k@cgs@full@ChargeProton} is the charge of a proton in cgs units with full precision. (CODATA 2018)

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

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

Resulting in

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

\texttt{\textbackslash k@SI@short@ChargeProtonNumeric} \texttt{\textbackslash 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.)

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

Resulting in

\texttt{The value is 1.60e-19}

\texttt{\textbackslash k@SI@full@ChargeProtonNumeric} \texttt{\textbackslash 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.)

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

Resulting in
The value is $1.602176634 \times 10^{-19}$

\texttt{\textbackslash k\text@{}cgs\text@{}short\text@{}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.)

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

Resulting in

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

\texttt{\textbackslash k\text@{}cgs\text@{}full\text@{}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{\textbackslash k\text@{}cgs\text@{}full\text@{}ChargeProtonNumeric}
\makeatother
\end{verbatim}

Resulting in

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

1.4.4 Distances and Lengths

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

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

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

Resulting in
\textbf{\k@SI@full@RadiusBohr} \textit{is Bohr radius of an atom in SI units with full precision. (Calculated)}

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

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

Resulting in

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

\textbf{\k@cgs@short@RadiusBohr} \textit{is Bohr radius of an atom in cgs units with reduced precision. (Calculated)}

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

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

Resulting in

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

\textbf{\k@cgs@full@RadiusBohr} \textit{is Bohr radius of an atom in cgs units with full precision. (Calculated)}

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

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

Resulting in

The value is $5.292\,006\,59 \times 10^{-9}$ cm

\textbf{\k@SI@short@RadiusBohrNumeric} \textit{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.)
\makeatletter
The value is \SI{\text{short}}{\text{RadiusBohrNumeric}}
\makeatother

Resulting in

The value is 5.29e\text{ – 11}

\SI{\text{full}}{\text{RadiusBohrNumeric}} 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.)

\makeatletter
The value is \SI{\text{full}}{\text{RadiusBohrNumeric}}
\makeatother

Resulting in

The value is 5.29200659e\text{ – 11}

\SI{\text{short}}{\text{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
The value is \SI{\text{short}}{\text{RadiusBohrNumeric}}
\makeatother

Resulting in

The value is 5.29e\text{ – 09}

\SI{\text{full}}{\text{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
The value is \SI{\text{full}}{\text{RadiusBohrNumeric}}
\makeatother

Resulting in
The value is $5.29200659e^{-09}$

\texttt{\textbackslash SIshortAstronomicalUnit} \texttt{\textbackslash SIshortAstronomicalUnit} 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.)

\begin{verbatim}
\makeatletter
\texttt{The value is \texttt{\textbackslash SIshortAstronomicalUnit}}
\makeatother
\end{verbatim}

Resulting in

The value is $1.50 	imes 10^{11}$ m

\texttt{\textbackslash SIfullAstronomicalUnit} \texttt{\textbackslash SIfullAstronomicalUnit} 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.)

\begin{verbatim}
\makeatletter
\texttt{The value is \texttt{\textbackslash SIfullAstronomicalUnit}}
\makeatother
\end{verbatim}

Resulting in

The value is $1.495978707 	imes 10^{11}$ m

\texttt{\textbackslash cgsshortAstronomicalUnit} \texttt{\textbackslash cgsshortAstronomicalUnit} 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.)

\begin{verbatim}
\makeatletter
\texttt{The value is \texttt{\textbackslash cgsshortAstronomicalUnit}}
\makeatother
\end{verbatim}

Resulting in
The value is $1.50 \times 10^{13}$ cm

\cgsfullastronomicalunit \cgsfullastronomicalunit 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.)

\makeatletter
The value is \cgsfullastronomicalunit
\makeatother

Resulting in

The value is $1.495\,978\,707 \times 10^{13}$ cm

\sisshortastronomicalunitnumeric \sisshortastronomicalunitnumeric is a mathematical value of 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
The value is \sisshortastronomicalunitnumeric
\makeatother

Resulting in

The value is $1.50e + 11$

\sisfullastronomicalunitnumeric \sisfullastronomicalunitnumeric is a mathematical value of 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.)

\makeatletter
The value is \sisfullastronomicalunitnumeric
\makeatother

Resulting in
The value is $1.495978707 \times 10^{11}$

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

Resulting in

```
The value is $1.50 \times 10^{13}$
```

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

Resulting in

```
The value is $1.495978707 \times 10^{13}$
```

\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
\text{The value is} \k@SI@short@Parsec
\makeatother
```

Resulting in

```
The value is $3.09 \times 10^{16}$ m
```
\texttt{\textbackslash k@SI@full@Parsec} \texttt{\textbackslash 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.)

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

Resulting in

The value is $3.085\,677\,581 \times 10^{16}$ m

\texttt{\textbackslash k@cgs@short@Parsec} \texttt{\textbackslash 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.)

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

Resulting in

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

\texttt{\textbackslash k@cgs@full@Parsec} \texttt{\textbackslash k@cgs@full@Parsec} is the length of a parsec ($\frac{648000\text{ au}}{\pi}$) 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 $3.085\,677\,581 \times 10^{18}$ cm

\texttt{\textbackslash k@SI@short@ParsecNumeric} \texttt{\textbackslash 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.)
The value is $\kappa SI@short@ParsecNumeric$

Resulting in

The value is $3.09e + 16$

$kSI@full@ParsecNumeric$ 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.)

The value is $3.085677581e + 16$

$k@cgs@short@ParsecNumeric$ is a mathematical value of 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 $3.09e + 18$

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

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

Resulting in
The value is $3.085677581 \times 10^{18}$

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

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

Resulting in

The value is $6.96 \times 10^8$ m

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

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

Resulting in

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

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

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

Resulting in

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

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

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

The value is $6.957 \times 10^{10}$ cm
\makeatletter
\The value is \k@cgs@full@RadiusSun
\makeatother

Resulting in

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

\k@SI@short@RadiusSunNumeric \k@SI@short@RadiusSunNumeric 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.)

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

Resulting in

\The value is $6.96e + 08$

\k@SI@full@RadiusSunNumeric \k@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.)

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

Resulting in

\The value is $6.957e + 08$

\k@cgs@short@RadiusSunNumeric\k@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.)

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

Resulting in

\The value is $4.1$

41
The value is 6.96e + 10

\k@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.)

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

Resulting in

The value is 6.957e + 10

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

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

\makeatletter
    The value is \k@short@RadiusEarth
\makeatother

Resulting in

The value is 6.37 \times 10^6 m

\k@full@RadiusEarth is the mean radius of the Earth with full precision. (IAU Resolution B3 2015)

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

\makeatletter
    The value is \k@full@RadiusEarth
\makeatother

Resulting in

The value is 6.3710 \times 10^6 m

\k@short@RadiusEarthNumeric 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.)
The value is $\k@short@RadiusEarthNumeric$

Resulting in

The value is $6.37e+06$

$\k@full@RadiusEarthNumeric$ 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.)

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

Resulting in

The value is $6.3710e+06$

$\k@short@RadiusJupiter$ 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 \k@short@RadiusJupiter
\makeatother
\end{verbatim}

Resulting in

The value is $6.99 \times 10^7$ m

$\k@full@RadiusJupiter$ 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 \k@full@RadiusJupiter
\makeatother
\end{verbatim}

Resulting in
The value is 6.991 1 \times 10^7 \text{ m}

\short@RadiusJupiter\text{Numeric} \ short@RadiusJupiter\text{Numeric} 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.)

\makeatletter
\text{The value is } \short@RadiusJupiter\text{Numeric}
\makeatother

Resulting in

The value is 6.99e + 07

\full@RadiusJupiter\text{Numeric} \ full@RadiusJupiter\text{Numeric} 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.)

\makeatletter
\text{The value is } \full@RadiusJupiter\text{Numeric}
\makeatother

Resulting in

The value is 6.9911e + 07

1.4.5 Energy, Power, and Luminosity

\SI@short@Rydberg \ SI@short@Rydberg is the Rydberg energy (the binding energy of Hydrogen) in SI units with reduced precision. (Calculated)

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

\makeatletter
\text{The value is } \SI@short@Rydberg
\makeatother

Resulting in
\texttt{\textbackslash k@SI@full@Rydberg} is the Rydberg energy (the binding energy of Hydrogen) in SI units with full precision. (Calculated)

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

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

Resulting in

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

\texttt{\textbackslash k@cgs@short@Rydberg} is the Rydberg energy (the binding energy of Hydrogen) 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@Rydberg}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $2.18 \times 10^{-11}$ erg
\end{verbatim}

\texttt{\textbackslash k@cgs@full@Rydberg} is the Rydberg energy (the binding energy of Hydrogen) 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@Rydberg}
\makeatother
\end{verbatim}

Resulting in

\begin{verbatim}
The value is $2.179\,775\,77 \times 10^{-11}$ erg
\end{verbatim}

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

The macro can be invoked by (e.g.)
The value is \texttt{k0vshortRydberg} resulting in

\begin{verbatim}
\texttt{The value is k0vfullRydberg}
\end{verbatim}

The value is $1.36 \times 10^1$ eV

\texttt{k0vfullRydberg} is the Rydberg energy (the binding energy of Hydrogen) in eV with full precision. (Calculated)
The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{The value is k0vfullRydberg}
\end{verbatim}

Resulting in

\begin{verbatim}
\texttt{The value is k0vfullRydberg}
\end{verbatim}

The value is $1.36050903 \times 10^1$ eV

\texttt{k0sishortRydbergNumeric} is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in SI units with reduced precision. (Calculated)
The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{The value is k0sishortRydbergNumeric}
\end{verbatim}

Resulting in

\begin{verbatim}
\texttt{The value is k0sishortRydbergNumeric}
\end{verbatim}

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

\texttt{k0sifullRydbergNumeric} is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in SI units with full precision. (Calculated)
The macro can be invoked by (e.g.)

\begin{verbatim}
\texttt{The value is k0sifullRydbergNumeric}
\end{verbatim}

Resulting in
The value is $2.17977577 e - 18$

\k@cgs@short@RydbergNumeric

\k@cgs@short@RydbergNumeric is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in cgs units with reduced precision. (Calculated)

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

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

Resulting in

The value is $2.18 e - 11$

\k@cgs@full@RydbergNumeric

\k@cgs@full@RydbergNumeric is a mathematical value of the Rydberg energy (the binding energy of Hydrogen) in cgs units with full precision. (Calculated)

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

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

Resulting in

The value is $2.17977577 e - 11$

\k@eV@short@RydbergNumeric

\k@eV@short@RydbergNumeric 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 \k@eV@short@RydbergNumeric
\makeatother

Resulting in

The value is $1.36e + 01$

\k@eV@full@RydbergNumeric

\k@eV@full@RydbergNumeric 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.)
The value is $1.36050903 \times 10^{01}$

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

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

\texttt{\textbackslash SI@short@LuminositySun}

Resulting in

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

\texttt{\textbackslash 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.)

\texttt{\textbackslash SI@full@LuminositySun}

Resulting in

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

\texttt{\textbackslash 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.)

\texttt{\textbackslash cgs@short@LuminositySun}

Resulting in
The value is $3.83 \times 10^{33} \text{erg s}^{-1}$

\texttt{\texttt{k@cgs@full@LuminositySun}} \texttt{ 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 \texttt{k@cgs@full@LuminositySun}
\makeatother
\end{verbatim}

Resulting in

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

\texttt{\texttt{k@SI@short@LuminositySunNumeric}} \texttt{ 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.)

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

Resulting in

The value is $3.83e + 26$

\texttt{\texttt{k@SI@full@LuminositySunNumeric}} \texttt{ is a mathematical value of 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 \texttt{k@SI@full@LuminositySunNumeric}
\makeatother
\end{verbatim}

Resulting in

The value is $3.828e + 26$

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

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

Resulting in

The value is $3.83 \times 10^{33}$

\k@cgs@full@LuminositySunNumeric 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.)

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

Resulting in

The value is $3.828 \times 10^{33}$

1.4.6 Pressure

\k@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 \k@SI@short@PressureAtmosphere
\makeatother

Resulting in

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

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

The macro can be invoked by (e.g.)
The value is $k\text{SI}\text{full}\text{PressureAtmosphere}$

Resulting in

The value is $1.01325 \times 10^5 \text{ Pa}$

$k\text{cgs}\text{short}\text{PressureAtmosphere}$ is the standard atmospheric pressure in cgs units with reduced precision. (CODATA 2018)

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

The value is $k\text{cgs}\text{short}\text{PressureAtmosphere}$

Resulting in

The value is $1.01 \text{ bar}$

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

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

The value is $k\text{cgs}\text{full}\text{PressureAtmosphere}$

Resulting in

The value is $1.01325 \text{ bar}$

$k\text{SI}\text{short}\text{PressureAtmosphereNumeric}$ 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.)

The value is $k\text{SI}\text{short}\text{PressureAtmosphereNumeric}$

Resulting in
\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.)
\makeatletter
\makeatother

Resulting in
The value is \k@SI@full@PressureAtmosphereNumeric

\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.)
\makeatletter
\makeatother

Resulting in
The value is \k@cgs@short@PressureAtmosphereNumeric

\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.)
\makeatletter
\makeatother

Resulting in
The value is \k@cgs@full@PressureAtmosphereNumeric

\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.)
The value is \SI{1.00 \times 10^5}{\text{Pa}}

\SI{1.00 \times 10^5}{\text{Pa}} is the standard atmospheric pressure in SI units with full precision. (CODATA 2018)

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

The value is \SI{1.0000 \times 10^5}{\text{Pa}}

\SI{1.0000 \times 10^5}{\text{Pa}} is the standard atmospheric pressure in cgs units with full precision. (CODATA 2018)

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

The value is 1.00 bar

\SI{53}{\text{bar}} is the standard atmospheric pressure in cgs units with reduced precision. (CODATA 2018)

The macro can be invoked by (e.g.)
The value is 1.000 00 bar

\SI{100}{\bar} 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
The value is \SI{100}{\bar}
\makeatother
\end{verbatim}

Resulting in

The value is 1.00e + 05

\SI{1000000}{\bar} 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.)

\begin{verbatim}
\makeatletter
The value is \SI{1000000}{\bar}
\makeatother
\end{verbatim}

Resulting in

The value is 1.000000e + 05

\SI{100}{\cgs} 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.)

\begin{verbatim}
\makeatletter
The value is \SI{100}{\cgs}
\makeatother
\end{verbatim}

Resulting in

The value is 1.00e + 00

\SI{1000000}{\cgs} 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.)
The value is \( \textbf{\texttt{PressureStandard}} \)

Resulting in

The value is \( 1.00000e+00 \)

### 1.4.7 Velocity, Speed and Acceleration

\( \texttt{\textit{\texttt{SpeedLight}}} \) is the speed of light in SI units with reduced precision. (CODATA 2018)

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

\makeatletter
\texttt{\textit{\texttt{SpeedLight}}} \makeatother

Resulting in

The value is \( 3.00 \times 10^8 \text{ m s}^{-1} \)

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

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

\makeatletter
\texttt{\textit{\texttt{SpeedLight}}} \makeatother

Resulting in

The value is \( 2.99792458 \times 10^8 \text{ m s}^{-1} \)

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

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

Resulting in

The value is \( 3.00 \times 10^{10} \text{ cm s}^{-1} \)

\( \texttt{cgs@full@SpeedLight} \) is the speed of light in cgs units with full precision.

(CODATA 2018)

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

\makeatletter
\makeatother

Resulting in

The value is \( 2.99792458 \times 10^{10} \text{ cm s}^{-1} \)

\( \texttt{SI@short@SpeedLightNumeric} \) 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.)

\makeatletter
\makeatother

Resulting in

The value is \( 3.00 \times 10^{8} \)

\( \texttt{SI@full@SpeedLightNumeric} \) 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.)

\makeatletter
\makeatother

Resulting in

The value is \( 3.00 \times 10^{8} \)
\k@cgs@short@SpeedLightNumeric\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.)

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

Resulting in

The value is 2.99792458e + 08

\k@cgs@full@SpeedLightNumeric\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.)

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

Resulting in

The value is 3.00e + 10

\k@SI@short@AccelGravity\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.)

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

Resulting in

The value is 9.81 m s^{-2}

\k@SI@full@AccelGravity\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.)
The value is \k@SI@full@AccelGravity

Resulting in

The value is \SI{9.80665}{\meter\per\second^2}

\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.)

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

Resulting in

The value is \SI{9.81e2}{\centi\meter\per\second^2}

\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.)

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

Resulting in

The value is \SI{9.80665e2}{\centi\meter\per\second^2}

\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.)

\makeatletter
The value is \k@SI@short@AccelGravityNumeric
\makeatother
\SI{9.81e+00}{\text{m/s}^2} 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 \SI{9.81e+00}{\text{m/s}^2}
\makeatother
\end{verbatim}

Resulting in

The value is $9.81 \times 10^0$

\cgs{9.80665e+00}{\text{m/s}^2} 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 \cgs{9.80665e+00}{\text{m/s}^2}
\makeatother
\end{verbatim}

Resulting in

The value is $9.80665 \times 10^0$

\cgsfull{9.81e+02}{\text{m/s}^2} 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 \cgsfull{9.81e+02}{\text{m/s}^2}
\makeatother
\end{verbatim}

Resulting in

The value is $9.81 \times 10^2$
The value is $9.80665 \times 10^2$ 

### 1.4.8 Other Constants

\texttt{\textbackslash k@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{\textbackslash k@SI@short@Coulomb}
\makeatother
\end{verbatim}

Resulting in

The value is $8.99 \times 10^9$ N m$^2$ C$^{-2}$

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

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

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

Resulting in

The value is $8.98755179 \times 10^9$ N m$^2$ C$^{-2}$

\texttt{\textbackslash k@cgs@short@Coulomb} is the Coulomb constant ($\frac{1}{4\pi\epsilon_0}$) 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@Coulomb}
\makeatother
\end{verbatim}

Resulting in
The value is \k@cgsfullCoulomb
\k@cgsfullCoulomb 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.)

\makeatletter
The value is \k@cgsfullCoulomb
\makeatother

Resulting in

The value is 1.00

\k@SISHortCoulombNumeric \k@SISHortCoulombNumeric 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.)

\makeatletter
The value is \k@SISHortCoulombNumeric
\makeatother

Resulting in

The value is 8.99\(e\) + 09

\k@SIfullCoulombNumeric \k@SIfullCoulombNumeric is a mathematical value of the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in SI units with full precision. (Calculated)

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

\makeatletter
The value is \k@SIfullCoulombNumeric
\makeatother

Resulting in

The value is 8.98755179\(e\) + 09

\k@cgsSHortCoulombNumeric \k@cgsSHortCoulombNumeric is a mathematical value of the Coulomb constant \( \frac{1}{4\pi\varepsilon_0} \) in cgs units with reduced precision. (Calculated)

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

Resulting in

The value is 1.00c + 00

The 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 1.00000000c + 00

The k@SI@short@VacuumPermittivity k@SI@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.)

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

Resulting in

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

The k@SI@full@VacuumPermittivity k@SI@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.)

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

Resulting in
\k@cgs@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.)

\makeatletter
\makeatother

Resulting in

The value is \k@cgs@short@VacuumPermittivity

\k@cgs@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.)

\makeatletter
\makeatother

Resulting in

The value is \k@cgs@full@VacuumPermittivity

\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
\makeatother

Resulting in

The value is \k@SI@short@VacuumPermittivityNumeric

\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.)
The value is \k@SI@full@VacuumPermittivityNumeric

Resulting in

The value is $8.8541878128 \times 10^{12}$

\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 $7.96 \times 10^{-02}$

\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 $7.9577471546 \times 10^{-02}$

\k@SI@short@VacuumPermeability\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
\texttt{\SI{1}{\per	ext{m}}}:
\begin{tabular}{cccc}
\hline
\& SI &\& m &\& T &\& m &\& A &\& m &\& 1 \\
\hline
1 &\& & & & & & & & & \\
\end{tabular}

\texttt{\SI{1}{\per\text{emu}}}:
\begin{tabular}{cccc}
\hline
\& cgs &\& cm &\& G &\& cm &\& \text{mgauss} &\& \text{mcmgauss} &\& \text{mcmgauss} \\
\hline
1 &\& & & & & & & & & \\
\end{tabular}

\texttt{\SI{1}{\per\text{m}}}
\texttt{\SI{1}{\per\text{m}}} is the magnetic permeability of the vacuum
in SI units with full precision. (Calculated)
The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \SI{1}{\per\text{m}}
\makeatother
\end{verbatim}
Resulting in

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

\texttt{\SI{1}{\per\text{emu}}} is the magnetic permeability of the vacuum
in cgs units with reduced precision. (Calculated)
The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \SI{1}{\per\text{emu}}
\makeatother
\end{verbatim}
Resulting in

The value is $1.2566370621 \times 10^{-6}$ N A$^{-2}$

\texttt{\SI{1}{\per\text{m}}} is the magnetic permeability of the vacuum
in cgs units with full precision. (Calculated)
The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \SI{1}{\per\text{m}}
\makeatother
\end{verbatim}
Resulting in

The value is $1.26 \times 10^{4}$

\texttt{\SI{1}{\per\text{emu}}} is the magnetic permeability of the vacuum
in cgs units with full precision. (Calculated)
The macro can be invoked by (e.g.)
\begin{verbatim}
\makeatletter
The value is \SI{1}{\per\text{emu}}
\makeatother
\end{verbatim}
Resulting in

The value is $1.26 \times 10^{4}$
\SI{1}{\tesla} 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.)

\texttt{\makeatletter\texttt{The value is \SI{1}{\tesla}}\makeatother}

Resulting in

The value is $1 \times 10^1$

\SI{1}{\tesla} 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.)

\texttt{\makeatletter\texttt{The value is \SI{1}{\tesla}}\makeatother}

Resulting in

The value is $1.26 \times 10^6$

\SI{1}{\tesla} 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.)

\texttt{\makeatletter\texttt{The value is \SI{1}{\tesla}}\makeatother}

Resulting in

The value is $1.26 \times 10^1$

\SI{1}{\tesla} 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.)

\texttt{\makeatletter\texttt{The value is \SI{1}{\tesla}}\makeatother}

Resulting in

The value is $1.26 \times 10^1$
The value is \k@cgs@full@VacuumPermeabilityNumeric

Resulting in

The value is \k@cgs@full@VacuumPermeabilityNumeric

\k@short@VacuumImpedance

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

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

\makeatletter
The value is \k@short@VacuumImpedance
\makeatother

Resulting in

The value is \k@short@VacuumImpedance

\k@full@VacuumImpedance

\k@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 \k@full@VacuumImpedance
\makeatother

Resulting in

The value is \k@full@VacuumImpedance

\k@short@VacuumImpedanceNumeric

\k@short@VacuumImpedanceNumeric 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 \k@short@VacuumImpedanceNumeric
\makeatother

Resulting in

The value is \k@short@VacuumImpedanceNumeric
\k@full@VacuumImpedanceNumeric 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 \k@full@VacuumImpedanceNumeric
\makeatother

Resulting in

The value is 3.77e + 02

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

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

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

Resulting in

The value is 1.38 x 10^{-23} J K^{-1}

\k@SI@full@Boltzmann is the Boltzmann constant in SI units with full precision. (CODATA 2018)

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

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

Resulting in

The value is 1.380649 x 10^{-23} J K^{-1}

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

The macro can be invoked by (e.g.)
\textit{\textbackslash makeatletter}

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

\textit{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.38 \times 10^{-16} \text{ erg K}^{-1}}

\texttt{\textbackslash k@cgs@full@Boltzmann}

\textit{\textbackslash k@cgs@full@Boltzmann} is the Boltzmann constant in cgs units with full precision. (CODATA 2018)

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

\textit{\textbackslash makeatletter}

\texttt{The value is \textbackslash k@cgs@full@Boltzmann}

\textit{\textbackslash makeatother}

Resulting in

\texttt{The value is 1.380 649 \times 10^{-16} \text{ erg K}^{-1}}

\texttt{\textbackslash k@eV@short@Boltzmann}

\textit{\textbackslash k@eV@short@Boltzmann} is the Boltzmann constant in eV with reduced precision. (CODATA 2018)

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

\textit{\textbackslash makeatletter}

\texttt{The value is \textbackslash k@eV@short@Boltzmann}

\textit{\textbackslash makeatother}

Resulting in

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

\texttt{\textbackslash k@eV@full@Boltzmann}

\textit{\textbackslash k@eV@full@Boltzmann} is the Boltzmann constant in eV with full precision. (CODATA 2018)

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

\textit{\textbackslash makeatletter}

\texttt{The value is \textbackslash k@eV@full@Boltzmann}

\textit{\textbackslash makeatother}

Resulting in

69
The value is $8.617.333 \times 10^{-5}$ eV K$^{-1}$

\verb|\k@SI@short@BoltzmannNumeric| 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
\texttt{The value is } \k@SI@short@BoltzmannNumeric
\makeatother
\end{verbatim}

Resulting in

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

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

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

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

Resulting in

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

\verb|\k@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.)

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

Resulting in

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

\verb|\k@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.)
The value is \texttt{k@\cgs@full@BoltzmannNumeric} \makeatother

Resulting in

\texttt{The value is 1.380649e - 16}

\texttt{k@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
\texttt{The value is k@eV@short@BoltzmannNumeric} \makeatother

Resulting in

\texttt{The value is 8.62e - 05}

\texttt{k@eV@full@BoltzmannNumeric} is a mathematical value of the Boltzmann constant in eV with full precision. (CODATA 2018)

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

\makeatletter
\texttt{The value is k@eV@full@BoltzmannNumeric} \makeatother

Resulting in

\texttt{The value is 8.617333e - 05}

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

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

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

Resulting in
The value is $6.63 \times 10^{-34}$ Js

\texttt{\textbackslash k@SI@full@Planck}\hspace{1cm} \texttt{\textbackslash k@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
\texttt{\textbackslash k@SI@full@Planck}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

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

The value is $6.626\,070\,15 \times 10^{-34}$ Js

\texttt{\textbackslash k@cgs@short@Planck}\hspace{1cm} \texttt{\textbackslash k@cgs@short@Planck} is the Planck constant in cgs units with reduced precision. (CODATA 2018)

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

\begin{verbatim}
\makeatletter
\texttt{\textbackslash k@cgs@short@Planck}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

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

\texttt{\textbackslash k@cgs@full@Planck}\hspace{1cm} \texttt{\textbackslash k@cgs@full@Planck} is the Planck constant in cgs units with full precision. (CODATA 2018)

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

\begin{verbatim}
\makeatletter
\texttt{\textbackslash k@cgs@full@Planck}
\texttt{\textbackslash makeatother}
\end{verbatim}

Resulting in

The value is $6.626\,070\,15 \times 10^{-27}$ erg s

\texttt{\textbackslash k@eV@short@Planck}\hspace{1cm} \texttt{\textbackslash k@eV@short@Planck} is the Planck constant in eV with reduced precision. (CODATA 2018)

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

Resulting in

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

\texttt{\textbackslash k@eV@full@Planck} \texttt{\textbackslash k@eV@full@Planck} is the Planck constant in eV with full precision. (CODATA 2018)

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

\makeatletter
The value is \texttt{\textbackslash k@eV@full@Planck}
\makeatother

Resulting in

\texttt{The value is 4.135 667 70 \times 10^{-15} \text{ eV s}}

\texttt{\textbackslash k@SI@short@PlanckNumeric} \texttt{\textbackslash k@SI@short@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.)

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

Resulting in

\texttt{The value is 6.63e - 34}

\texttt{\textbackslash k@SI@full@PlanckNumeric} \texttt{\textbackslash k@SI@full@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.)

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

Resulting in

\texttt{73}
The value is $6.62607015e^{-34}$

\texttt{\k@cgs@short@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 \k@cgs@short@PlanckNumeric
\makeatother
\end{verbatim}

Resulting in

The value is $6.63e^{-27}$

\texttt{\k@cgs@full@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.)

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

Resulting in

The value is $6.62607015e^{-27}$

\texttt{\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.)

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

Resulting in

The value is $4.14e^{-15}$

\texttt{\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.)
The value is 4.13566770e−15

\( \frac{h}{2\pi} \) in SI units with reduced precision. (Calculated)

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

Resulting in

\( 1.05 \times 10^{-34} \text{ Js} \)

\( \frac{h}{2\pi} \) in SI units with full precision. (Calculated)

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

Resulting in

\( 1.05457182 \times 10^{-34} \text{ Js} \)

\( \frac{h}{2\pi} \) in cgs units with reduced precision. (Calculated)

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

Resulting in
The value is $1.05 \times 10^{-27}$ erg s

\texttt{\textbackslash k@cgs\textunderscore full\textunderscore PlanckReduced} \texttt{\textbackslash k@cgs\textunderscore full\textunderscore PlanckReduced} is the Reduced Planck constant $(\frac{h}{2\pi})$ in cgs units with full precision. (Calculated)

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

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

Resulting in

The value is 1.054 571 82 $10^{-27}$ erg s

\texttt{\textbackslash k@eV\textunderscore short\textunderscore PlanckReduced} \texttt{\textbackslash k@eV\textunderscore short\textunderscore PlanckReduced} is the Reduced Planck constant $(\frac{h}{2\pi})$ in eV with reduced precision. (Calculated)

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

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

Resulting in

The value is 6.58 $10^{-16}$ eV s

\texttt{\textbackslash k@eV\textunderscore full\textunderscore PlanckReduced} \texttt{\textbackslash k@eV\textunderscore full\textunderscore PlanckReduced} is the Reduced Planck constant $(\frac{h}{2\pi})$ in eV with full precision. (Calculated)

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

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

Resulting in

The value is 6.582 119 57 $10^{-16}$ eV s

\texttt{\textbackslash k@SI\textunderscore short\textunderscore PlanckReducedNumer\textbackslash k@SI\textunderscore short\textunderscore PlanckReducedNumer} 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.)
\makeatletter
The value is \k@SI@short@PlanckReducedNumeric
\makeatother

Resulting in

The value is 1.05e – 34

\k@SI@full@PlanckReducedNumeric is a mathematical value of the Reduced Planck constant \( \frac{\hbar}{2\pi} \) in SI units with full precision. (Calculated)

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

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

Resulting in

The value is 1.05457182e – 34

\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.)

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

Resulting in

The value is 1.05e – 27

\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.)

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

Resulting in
The value is 1.05457182\(e^{-27}\)

\texttt{\textbackslash k@eV@short@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \(\left(\frac{\hbar}{2\pi}\right)\) in eV with reduced precision. (Calculated)

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

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

Resulting in

The value is 6.58e-16

\texttt{\textbackslash k@eV@full@PlanckReducedNumeric} is a mathematical value of the Reduced Planck constant \(\left(\frac{\hbar}{2\pi}\right)\) in eV with full precision. (Calculated)

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

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

Resulting in

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.)

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

Resulting in

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.)
The value is $k_{\text{SI full Gravity}}$

Resulting in

The value is $6.67430 \times 10^{-11}$ N kg$^{-2}$ m$^2$ 

$k_{\text{cgs short Gravity}}$ is Newton’s gravitational constant 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@Gravity
\makeatother
\end{verbatim}

Resulting in

The value is $6.67 \times 10^{-8}$ dyn g$^{-2}$ cm$^2$ 

$k_{\text{cgs full Gravity}}$ is Newton’s gravitational constant in cgs units with full precision.  (CODATA 2018)

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

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

Resulting in

The value is $6.67430 \times 10^{-8}$ dyn g$^{-2}$ cm$^2$ 

$k_{\text{SI short GravityNumeric}}$ 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.)

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

Resulting in

The value is $6.67430 \times 10^{-8}$ dyn g$^{-2}$ cm$^2$ 

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The value is $6.67e-11$

\texttt{\SI{67430e\textbf{11}}}

\texttt{\SI{67430e\textbf{08}}}

\texttt{\SI{6.67e-08}}

\texttt{\SI{6.67430e-08}}

\texttt{\SI{6\times10^4}}
The value is \k@SI@short@StefanBoltzmann
\makeatother

Resulting in
The value is $5 \times 10^{-8} \text{J K}^{-4} \text{m}^{-2} \text{s}^{-1}$

\k@SI@full@StefanBoltzmann \k@SI@full@StefanBoltzmann is the Stefan-Boltzmann blackbody constant
$\left(\frac{2\pi^4 k_B^2}{15\hbar^3 c^2}\right)$ in SI units with full precision. (Calculated)

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

Resulting in
The value is $5.67 \times 10^{-8} \text{J K}^{-4} \text{m}^{-2} \text{s}^{-1}$

\k@cgs@short@StefanBoltzmann \k@cgs@short@StefanBoltzmann is the Stefan-Boltzmann blackbody constant
$\left(\frac{2\pi^4 k_B}{15\hbar^3 c^2}\right)$ in cgs units with reduced precision. (Calculated)

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

Resulting in
The value is $5.67 \times 10^{-5} \text{erg K}^{-4} \text{cm}^{-2} \text{s}^{-1}$

\k@cgs@full@StefanBoltzmann \k@cgs@full@StefanBoltzmann is the Stefan-Boltzmann blackbody constant
$\left(\frac{2\pi^4 k_B}{15\hbar^3 c^2}\right)$ in cgs units with full precision. (Calculated)

The macro can be invoked by (e.g.)
\makeatletter
The value is \k@cgs@full@StefanBoltzmann
\makeatother
Resulting in

\[
\text{The value is } 5.670 \, 374 \times 10^{-5} \text{ erg K}^{-4} \text{ cm}^{-2} \text{ s}^{-1}
\]

\texttt{\k@SI@short@StefanBoltzmannNumeric} is a mathematical value of the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2k_Bh}{15c^3} \right) \) in SI units with reduced precision. (Calculated)

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

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

Resulting in

\[
\text{The value is } 5.67e - 08
\]

\texttt{\k@SI@full@StefanBoltzmannNumeric} is a mathematical value of the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2k_Bh}{15c^3} \right) \) in SI units with full precision. (Calculated)

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

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

Resulting in

\[
\text{The value is } 5.670374e - 08
\]

\texttt{\k@cgs@short@StefanBoltzmannNumeric} is a mathematical value of the Stefan-Boltzmann blackbody constant \( \left( \frac{2\pi^2k_Bh}{15c^3} \right) \) in cgs units with reduced precision. (Calculated)

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

Resulting in

The value is $7.57 \times 10^{-16} \text{J m}^{-3} \text{K}^{-4}$

\k@SI@full@Radiation \k@SI@full@Radiation is the radiation constant, $a \left(\frac{8\pi^5 k_B^4}{15h^3 c^2}\right)$ in SI units with full precision. (Calculated)

The macro can be invoked by (e.g.)
The value is $\kSIfullRadiation$
\makeatother

Resulting in

The value is $7.565\,733 \times 10^{-16} \text{ J m}^{-3} \text{ K}^{-4}$

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

\makeatletter
The value is $\kCGSshortRadiation$
\makeatother

\kCGSshortRadiation is the radiation constant, $a \left( \frac{8\pi^5 k_B^4}{15 c^3 h^3} \right)$ in cgs units with reduced precision. (Calculated)

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

\makeatletter
The value is $\kCGSfullRadiation$
\makeatother

\kCGSfullRadiation is the radiation constant, $a \left( \frac{8\pi^5 k_B^4}{15 c^3 h^3} \right)$ in cgs units with full precision. (Calculated)

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

\makeatletter
The value is $\kSIshortRadiationNumeric$
\makeatother

\kSIshortRadiationNumeric is a mathematical value of the radiation constant, $a \left( \frac{8\pi^5 k_B^4}{15 c^3 h^3} \right)$ 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 is a mathematical value of the radiation constant, \( a \left( \frac{8\pi^2k_\text{B}^4}{15c^3h^7} \right) \) 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, \( a \left( \frac{8\pi^2k_\text{B}^4}{15c^3h^7} \right) \) in cgs units with reduced precision. (Calculated)
The macro can be invoked by (e.g.)
\makeatletter
The value is \k@cgs@short@RadiationNumeric
\makeatother
Resulting in
The value is 7.57e – 15
\k@cgs@full@RadiationNumeric \k@cgs@full@RadiationNumeric is a mathematical value of the radiation constant, \( a \left( \frac{8\pi^2k_\text{B}^4}{15c^3h^7} \right) \) in cgs units with full precision. (Calculated)
The macro can be invoked by (e.g.)
\makeatletter
The value is \k@cgs@full@RadiationNumeric
\makeatother
\texttt{\textbackslash k@short@FineStructure} \texttt{\textbackslash k@short@FineStructure} is the fine structure constant with reduced precision. (Calculated)

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

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

Resulting in

\begin{verbatim}
The value is $7.565733 \times 10^{-15}$
\end{verbatim}

\texttt{\textbackslash k@full@FineStructure} \texttt{\textbackslash k@full@FineStructure} is the fine structure constant with full precision. (Calculated)

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

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

Resulting in

\begin{verbatim}
The value is $7.30 \times 10^{-3}$
\end{verbatim}

\texttt{\textbackslash k@short@FineStructureNumeric} \texttt{\textbackslash k@short@FineStructureNumeric} is a mathematical value of the fine structure constant with reduced precision. (Calculated)

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

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

Resulting in
The value is $7.30 \times 10^{-3}$

\texttt{\textbackslash k@full@FineStructureNumeric} \texttt{\textbackslash k@full@FineStructureNumeric} is a mathematical value of the fine structure constant with full precision. (Calculated)

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

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

Resulting in

The value is $7.29735257 \times 10^{-3}$

\texttt{\textbackslash k@short@FineStructureReciprocal} \texttt{\textbackslash k@short@FineStructureReciprocal} is 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 \texttt{\textbackslash k@short@FineStructureReciprocal}
\makeatother
\end{verbatim}

Resulting in

The value is $1.37 \times 10^{2}$

\texttt{\textbackslash k@full@FineStructureReciprocal} \texttt{\textbackslash k@full@FineStructureReciprocal} is 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 \texttt{\textbackslash k@full@FineStructureReciprocal}
\makeatother
\end{verbatim}

Resulting in

The value is $1.37035999 \times 10^{2}$

\texttt{\textbackslash k@short@FineStructureReciprocal} \texttt{\textbackslash k@short@FineStructureReciprocalNumeric} is a mathematical value of the reciprocal of the fine structure constant with reduced precision. (Calculated)

The macro can be invoked by (e.g.)
\texttt{\textbackslash makeatletter}
\begin{verbatim}
  The value is \texttt{\short@FineStructureReciprocalNumeric}
\end{verbatim}
\texttt{\textbackslash makeatother}

Resulting in
\begin{verbatim}
The value is 1.37e + 02
\end{verbatim}

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

Resulting in
\begin{verbatim}
The value is 1.37035999e + 02
\end{verbatim}

\texttt{\short@Avogadro}
\texttt{\short@Avogadro} is Avogadro's Number (the number of particles in a mole) with reduced precision. (CODATA 2018)

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

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

Resulting in
\begin{verbatim}
The value is 6.02 \times 10^{23}
\end{verbatim}

\texttt{\full@Avogadro}
\texttt{\full@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.)

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

Resulting in
The value is \text{6.02240760} \times 10^{23}

\textit{\textbackslash k@shortAvogadroNumeric} 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.)

\makeatletter
\text{The value is \textbackslash k@shortAvogadroNumeric}
\makeatother

Resulting in

\text{The value is 6.02e + 23}

\textit{\textbackslash k@fullAvogadroNumeric} 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.)

\makeatletter
\text{The value is \textbackslash k@fullAvogadroNumeric}
\makeatother

Resulting in

\text{The value is 6.02240760e + 23}

\textbf{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 mass of Earth 3, 19, 20  
Add mass of Jupiter .......... 3, 21  
Add radius of Earth .......... 4, 42, 43

Add radius of Jupiter ... 4, 43, 44
Correct value in eV. ............ 2, 3, 7–17, 22–25
Correct value. ............ 5, 57–59
Fix order of magnitude of constant. ............ 2, 3, 5–17, 22–25, 60–62, 71–78, 80–83
Fix prefix of units. ............ 4, 50–54
Fix units. ............ 5, 57–59
Fix value of constant. .... 5, 6, 64–66, 78–80
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